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Device to Measure Load on Spine Segments in the Lumbar Region

Adolescent Idiopathic Scoliosis (AIS), a condition which causes the spine to curve sideways, affects as many as 4 in 100 adolescents, according to the Scoliosis Research Society. The most common treatment of this condition is surgery, with positive outcomes correlating with greater technique and experience of the surgeon. There are about 29,000 AIS surgeries performed per year, each costing around \$92,000. Because there are no means for providing accurate measurements of spine parameters, AIS surgery relies on visual inspection and surgeon intuition, which can result in errors and follow-up procedures. Additional surgical procedures come with increased risks and associated costs.

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Researchers at Arizona State University have developed a device to assist surgeons in AIS procedures, which could lower the associated costs and risks of follow-up procedures. The device includes an intraoperative sensor that can measure the load distribution in the thoracolumbar region and provide surgeons and researchers with quantitative load measurements. This device can translate contact forces into a load display and provides an alternative measurement tool instead of solely relying on a surgeon's visual inspection and intuition. With an error rate of just 5%, the number of follow-up surgical procedures could be greatly reduced.

This device has the potential to help a lot of scoliosis patients and eliminate the need for iterative surgeries and postoperative complications.

Potential Applications

- Scoliosis surgeries
- Other surgical spinal procedures that could use load tests

Benefits and Advantages

- Accurate – numerically measures load in the thoracolumbar region with 5% error
- Cost Effective

- Small form factor – could be reduced to microns in size
- Enhanced surgical outcomes
 - o Could decrease postoperative complications
 - o Could reduce the need for follow-up surgeries
 - o Ease pain post-surgery
- Long lasting battery life for consistent performance during surgical procedures lasting 6-8 hours

For more information about the inventor(s) and their research, please see [Dr. La Belle's laboratory webpage](#)