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Adolescent soccer is correlated with a slight increase of kyphosis: a controlled cross-sectional survey

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1 Introduction

Low back pain during growth is recognised today as a possible problem, but risk factors are not yet well known.
A long discussion exist about the possible influence of sport activities on spinal growth: a U relationship has been proposed, where agonistic and sedentary schoolboys present more pain than controls.
Soccer is widely practiced by pupils in many different countries around the world, but we don't know if there is any correlation with changes in posture and/or spinal deformities.
Aim of this study was to check, through validated instruments, the possible relationship between soccer and spinal posture.

2 Aim of the study

Verify if boys playing agonistic soccer have variations of posture when compared to normal controls.

3 Methods

We evaluated 102 males practicing agonistic soccer two to three times per week in the age range 11-16, and compared them to a normal sample of 180 schoolboys of the same age range.
We collected a series of already validated measurements:

- plumbline distances from kyphosis apex of the C7, T12 and L3 vertebrae
- ATR (Angle of Trunk Rotation) according to Bunnell.

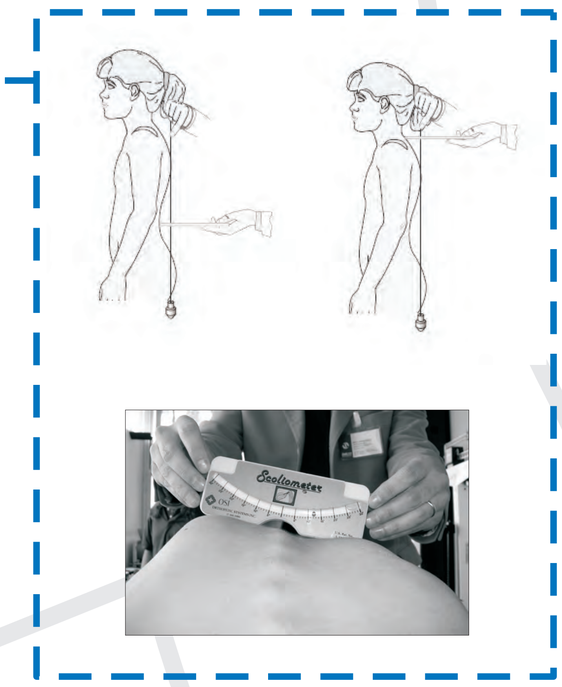
We calculated:

- the Sagittal Index (SI: sum of the distances of C7 and L3 - sagittal shape of the spine),
- the Sagittal Ratio (SR: C7/L3 - relationship between kyphosis and lordosis).

According to previous studies, we considered these normal references:

- ATR: 5°
- C7: cm 1.5-5.5
- L3: cm 2.8-7.0
- Sagittal Index: cm. 5.5-11.0
- Sagittal Ratio: 0.37-1.31

Statistics: ANOVA and chi-square.



4 Results

In soccer players we found statistically significant increases of the plumbline distances from kyphosis apex in:

- C7: 36.6±1.0 vs 33.6±0.7 (P<0.05)
- T12: 23.0±0.6 vs 21.3±0.8 (P<0.05)

We also found an increase of the Sagittal Ratio: 0.80±0.03 vs 0.73±0.02 (P<0.05).
We did not find more pathological cases in soccer pupils than in normals for any of the considered parameters.

	Soccer		Schoolboys		
	Average	STD. DEV.	Average	STD. DEV.	P
C7	36,62	9,50	33,67	9,95	<0,05
T12	22,99	8,09	21,31	8,00	<0,05
L3	47,45	8,89	48,69	10,32	NS
S1	29,02	7,35	29,67	8,32	NS 5
ATR	2,34	1,25	2,21	1,12	NS 42
H GIBBO	4,92	2,69	4,73	2,56	NS
S.I.	84,07	13,78	82,36	14,21	NS 80
S.R.	0,80	0,24	0,73	0,29	<0,05

5 Discussion

Apparently soccer adolescent players have a group tendency to the increase of kyphosis, with an unbalance between the two sagittal curves in favour of kyphosis (increase of the Sagittal Ratio).
Even if these changes were statistically significant, they were not clinically significant.
We did not find an increase of pathological cases (spinal deformities), but this population was small to detect these variations.

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