

Lightline distances: a new method for the assessment of the sagittal profile compared with the gold standard. Inter-rater reliability

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Introduction Considering the three-dimensional feature of the scoliosis pathology, the correct assessment of the patient needs the radiographic and clinical measurement of all the deviation plans. The evaluation of the sagittal plane is one of the most difficult. Radiographic evaluation can be distorted by the position of the patient's head and arms and the clinical evaluation can be distorted by the contact of the tools on the skin. The plumbline distances represent one of the gold standard tests for the clinical assessment of the patient's sagittal position.

Objective The aim of this study is the evaluation of the intra and inter-rater reliability of an optical tool to be used for measuring the distances of a series of landmarks (Head, cervical lordosis, C7, thoracic kyphosis, L3, lumbar lordosis, S1) with respect to the fixed and vertical light reference generated by the device. The simple tool is a laser able to project a perfectly vertical light line. The distance between this line and the landmarks of the spine are taken using a simple ruler on which the light beam is projected. These measurements were compared with the same measurements performed with the plumbline.

Method Design: inter-rater reliability The study was performed in two steps. The first step was carried out by comparing the measurements taken by an expert PT and the measurements taken by 5 inexperienced therapists, during an educational course. 10 patients were involved. The second part of the study was carried out by comparing the measurements taken by two expert therapists in a specialized clinic. 25 patients were involved. Measurements were performed on all patients with lightline and plumbline. The measures were taken blindly by the different physiotherapists and were collected and evaluated by a therapist not involved in the assessment. The data analysis was performed with the Pearson correlation index considering the correlation measurements of the individual specific landmarks.

Results and Discussions: The data analysis shows a strong difference between the inter-rater agreement about the assessment performed with the plumbline and the lightline. A very strong positive relationship was obtained using only the lightline for all the landmarks comparison. This result was similar for both experts and inexperienced assessor. A moderate positive correlation was obtained considering the comparison of the plumbline and lightline measurements. SEE THE EXCEL FILE ATTACHMENT

Conclusion and Significance The very important difference between the agreement obtained using the lightline with respect to the plumbline, suggests to change the measurement method for the assessment of the sagittal posture.