



## **Pulmonary Function at Minimum 10 Years After Segmental Pedicle Screw Instrumentation for Thoracic Adolescent Idiopathic Scoliosis**

Linda Helenius,<sup>1</sup> Matti Ahonen,<sup>2</sup> Johanna Syvänen,<sup>3</sup> Tanja Perokorpi,<sup>2</sup> and Ilkka Helenius<sup>4</sup>

<sup>1</sup>Department of Anaesthesia and Intensive Care, University of Turku and Turku University Hospital, Turku, Finland

<sup>2</sup>Department of Paediatric Surgery, Orthopaedics and Traumatology, University of Helsinki and Helsinki University Hospital, Helsinki, Finland

<sup>3</sup>Department of Paediatric Orthopaedics, University of Turku and Turku University Hospital, Turku, Finland

<sup>4</sup>Department of Orthopaedics and Traumatology, University of Helsinki and Helsinki University Hospital, Helsinki, Finland.

### **Background**

Adolescent idiopathic scoliosis with thoracic curves is associated with reduced pulmonary function preoperatively. It remains unclear how much pulmonary improvement can be obtained using pedicle screw instrumentation at long-term follow-up.

### **Methods**

Out of 64 consecutively surgically treated patients with thoracic AIS (Lenke 1-4, 6) using pedicle screw instrumentation, 50 (mean age at final FU  $14.7 \pm 1.9$ , 44 females) participated in a prospective 10-year follow-up study. They were evaluated using clinical examination, spinal radiographs, and spirometry preoperatively and at 10-year follow-up. The preoperative percentage predicted values were adjusted for the height loss caused by the scoliosis according to curve size.

## **Results**

Preoperatively 49% (20/41) had forced vital capacity (FVC) or forced expiratory volume in one second ( $FEV_1$ ) below 80% of the predicted normal values representing pulmonary function impairment. Major curve correction averaged 76% (SD 9%). FVC improved from preoperative 3.29 L (SD 0.78L) to 3.87 L (0.79L) at 10-year follow-up ( $p < 0.001$ ). This improvement averaged 510 mL (SD 560 mL) in patients having both preoperative and 10-year follow-up measurements available. The percentage predicted values for FVC showed an improvement from 83% preoperatively to 86% at 10-year follow-up. At 10-year follow-up 38% (19/50) of the patients had FVC or  $FEV_1$  below 80% of the predicted values.

## **Conclusions**

Lung volumes improved by a mean of 510 mL from preoperative to 10-year follow-up in patients undergoing pedicle screw instrumentation for thoracic AIS. Despite improvement of absolute values, one-third of the patients fulfilled the criteria for pulmonary function impairment at 10-year follow-up.

## **Disclosures**

Scientific funding from Finnish Paediatric Research Foundation, Päivikki and Sakari Sohlberg Foundation, and Medtronic International (ERP-2022-13237).

