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Monitoring of changes in trunk rotation during scoliosis physiotherapy

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Objective

The aim of the study was to assess angle of trunk rotation (ATR) in primary scoliosis and in secondary curvatures in a cohort of adolescent girls during Functional Individual Therapy for Scoliosis (FITS) physiotherapy.

Materials and methods

Sixty-four girls with scoliosis (age 13.9 ± 1.9 years, mean Cobb angle 30.6 ± 14.7 degrees, Risser sign median 2.0), underwent a 14-day intensive in-patient physiotherapy program according to FITS. The monitoring of curve behavior was clinical, using the Bunnell scoliometer [1] to measure ATR. Measurements were performed in a relaxed and in actively corrected posture. Sum of rotation (SR) was calculated as equal to primary curve rotation (PCR) plus upper compensatory curve rotation (UCR) plus lower compensatory curve rotation (LCR). Fourteen girls were followed for one year, while undergoing outpatient FITS therapy and part-time (12 hours per day) brace treatment.

Results

Intensive in-patient FITS physiotherapy reduced primary curve rotation measured in a relaxed posture from 9.5 ± 4.7 to 8.5 ± 4.5 degrees ($p = 0.0004$, paired t test) as well as the sum of rotation from 13.1 ± 6.7 to 11.6 ± 6.4 degrees ($p = 0.0002$, paired t test). Trunk rotation in the upper compensatory curve was not affected ($p = 0.11$, Wilcoxon matched-pairs test). Trunk rotation in the lower compensatory curve slightly increased from 0.9 to 1.7

degrees ($p = 0.0065$, Wilcoxon matched-pairs test). In actively corrected posture, PCR angle decreased from 8.2 ± 4.3 to 7.2 ± 4.6 ($p = 0.0063$, paired t test), while SR angle decreased from 12.4 ± 6.1 to 11.4 ± 6.0 ($p = 0.0054$, paired t test). In fourteen girls examined one year later in a relaxed posture there was no deterioration of the PCR angle (9.1 degrees versus 10.1 initially, $p = 0.16$, NS) nor the SR angle (12.2 degrees versus 13.1 initially, $p = 0.18$, NS), while in the corrected posture the PCR angle decreased from 7.7 ± 4.7 to 5.6 ± 3.4 ($p = 0.04$, paired t test) and the SR angle decreased from 11.4 ± 5.4 to 8.7 ± 5.5 degrees ($p = 0.04$, paired t test).

Conclusion

(1) We recommend to monitor ATR both in primary and in compensatory curves during scoliosis therapy. (2) Fourteen days' in-patient FITS therapy reduced trunk rotation in the primary curve and reduced the sum of rotations measured at three levels of the back, as well as increased the patient's capacity for active posture correction. (3) For patients who received out-patient exercises combined with half-time bracing, the result was stable after one year.

References

1. Bunnell WVP: **An objective criterion for scoliosis screening.** *J Bone Joint Surg* 1984, **66A**:1381-1387.