

Radiographic and Clinical Outcomes after Vertebral Body Tethering in Scoliosis Patients

Mary Francis Garcia¹, BS; Kelsey Hideshima¹, MD; Mandeep Chhokar¹, BS; Rolando Roberto¹, MD
¹Shriners Hospitals for Children Northern California, Sacramento, CA, USA
 mgarcia45@student.touro.edu

Disclosures: Mary Francis Garcia (N), Kelsey Hideshima (N), Mandeep Chhokar (N), Rolando Roberto (N)

INTRODUCTION: Since 2019, Vertebral Body Tethering (VBT) has been a FDA-approved procedure for adolescent idiopathic scoliosis (AIS). Compared to the current operative treatment of scoliosis, posterior spinal fusions (PSF), VBT allows for muscle sparing and motion preservation. Given its recency of approval, there is limited research assessing the radiographic and clinical outcomes of VBT. This study aims to establish that VBT results in satisfactory radiographic improvement in scoliosis. Secondly, we aim to evaluate patients' PROMIS scores after VBT.

METHODS: A retrospective review of 67 patients (both sexes included) who underwent VBT procedures from 2017-2024 at a single pediatric specialty center was completed. Institutional review board approval was obtained through Shriners Hospitals for Children Northern California. Inclusion criteria included: aged between 7-18 at the time of operation and PROMIS assessment, diagnosis of idiopathic, neuromuscular, or syndromic scoliosis, Sanders age 2-5, diagnostic major Cobb angle over 40°, and either failed bracing or had curvature that was outside the bracing range (>45°). Satisfactory radiographic curve improvement was defined by a final Cobb angle of less than 40 degrees for tethered curves and secondary curves. Patient clinical satisfaction was defined by their PROMIS scores. T-tests, chi-squared tests, ANOVAs and Kaplan-Meier were done using SPSS.

RESULTS SECTION: A total of 67 VBT procedures were performed from 2017-2024 with an average follow-up of 691 days. The average age was 12.8 years old. The average Sanders and Risser scores were 3.38 and 0.84 respectively. 65% of the patients were juvenile idiopathic scoliosis, 13.43% were AIS, 13.45% were neuromuscular scoliosis, and 5.97% were syndromic scoliosis patients. Most common major curve was located in the mid-thoracic region. Average preoperative major curves were 55.11° (±9.43) and average preoperative minor curves were 36.26° (±10.84). Average levels tethered was 7.31 (±1.51). At time of hospital discharge, average major curve measured 24.29° (±10.09) and average minor curve was 24.18° (±10.03). At final follow up, average major curve was 25.09° (±15.11) and average minor curve was 21.10° (±13.53) (Figure 1). 82% of patients maintained radiographic success at final follow up. There were no significant changes in patient's PROMIS scores between pre and post operative assessments (Figure 2).

DISCUSSION: Overall, Vertebral Body Tethering (VBT) demonstrates satisfactory radiographic outcomes in the treatment of scoliosis, with the majority of patients maintaining curve correction at final follow-up. While PROMIS scores did not show statistically significant changes, trends toward reduced pain interference and intensity and improved peer relationship scores suggest potential clinical benefits. These findings support VBT as a viable, motion-preserving alternative to traditional spinal fusion in appropriately selected patients.

SIGNIFICANCE/CLINICAL RELEVANCE: This study contributes to the growing body of research about VBT by providing a large sample size, a follow up period longer than 2 years, and utilizing PROMIS scores as a means of communicating clinical results. We have demonstrated that VBT continues to be a promising option for patients who seek to correct their scoliosis while preserving muscle and motion in their spine.

IMAGES AND TABLES:

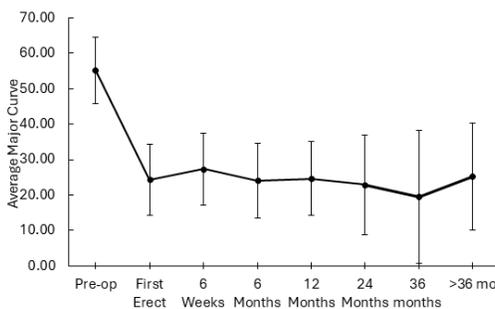


Figure 1. Radiographic outcomes of VBT on average main curve angle over 36+ months. N=68 Error bars represent standard deviation.

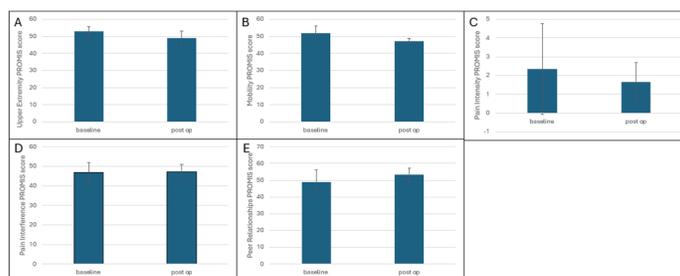


Figure 2. Preoperative and post operative PROMIS scores of patients who underwent VBT from 2019-2024. (A) Average upper extremity PROMIS scores. (B) Average mobility PROMIS scores. (C) Average pain intensity (1-10) PROMIS scores. (D) Average pain interference PROMIS scores. (E) Average peer relationships PROMIS scores.