

Oral presentation

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## Adolescent soccer is correlated with an increase of kyphosis but a reduction of low back pain: a controlled cross-sectional survey

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### Objectives

To verify the relationship between LBP and posture in adolescent soccer players.

### Background

In both adults and children a correlation has been shown between sports participation and low back pain (LBP). A long debate exists regarding the possible influence of sports participation on spinal growth in children. Soccer is a very popular sport played by many children worldwide.

### Methods

We performed a clinical evaluation on 102 males age 11-16 who played competitive soccer two to three times per week. We compared them to a normal sample of 180 boys of the same age range who did not play soccer. In addition, we proposed a validated questionnaire on LBP prevalence and clinical characteristics that were compared to a normal sample of 668 schoolboys. The validated measurements we collected were plumbline distances from kyphosis apex (C7, T12 and L3) and ATR according to the Bunnell method. We calculated the Sagittal Index (SI: sum of the distances of C7 and L3), and the Sagittal Ratio (SR: C7/L3 - relationship between kyphosis and lordosis). According to previous studies, we considered the following to be normal references: ATR of less than 5°, Sagittal Index of 1.5-5.5 cm (C7), 2.8-7.0 cm (L3) 5.5-11.0 cm, and Sagittal Ratio of 0.37-1.31. Our analysis used normal-

ity tests, ANOVA and chi-square; the Kruskal Wallis test for non parametric data was also applied.

### Results

We found statistically significant increases of the plumbline distances from kyphosis apex in C7 ( $36.6 \pm 1.0$  vs  $33.6 \pm 0.7$ ) and T12 ( $23.0 \pm 0.6$  vs  $21.3 \pm 0.8$ ) as well as an increase of SR ( $0.80 \pm 0.03$  vs  $0.73 \pm 0.02$ ). We did not find more pathological cases in soccer players than in normals for any of the parameters we evaluated. When compared to normals, soccer players had a statistically significant reduction in most of the LBP parameters. Among LBP sufferers, the intensity of LBP was similar in the two populations.

### Conclusion

Apparently, adolescent soccer players have less LBP than controls, while they have a group a tendency to have increased kyphosis, with an unbalance between the two sagittal curves in favor of kyphosis (ie, an increase in the Sagittal Ratio). Even if these changes were statistically significant, they were not clinically significant. We did not find an increase in pathology (spinal deformities), but this population may have been too small to detect these variations.