

AAP National Conference & Exhibition 2022
Section on Orthopaedics-POSNA Young Investigator Awards

Major Cobb Angle Did Not Decrease in 92% of Patients After Vertebral Body Tethering Surgery Following First Erect Radiograph

Tiffany N. Phan, BA¹; Tishya A. Wren, PhD¹; Michael J. Heffernan, MD¹; Firoz Miyanji, MD²; Stefan Parent, MD^{3,4}; Michelle C. Welborn, MD⁵; David L. Skaggs, MD⁶; Kenneth David Illingworth, MD^{1,6}; Pediatric Spine Study Group; Lindsay M. Andras, MD¹

¹Jackie and Gene Autry Orthopaedic Center, Children's Hospital of Los Angeles, Los Angeles, CA; ²British Columbia Children's Hospital, Vancouver, British Columbia; ³Department of Orthopaedics, CHU Sainte-Justine, Montreal, Quebec; ⁴Department of Surgery, University of Montreal, Montreal, Quebec; ⁵Department of Orthopaedic Surgery, Shriners' Hospital for Children Portland, Portland, OR; ⁶Department of Orthopaedics, Cedars-Sinai Medical Center, Los Angeles, CA

DOI: 10.55275/JPOSNA-2023-712



Spine

Recipient: Tiffany N. Phan, BA

Abstract

Introduction: Much enthusiasm has been generated around vertebral body tethering (VBT) as an alternative to fusion treatment. However, the majority of series report little difference between Cobb angles on the first erect postoperative x-ray and final follow-up, suggesting

VBT is not consistently modulating spine growth in a way that significantly affects Cobb Angle.

Methods: All AIS patients who underwent VBT with >2 yrs follow-up between December 2013 and January 2020 in a multi-center registry were reviewed. Change in Cobb angle was calculated by subtracting the Cobb angle at final follow-up from that on first erect postoperative radiographs. A change in Cobb angle $\leq 5^\circ$ was considered within normal measurement variability.

Results: There were a total of 113 patients who met inclusion criteria with a mean age of 12.9 yrs (SD 1.3) and a mean follow-up of 3.7 yrs (range: 2.0 to 6.8). A mean of 6.6 levels were tethered. Preoperative mean major Cobb angle was 51.1° (range: 32° to 75°), which corrected to a mean major Cobb of 27.4° (range: 10° to 53°) on first erect radiographs. At final follow-up, the mean major Cobb was 31.1° (range: -50° to 69°). 50.4% (57/113) of curves were stable (Cobb angles within 5° of their first erect radiograph on final follow-up). A total of 41.6% (n=47) had $>5^\circ$

of increase in Cobb angle following the initial erect radiograph. 8% (n=9) showed more than 5° of decrease in Cobb angle during the follow-up period, and 4.4% (n=5) had greater than 10° of correction. 2 of those 5 patients that corrected more than 10° overcorrected, ending up with 30° and 50 curves in the opposite direction.

Conclusion: Although this technique holds promise and many of the curves remained stable from first erect to final follow-up (50%), only 9/113 VBT patients in this series demonstrated improvement in Cobb angle over time following first erect imaging, including 2

patients that overcorrected. Further research is needed to identify the differentiating factors between those patients that progressed, didn't progress, or overcorrected to determine which patients are more likely to benefit from VBT.

Reprinted with Permission from AAP. The Young Investigator Awards (YIA) recognize the best abstract presentations by residents, fellows, and students at the annual scientific session during the National Conference & Exhibition.