



014.102 Correlation between the hump measured in forward bending of the trunk, in standing position and the real rotation of the apical vertebra

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Introduction: The ATR measure is one of the most important clinical measurement of scoliosis patients. It is the most Important Information for screening and fundamental also for therapy management The ATR is a clinical sign considered closely related to rotation of the vertebrae interested by the scoliotic curves. The ATR assessment is performed with the patient in forward bending of the trunk, to make appear the hump.

Objectives: The purpose of the study is to understand better the real value of the hump assessed In the classical position (forward bending of the trunk), compared with the measurement performed with the patient in standing position.

Another aim is to assess the real association of the vertebral rotation measured on the X-ray and its hypothetical clinical correspondent represented by the hump.

Methods: 40 female adolescents at their first evaluation before any treatment were recruited for the study.

A series of measures has been carried out:

- ATR with patient in forward bending of the trunk.
- ATR with patient in standing position, using a Formetric Diers (standing ATR).
- Measurement of the real height difference of the two side portions of the trunk, similar to the measure of the classical

hump. The humps were assessed in the same area of the hump measured in forward bending.

- Measurements of the vertebral rotation using the Raimondi method.

This group of humps was divided into two subgroups: thoracic hump (25 patients) and lumbar hump (18) to understand if there are significant differences between the correlation analysis of the two subgroups.

The statistical analysis was performed using the Pearson index and the T-test

Results: The average results were: ATR $9.80^{\circ} \pm 3.5^{\circ}$; ATR in standing $7.75^{\circ} \pm 3.1^{\circ}$; vertebral rotation $14.68^{\circ} \pm 7.6^{\circ}$

The correlation between the ATR and the standing ATR is weak 0:24 ($p = 0.0002$). While the measure of the hump assessed in standing position and the corresponding vertebral rotation, measured on the X-ray, shows a moderate correlation: 0:47 ($p = 8.38849E-08$)

Subgroup analysis:

The 25 thoracic ATR ($9.92^{\circ} \pm 3.5^{\circ}$) and standing ATR ($7.28^{\circ} \pm 3.06^{\circ}$) doesn't shows any correlation: -0.03 (p -value = 0.01) while the standing ATR and the corresponding vertebral rotation shows a moderate correlation: 0:56 ($p = 7.69$)

The 18 lumbar ATR (average $9.62^{\circ} \pm 3.4^{\circ}$) and standing ATR (average $8.2^{\circ} \pm 3.2^{\circ}$) show a strong correlation: 0.72 (p value = 0.09) while the standing ATR and the corresponding vertebral rotation show a weak correlation: 0:31 (p value = 0.0002).

Conclusions and Significance

There is not a corresponding link between the real rotation of the apical vertebra of a scoliosis curve and the relative hump. The stronger correlation between the hump measured in forward bending and standing position of the trunk is only related to the lumbar spine. The hump classically measured for scoliosis assessment does not correspond to the real rotation of the apical vertebra, so, this data need a reasoning about the real significance.