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Research article

## Sagittal Spinal Morphology in Highly Trained Adolescent Tennis Players

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### ABSTRACT

Sports with a predominance of forward-bending and extension postures have been associated with alterations in the sagittal spinal curvatures and greater risk of spinal injury. Because, the tennis players adopt these postures, the aims of this study were: 1) to describe spinal curvatures and pelvic tilt in male and female highly trained adolescent tennis players during relaxed standing posture and with thoracic spine corrected (in prone lying on the floor); and 2) to determine the frequency of thoracic hyperkyphosis and lumbar hypo/hyper lordosis in these postures. Forty adolescent tennis players (24 male and 16 female) aged 13-18 years, participated voluntarily in this study. The Spinal Mouse system was used to measure sagittal spinal curvatures and pelvic tilt. The mean values in the relaxed standing posture were  $43.83^\circ \pm 7.87^\circ$  (thoracic kyphosis),  $-27.58^\circ \pm 7.01^\circ$  (lumbar lordosis), and  $13.38^\circ \pm 5.57^\circ$  (pelvic tilt) for male tennis players, respectively; and  $36.13^\circ \pm 6.69^\circ$  (thoracic kyphosis),  $-32.69^\circ \pm 5.06^\circ$  (lumbar lordosis),  $20.94^\circ \pm 5.36^\circ$  (pelvic tilt) for female tennis players ( $p < 0.05$  between genders in all spinal parameters). The male and female tennis players showed a frequency of 62.5% and 93.8% ( $p = 0.032$ ) for neutral thoracic kyphosis, and 83.3% and 93.8% ( $p = 0.062$ ) in neutral lumbar lordosis, respectively. In conclusion, due to the high percentage of neutral spinal curvatures in both male and female tennis players, to practice tennis in these levels does not alter sagittal spinal morphology in the relaxed standing posture in adolescent highly trained tennis players.

**Key words:** Spinal mouse, posture, thoracic, lumbar, pelvic

## Key Points

- This study evaluated thoracic and lumbar spinal curvatures and pelvic tilt during several postures in young highly trained tennis players.
- Female tennis players showed statistically significant greater anterior pelvic tilt, lumbar lordosis and lower thoracic kyphosis than male tennis players.
- The high percentage of neutral thoracic kyphosis and lumbar lordosis posture in both groups of young tennis players in relaxed standing might affirm that tennis does not negatively affect sagittal spinal posture at these ages.
- A specific postural program could be recommended to improve the slumped sitting and maximal trunk flexion in knees extended postures.

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