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Dynamic monitoring of the curvature of the spine: case of scoliosis detection

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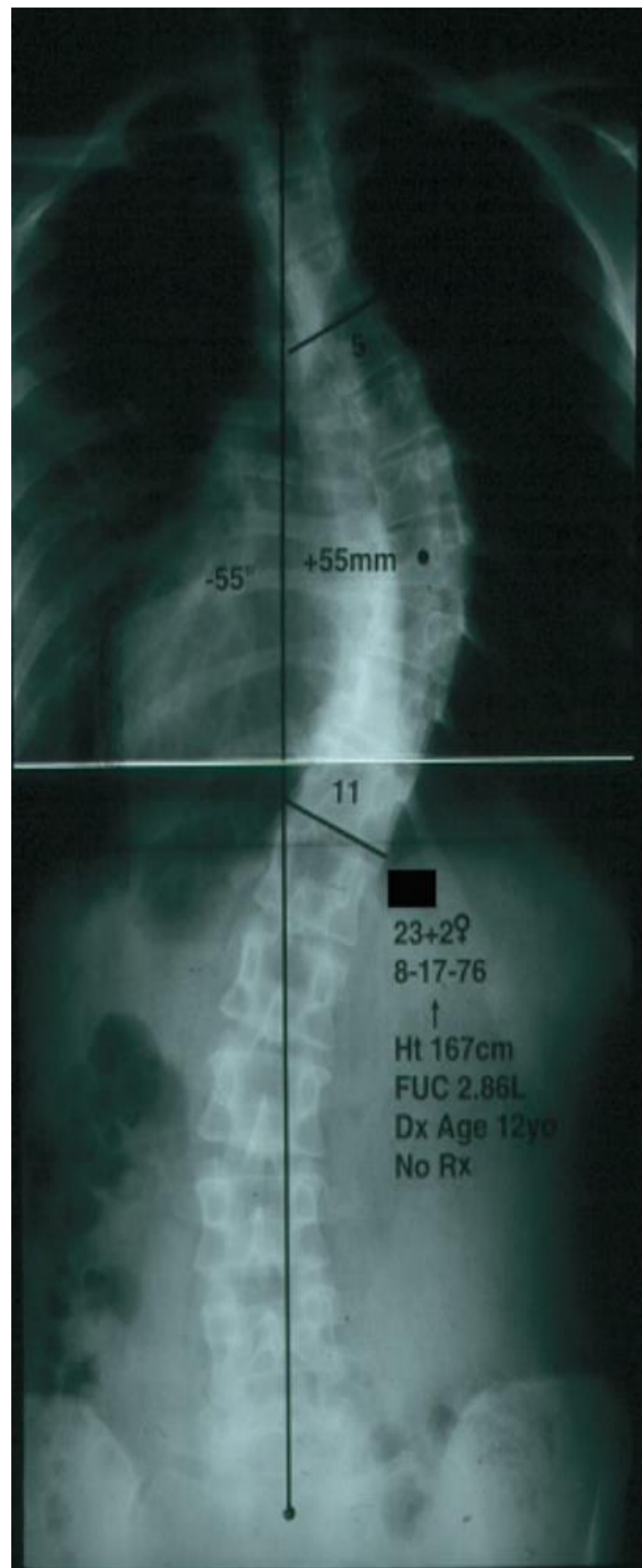


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Dynamic monitoring of the curvature of the spine: case of scoliosis detection

