



Light-optical 3D/4D spinal analysis technology

Initial diagnoses of spinal anomalies are usually made based on the external appearance and shape of the back. To support the suspected diagnosis, it is necessary to take regular X-rays of the spine. This exposes the patient to high levels of radiation and is thus not optimal, especially for younger people. Medical technology is therefore interested in new technologies that offer a radiation-free alternative to measurement.

A technology that has been gaining ground in recent years is a non-contact and yet high-resolution measurement technology. With this technology it is also possible to measure the spine and the entire human back. Objective analyses of posture and statics as well as all types of spinal deformities can be visually displayed. The examination is quick and radiation-free.

DIERS formetric 4D works on the basis of video raster stereography and physical triangulation. In this process, a grid of lines is cast onto the back of the person to be examined with the help of a light projector and captured and recorded by a camera unit. With the help of computer software, line curvatures can be examined and a virtual three-dimensional plaster cast can be created by photogrammetry.

The three-dimensional surface and spinal reconstruction does not require manual reflective markings as known from other measurement systems. The technology independently and automatically detects relevant anatomical fixed points such as the spinal midline, sacral point or VP. Supported by a correlation model, it is possible to design an exact reconstruction of the pelvic position as well as the spinal curve. The correlation model analyses the relationships between the vertebral bodies and the surface curvature.

The DIERS 4D-Average technology not only designs a 3D model of the spine, but also includes the temporal component. This allows posture analyses and functional studies to be carried out. When performed, 10 images of the back are taken per second, and the total length of the measurement can vary depending on the intention of the treatment.

INNOVATIVE TECHNOLOGICAL APPROACHES

- ◆ **Company:**
DIERS International GmbH
- ◆ **Technological basis:**
Video raster stereography
- ◆ **Areas of application:**
Scoliosis, arthrosis, pelvic obliquity, osteoporosis, posture tests, neurological examinations
- ◆ **Advantages:**
radiation-free, holistic view of the musculo-skeletal system, early & individual therapies, combines many individual systems in one, understandable & clear results, contactless
- ◆ **Website:**
<https://diers.eu/de/produkte/>

What is video raster stereography?

This is a measurement of the human back with the help of light and without the use of X-rays. It uses a multi-light-section method in which the back is completely covered by a grid of parallel strips. All light sections are captured by a video camera in a single exposure. Due to the short exposure time of 1/25 second, a whole series of shots can be taken and thus motion sequences can be captured. Visually, the image is represented by thicker and thinner lines that are used for accurate photogrammetric reconstruction and, together with the calibration data, contains all the necessary three-dimensional information.

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