

LY042 2009-02-26 9:52

**Topic** Evaluation (Scoliosis & Kyphosis)

**Title** Validity of distances from the plumbline in sagittal plane deformities: repeatability, correlation with kyphosis angles and normative values.

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**Abstract**

**Objectives:** Assessing the repeatability of different methods to collect in everyday clinics the sagittal profile of patients with spinal deformities to identify the best one to be used

**Background:** The sagittal plane measures have a relevant role both in Idiopathic Scoliosis and in Hyperkyphosis management. Nevertheless, clinical tools for everyday use are scarce and not adequately studied. In a previous study we evaluated the intra and inter-rater repeatability and the measure error of the plumbline distance in AIS.

**Methods:** We performed 4 different studies in 4 different populations of adolescent idiopathic scoliotic and Hyperkyphotic patients. In the first study we report the normative data of the plumbline measures in a general population of 180 adolescents. In the second one we compared the sagittal distances from the plumbline of C7, T12 and L3 with the measures of the Video Rasterstereography at the same levels and the angles of Kyphosis and Lordosis in 100 AIS patients. In the third one we evaluated the intra and inter-rater repeatability and the measure error of kyphosis and lordosis angles measured with the Inclimed in 100 AIS patients. These data have been compared with the plumbline measures. In the last study we evaluated the repeatability of the sagittal distances from the plumbline by using a 1 mm change instead of 5 mm in a population of 40 patients. Statistical analysis: Repeatability has been evaluated according to Bland and Altman, so to identify the limits of variation clinically significant.

**Results:** Study 1: the normative data were  $34 \pm 11$ mm for C7 and  $34 \pm 15$ mm for L3 for females and  $34 \pm 10$ mm for C7 and  $48 \pm 10$ mm for males. Study 2: a coefficient of correlation was calculated, in order to compare measures. Study 3: the k value for Inclimed varied from fair to good. Study 4: the repeatability was fair for this measure.

**Conclusion:** Some clinical instruments are now available for sagittal plane assessment in AIS and Hyperkyphosis. The results of the present study give the limits during measurements in a clinical setting of parameter that are routinely collected by some clinicians.

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