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www.g-scop.grenoble-inp.fr



Context

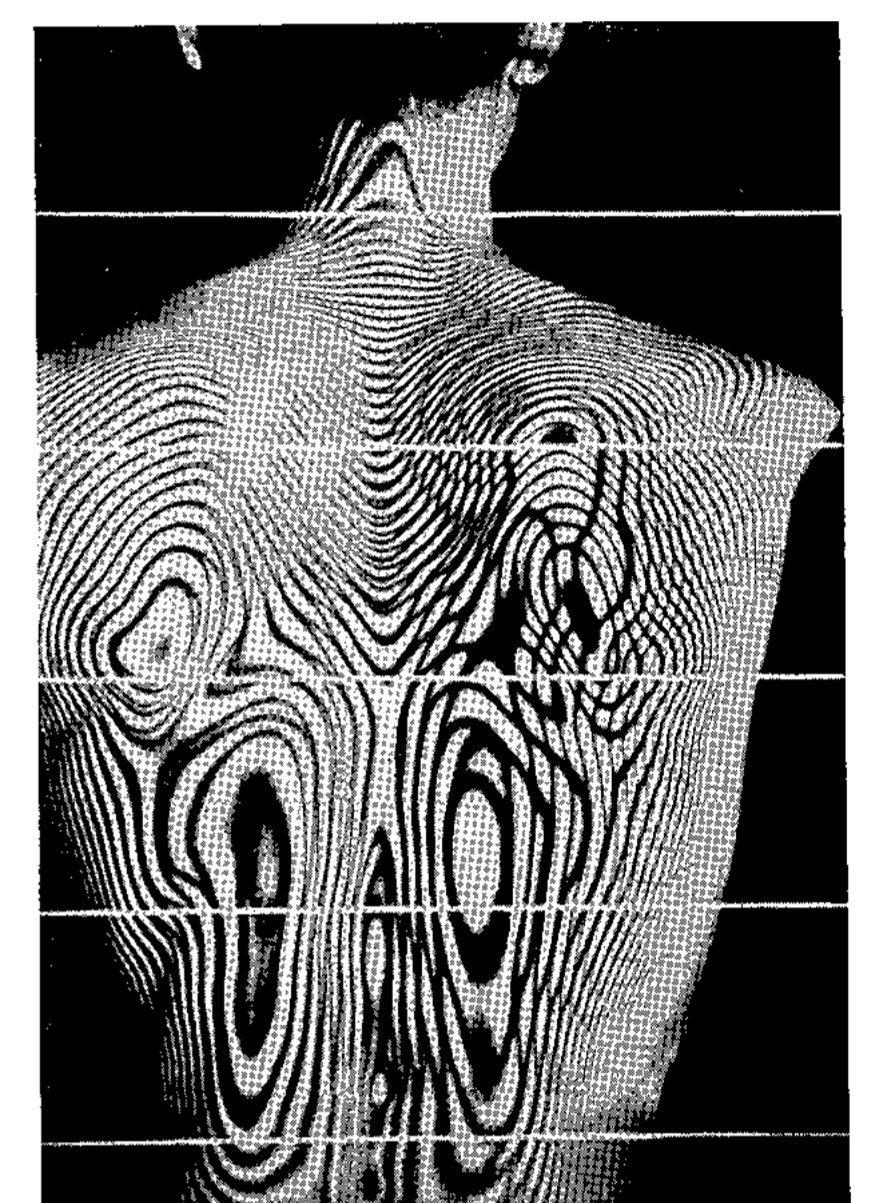
- Scoliosis is a widespread spinal pathology that deforms the spine in all three dimensions and can lead to health complications.
- Early detection can reduce the impact of scoliosis at skeletal maturity. Methods exist for this purpose, but require special knowledge and/or equipment, and have poor repeatability..
- The aim is to offer a simple and effective tool for detecting spinal pathologies, by capturing the movement of the spine and back.



