



TECHNOLOGY

Ultrasonic Guided Wave-based Structural Health Monitoring Method and Apparatus for Spinal Growing Rods

OVERVIEW

Background:

Scoliosis is the deformation or abnormal curvature of the spine and affect 2-3% of the population worldwide. In the severe cases of scoliosis, the standard of practice is to implant growing rod construct devices that straighten the patient's spine to improve correct spinal alignment and prevent further deformation. These rods currently experience a 15-69% failure rate (they can break at any time) leading to emergency surgery. There is no technology that currently exists to determine the current structural damage of the rod and thus, there is a high interest in creating such a device that can accomplish this in order to reduce unexpected surgeries.

Innovation:

Researchers at the University of Maryland have built a novel structural health monitoring (SHM) system for spinal growing rod constructs. The system utilizes ultrasonic guided waves, enabled by piezoelectric [material] (PZT) transducers and receivers, that are able to detect fatigue and notch cracks along the rods, which enable the surgeon to detect structural damage and replace rods prior to fracture during or after rod lengthening procedures. Guided wave-based SHM technique allows for increased sensitivity to smaller defects, complete coverage of the waveguide cross-section and provides the ability to choose monitoring ranges easily.

APPLICATIONS

- Scoliosis rod fracture prevention
- Medical Devices
- Ultrasound, fluid level, or heat monitoring
- Could be adapted for small rods/parts for: Rotorcraft, Bridges, Buildings, etc.

ADVANTAGES

- Earlier detection of growing rod failure
- Potentially decreased amount of patient surgeries
- Larger monitoring ranges
- Complete coverage of the waveguide cross-section
- Higher sensitivity

CONTACT INFO

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Additional Information

INSTITUTION

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PATENT STATUS

Pending

LICENSE STATUS

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CATEGORIES

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- Devices
- Engineering

EXTERNAL RESOURCES

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