

**E-Poster #5**

\*\*LOUIS A. GOLDSTEIN AWARD NOMINEE FOR BEST CLINICAL PRESENTATION

**Risk Factors for Critical Intraoperative Neuromonitoring Changes During AIS Surgery**

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**Introduction:** Intraoperative neuromonitoring (IONM) is an essential strategy to avoid neurologic problems during surgery for adolescent idiopathic scoliosis (AIS). To our knowledge there are no large studies which have determined factors associated with the ability to maintain good baseline IONM.

**Methods:** A multi-center prospective scoliosis database of patients who underwent surgery for AIS was reviewed to determine those patients who had a critical change in somatosensory-evoked potentials (SSEP) and/or motor-evoked potentials (MEP).

**Results:** 2189 patients undergoing AIS surgery were reviewed. SSEP was attempted in 92.5% and MEP in 77.7%. A critical change in SSEP was noted in 1.2% and was associated with larger preoperative proximal thoracic (PT) Cobb angle (32.3 vs. 23.7°), main thoracic (MT) Cobb angle (66.1 vs. 54.8°), and type of posterior surgical approach. Patients who had PSF with hybrid constructs (hooks, wires and screws) had higher incidence of critical changes compared to hooks alone, hooks with screws, and all screws (2.5% vs. 0.0 vs. 0.5 vs. 1.3%) ( $p < 0.05$ ). A critical change in MEP data occurred in 3.0% of patients and was associated with a larger proximal thoracic Cobb (29.5 vs. 24.2°), main thoracic Cobb (67.4 vs. 55.4°), male gender (5.9 vs. 2.2%), and type of posterior procedure in which hybrid construct was greater than hooks only, hooks with screws, and pedicle screws only (5.4 vs. 0.0 vs. 3.2 vs. 2.0%) ( $p < 0.05$ ). Those patients who had thoracic kyphosis  $>40^\circ$  were more likely to have MEP changes compared to  $<40^\circ$  (6.7 vs. 2.2%). Preoperative MRI findings did not correlate with critical IONM changes.

**Conclusion:** Risk factors for having critical IONM changes during AIS surgery are greater preoperative PT and MT curve magnitude,  $>40^\circ$  of thoracic kyphosis and the use of sublaminar wires. These preoperative factors should be taken into consideration when planning surgical treatment for AIS and the use of sublaminar wires should be avoided.

**Significance:** Neurologic deficit is the most feared complication following surgical treatment for adolescent idiopathic scoliosis. The results in this study provide clear preoperative risk factors for the development of critical IONM changes and strongly suggest against the use of sublaminar wires in the treatment of AIS.