3D Patient-Specific Modeling: Innovative Approach for Scoliosis Diagnosis

Researchers at the University of Kragujevac have proposed a new, non-invasive 3D methodology to assess scoliosis

It's a bright new day in Serbia. Researchers at the University of Kragujevac have proposed a new, non-invasive 3D methodology to assess scoliosis, in which spine measurements can be performed by limiting radiation exposure and human intervention.

Scoliosis in young patients

6-8% of the world's population is affected by scoliosis. It is a very complex spinal disorder and children and adolescents make up the most vulnerable group. Reducing radiation exposure, or eliminating it altogether as an assessment method, is imperative.

There's a need for new diagnostic techniques

In scoliosis, side-to-side curvature of the spine is common, typically involving rotation of the vertebrae. Usually the disorder is examined and diagnosed with some form of radiation such as CT or X-ray. This can result in harmful side effects for the patients.

Current scoliosis diagnostic methods have other drawbacks. The 2D nature of a planar X-ray, and the fact that these CT-based methods do not offer a standing position of the patient's spine, can limit the accuracy and detailing of the assessment.

Mimics Innovation Suite for 3D spinal reconstruction

The University of Kragujevac's published paper has based its research on a target group of 372 patients with various types of spinal deformity. In their research, the university used the Materialise Mimics Innovation Suite's segmentation algorithms for the 3D spinal reconstruction of CT images, and combined it with dorsal optical scans to generate a model of the spinal deformity. This offers a better analysis of the disorder.

It's been proven that the system used by the university demonstrates a reduction of exposure to radiation by replacing X-ray-based scans with optical scans, while still allowing for 3D measurements. As the 3D nature of the deformity is not paid enough attention in daily clinical practice, researchers expect that this new protocol will show its high value when these 3D measurements are performed on scoliosis patients.

3D reconstruction of the 4th lumbar vertebra from segmentation masks (point clouds)

Working towards eliminating radiation

Non-invasive, accurate and faster scoliosis diagnosis methods may be making their way into the medical world faster than we think. Their advantages show obvious promise, and give us a positive indication that 3D patient-specific modeling could be a step closer to eliminating x-ray

radiation, and improving patient diagnoses.

Source & Image Credit: [Materialise Medical](#)

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