

Rasterstereography in Scoliosis Detection and Management

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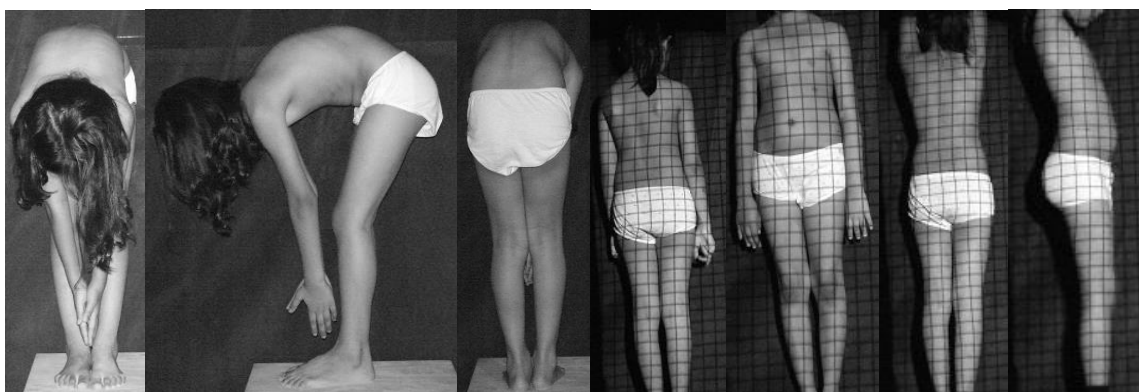
Scoliosis, lateral curvatures and rotations of the spinal column, effects children in their growth period. If recognized at an earlier stage, the deformity may be treated by a combination of exercises and braces. However, if it deteriorates and curve is increased, it may disfigure the body, cosmetically, and may affect vital organs, like heart and lungs. At this stage, the only recourse is major spinal surgery. There are so many risks involved in this type of intervention. Besides the routine risks of infection and associated problems with any surgical procedure, once may realize that spinal column is the site of many nerves, which control our motor system. Any damage to these may cripple the patient. A two-minute-orthopedic examination, with the child barefoot and completely stripped except short underpants may uncover early curves. However, visual and forward-bending tests may generate a number of large positives. This may expose screened children to un-necessary X rays. Since the bone marrow of a child is very delicate, the initial screening needs to be supplemented by imaging techniques not involving ionizing radiation. Out of the different stereophotogrammetric techniques available to the researcher of today, rasterstereography is distinctive in being non-disruptive, non-contact, non-invasive, non-ionizing, non-destructive, having simple set-up and cheap technique, which provides maps of gaussian curvatures of a subject or an object under investigation, by providing information of distortions produced in the projected raster grid, which is, essentially, a graph screen consisting of identical squares. This set-up makes it easier to measure surfaces otherwise inaccessible or difficult to map. Further, this technique avoids the risk of hurting, infecting or distorting what is being studied. Rasterstereography is capable of obtaining desired accuracy by changing raster-grid pitch and providing information in coordinate form. Rasterstereography of back has been, regularly, conducted for a number of years by selected groups. Our group is looking into the possibility of processing curvature information of the back of a child during forward-bending position, child facing the examiner (lumbar-region asymmetry is accentuated in this position), child asked touch toes after taking a right turn (missing processes of spinal column are visible in this position) and child's back towards the examiner (thoracic-region asymmetry is accentuated in this position).

Keywords: Scoliosis, rasterstereography, forward-bending test, school-age child

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From left to right, forward bending (front, side, back) and raster patterns projected on a child's body

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