A scoliometer, used to quantify thoracic cage deviation

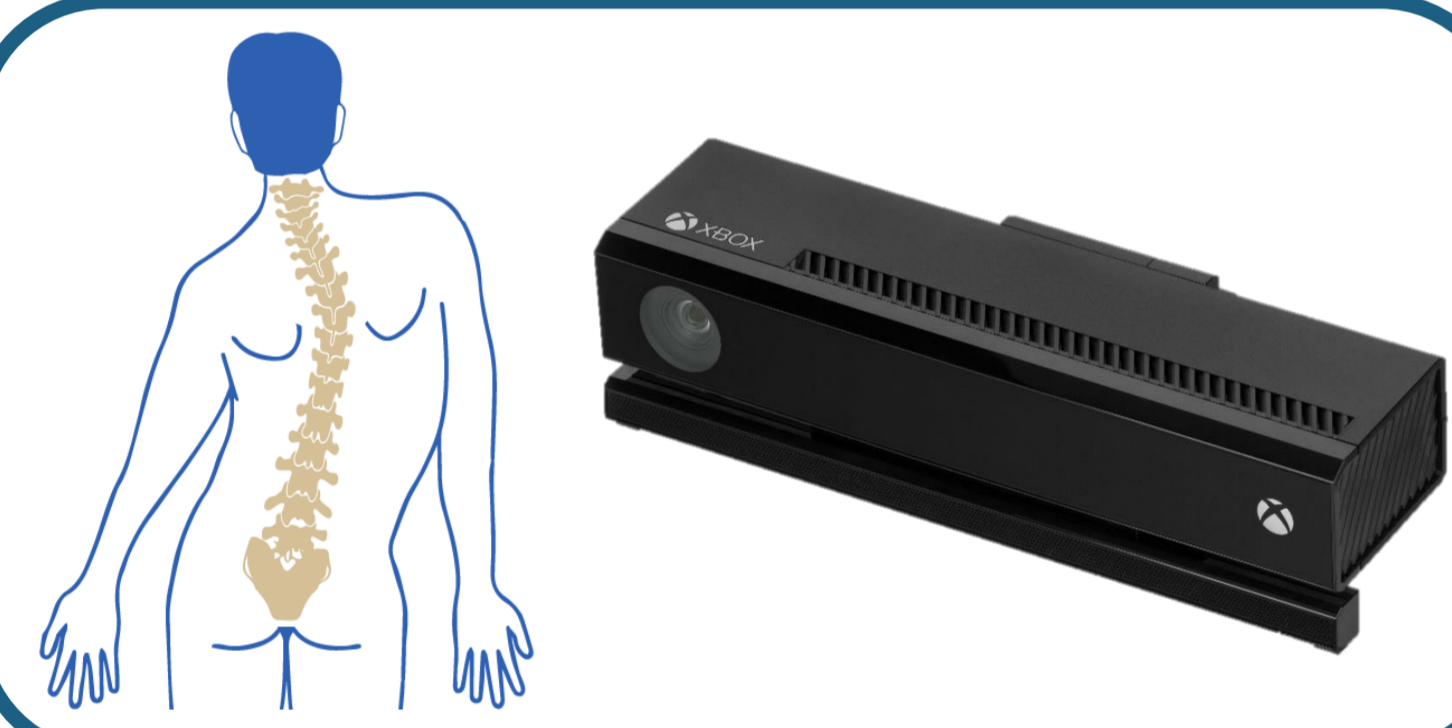


Illustration of an Adam's test, highlighting the gibbosity generated by vertebral rotation.

