



## The Comparison of Strain Distribution on Thai Scoliosis and Thai Scoliosis Adjust by Screw Fixation System

Chompunut Somtua<sup>1</sup>, Panya Aroonjarattham<sup>1</sup>, and Kitti Aroonjarattham<sup>2,\*</sup>

<sup>1</sup>Department of Mechanical Engineering, Faculty of Engineering, Mahidol University, Nakornpathom Thailand 73170

<sup>2</sup>Department of Orthopaedics, Faculty of Medicine, Burapha University, Chonburi Thailand 20131

\* Corresponding Author: kittaroon@gmail.com

**Abstract.** The secondary curve (S-shape) is the one of the scoliosis deformity types. The scoliosis usually occurs in the thoracolumbar region of the adolescent, adulthood and the elderly. If the patient do not advised and treated by the surgeon, the patient will be more pained and the curvature of the scoliosis will be increase. The screw fixation system or pedicle screw system is popularity in the treatment of spinal deformity. Because the surgical treatment is highly chance successful, the postoperative of pedicle screw system will become virtual homogeneous vertebral and movement together; however, the studies reporting of postoperative results in Thai scoliosis surgery have been few. Therefore, this study aims to analyse the strain on Thai scoliosis (S-shape) compare with normal Thai spine and Thai scoliosis adjusted by screw fixation system under the compressive load with finite element analysis. The results were shown the maximum strain occurred on Thai scoliosis, normal Thai spine and Thai scoliosis adjusted by screw fixation system respectively. It appeared that the strain occurred on the model of scoliosis adjusted by screw fixation system were more decrease than the scoliosis model and reasonable if compared with the normal model, due to the pedicle screw system could be absorbed the strain occurred on the spinal very well. The center of scoliosis preoperative was T7 and L1 levels had the maximum displacement before adjusted by screw fixation system. It affect the strain occurred on the models by the reaction force. As mentioned above, the patient should be advised and treated by the surgeon as fast as possible in order to return to daily activities better than before the surgery.

**Keywords:** Strain, Scoliosis, Thoracic to Thoracolumbar, Screw fixation system and Finite element analysis.