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*“Is Spinal Motion Preserved Following Vertebral Body Tethering for Adolescent Idiopathic Scoliosis? A Prospective Study”*

Adolescent Idiopathic Scoliosis (AIS) is a common condition where large curves ( $>50^\circ$ ) have potential to progress, and are associated with increased incidence of back pain and decreased quality of life. The standard treatment for surgical magnitude curves is posterior spinal instrumentation and fusion (PSF). Fusion surgery can result in junctional disease, adding-on phenomenon, and reduced spinal range of motion (ROM). Some potential downsides of PSF include increased blood loss, post-operative pain, infection, pseudarthrosis and degenerative disc disease (DDD) where revision rates for this procedure are as high as 14%.

Vertebral Body Tethering (VBT) is a newer minimally invasive approach to scoliosis correction without fusion. This thoracoscopic technique is done through percutaneous chest wall incisions where screws and a tether are inserted on the convexity of the curve to gain initial correction. Performing VBT in skeletally immature patients allows the concavity of the spine to grow, resulting in progressive curve correction, and vertebral body growth modulation, until skeletal maturity is achieved. Early results of VBT have shown the potential benefits of less pain, less blood loss, earlier mobilization and maintained ROM which could potentially lead to less long term DDD. To date, there is limited published research on the effectiveness of VBT for the treatment of AIS.

Spinal biomechanics studies have been performed following PSF have shown improved spinal-pelvic balance parameters at the cost of decreased ROM in various planes at the instrumented levels. There is no published biomechanical research that show the effects of VBT on spinal motion. We recently performed a biomechanical pilot study on 20 patients and showed that motion can be measured in control children, and children with non-operative scoliosis, as well as post-operative VBT and PSF. Although not statistically significant due to a small sample size, we found VBT had more motion than PSF, yet less motion than untreated scoliosis and controls. We propose this prospective research project to help further study the effect of VBT on spinal ROM.