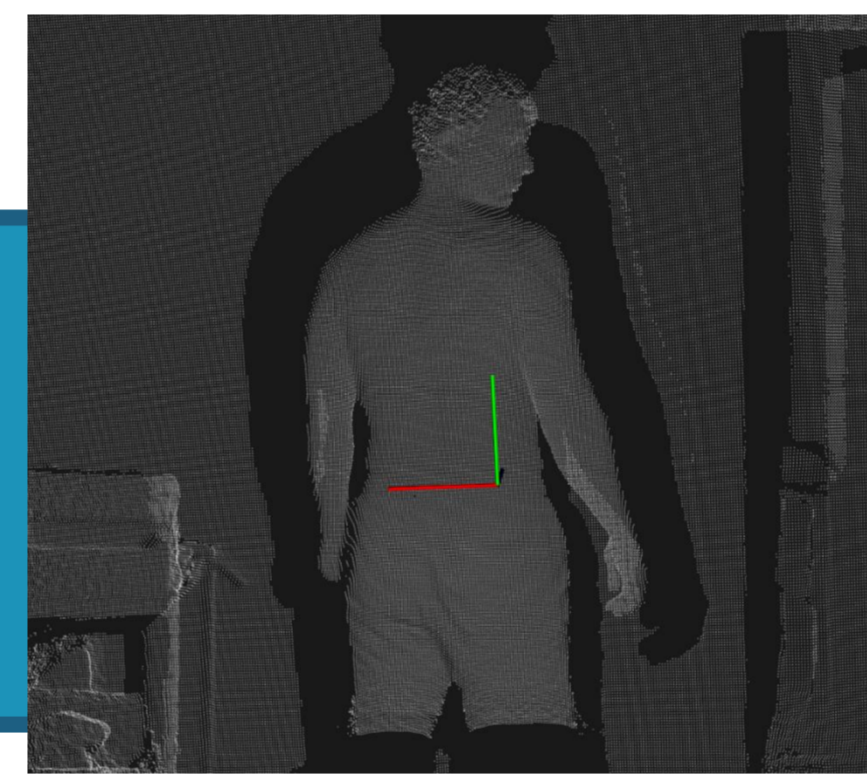


A topography of Moiré, used to highlight potential asymmetries

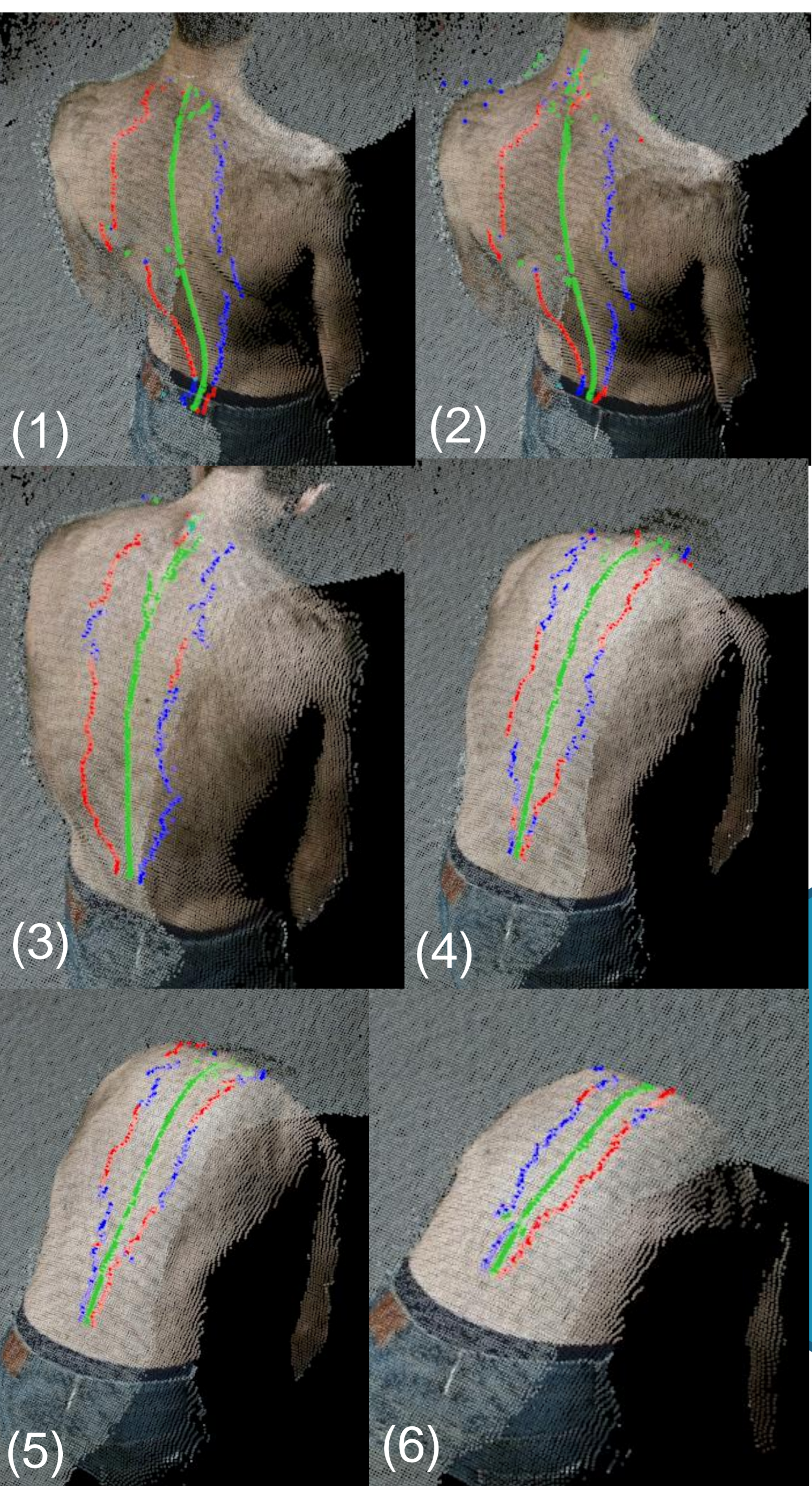
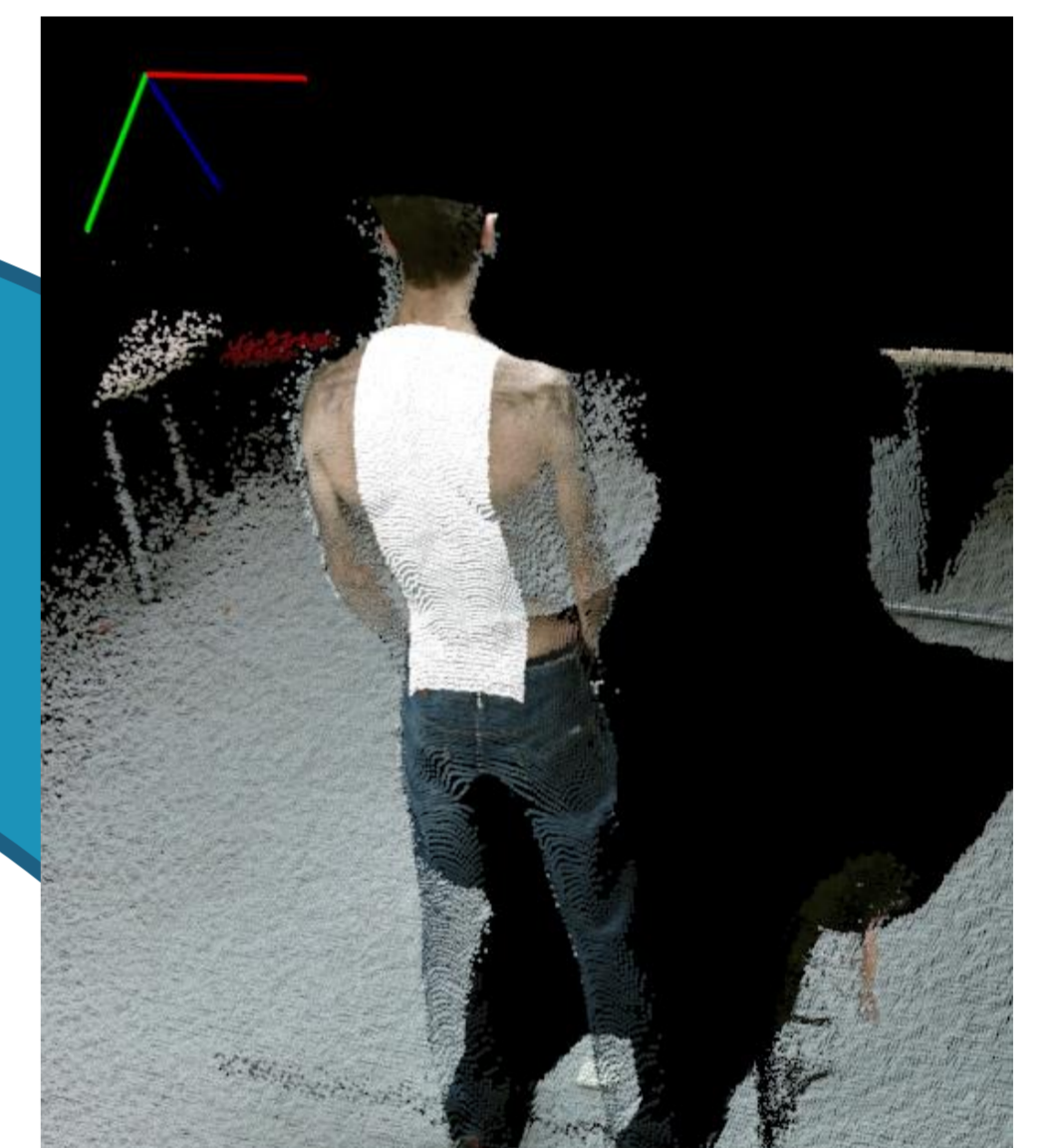
Results and perspectives



- Kinect captures the surface of the back as a point cloud



- The scene is filtered to keep only the area of interest



- The technical solution tracks the spinal column and quantifies its movement, making it possible to follow the evolution of spinal curvatures.
- The technology have been evaluated on 16 healthy patients and on a few scoliotic patients with good results.
- Ideally, this solution should be able to target specific areas of the spine to pinpoint an area of interest more precisely, enabling the evolution of a pathology or therapy to be monitored.

- The spine line is extracted by analyzing cross-sections of the patient's back.

- The analysis is repeated for all images in the capture, tracking the spine during the whole forward bending test

