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ASSESSMENT OF COBB ANGLE IN IDIOPATHIC SCOLIOSIS ON AXIAL LOADED MRI; Preliminary Results.

E MacSweeney¹, A Saifuddin¹, S Blease¹, MH Noordeen², BA Taylor².

Open MRI of Harley Street¹, 64 Harley Street, London and Department of Spinal Deformity², Royal National Orthopaedic Hospital NHS Trust, Stanmore, HA7 4LP, UK.

Objective: Axially loaded MRI simulates imaging of the lumbar spine in the standing position and is useful in the assessment of spinal stenosis¹. This study determines the ability of axially loaded spinal MRI to assess Cobb angle in patients with idiopathic scoliosis.

Design: Prospective study. Newly diagnosed patients with idiopathic scoliosis were referred for MRI of the whole spine. Cobb angle measurements were made from erect AP spinal radiographs prior to MRI. Coronal MR images of the thoracic and/or lumbar spine were obtained prior to and following loading of the spine in an MR compatible compression device (DynaWell). Cobb angle measurements were made on unloaded and loaded MRI studies using the same reference points as on radiographs. Radiographic and MRI Cobb angle measurements were compared. Informed consent was obtained from all patients and the study was approved by the local Ethics Committee.

Subjects: Five patients, all females with mean age 14 years (range 12-16 years) were included in the study.

Outcome Measures: Six curves were compared on pre-referral erect radiographs, unloaded and loaded MRI studies, 2 in the thoracic region and 4 in the thoracolumbar region.

Results: Curve characteristics and Cobb angle measurement on radiographs vs. axial unloaded and loaded MRI were as follows: Curve 1; T4-T12, 45⁰, 36⁰ and 41⁰. Curve 2; T10-L4, 52⁰, 22⁰ and 30⁰. Curve 3; T10-L4, 45⁰, 36⁰ and 38⁰. Curve 4; T6-T10, 42⁰, 22⁰ and 22⁰. Curve 5; T11-L3, 43⁰, 32⁰ and 43⁰. Curve 6; T11-L3, 34⁰, 11⁰ and 31⁰.

Conclusions: Axial loading increases MRI Cobb angle measurements compared to unloaded studies. Initial results suggest that axial loaded MRI using the DynaWell Compression device may allow comparative measurement of Cobb angle to erect radiographs in the thoracolumbar region, but not in the thoracic region. This is likely related to the loading characteristics of the compression device, which is designed to concentrate loading in the lumbar region. Modification to include loading of the thoracic spine may improve results. The technique has the potential to replace radiography and thus reduce radiation burden to young adolescents with some types of idiopathic scoliosis.

Reference: Danielson B, Willen J. Axially loaded magnetic resonance image of the lumbar spine in asymptomatic individuals. Spine 2001; 26: 2601-2606.