UNIVERSITY OF MINNESOTA
Driven to Discover℠

3D Spine Registration Software for Computational Thoracic Volume Modeling (20160071)

Technology ID
20160071

Category
Life Sciences/Diagnostics & Imaging
Life Sciences/Health IT
Software & IT/Health IT

Learn more

Standardized iterative method for thoracic volume calculation

A novel software system creates patient-specific 3D representations of spine shape and thoracic cavity volume using biplanar radiographs and open-sourced graphics software. 3D visualization of spine and chest wall deformity using biplanar radiographs instead of CT scans reduces radiation exposure, which is especially important for pediatric patients. The technology can assess thoracic volume calculation for spinal deformities, diagnose a wide range of spinal and thoracic issues, and perform as a planning tool for surgical simulation in spine deformity procedures.

Novel thoracic volume calculation

No technology currently exists for thoracic volume calculation and alternative biplanar to 3D reconstruction software does not exist in the open-source community. This new technology uses open-sourced graphics software to convert biplanar radiographs to 3D images, bypassing the need for high dose radiation CT scans to assess thoracic volume.

BENEFITS AND FEATURES:

- Biplanar radiology converted to personalized 3D representations of spine
- Thoracic volume calculation
- Diagnosis of chest wall deformity, spinal conditions and other conditions
- Open-sourced graphics software
- Algorithm offers simplified and accurate automated method for determining thoracic volume
- Reduced radiation exposure, less invasive
- Broad implementation at relatively low cost

APPLICATIONS:

- Assessment of thoracic volume calculation for spinal deformities
- 3D visualization of spine and chest wall deformity using only biplanar radiographs
- Could replace CT scans for spine and chest wall imaging
- Planning tool for surgical simulation in spine deformity procedures

Phase of Development

Prototype dev.

Researchers

David Polly, MD, Professor, Orthopaedic Surgery

Arthur G. Erdman, PhD, Professor, Mechanical Engineering

Evan Bollig, PhD, Researcher, Minnesota Supercomputing Institute

Nancy Rowe, Scientific Visualization Consultant, Minnesota Supercomputing Institute

Charles Ledonio, MD, Investigator, Orthopaedic Surgery