

Biological maturation affects standing balance in young soccer players

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Purpose: Biological maturation presents sudden and rapid modifications that can influence the sensorimotor functions, in particular when the peak height velocity (PHV) is approaching. Standing balance is a fundamental skill that can be strongly affected by PHV¹. We examined the influence of biological maturation on the performance of static standing balance.

Methods: Two-hundred and 38 young healthy soccer players (U9 to U17) were evaluated. After anthropometric measurements, subjects stood barefooted on a baropodometric platform, and were recorded at 20 Hz during two 30-s tests (eyes open/closed). Subjects were split into six groups based on the Maturity Offset (MO, y), from $MO < -2.5$ y to $MO \geq 1.5$ y, representing the estimated time to/from the calculated PHV². The body center of pressure (CoP) sway area and velocity were calculated, along with the standard deviation (SD) of the antero-posterior (AP) and medio-lateral (ML) CoP trajectory. Differences between MO groups were tested using a 2-w ANOVA with repeated measures.

Results: The sway area decreased as the MO increased, in particular in $MO < -1.5$ y was higher than in $MO > 0.5$ y ($p < 0.001$). CoP velocity presented a similar pattern ($p < 0.001$), with a marked decline in groups with $MO > 0.5$ y. AP SD was higher before PHV. In two groups ($-2.5 \leq MO < -1.5$ y and $-0.5 \leq MO < 0.5$ y) open and closed eyes conditions differed. The youngest group (< -2.5 y) had a higher ML SD than groups with $MO > 0.5$ y.

Conclusions: Biological maturation in young soccer players is associated with changes in standing balance control. The reductions of CoP sway area, velocity and SD as the MO increases represent the improved efficiency of the postural control system.

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2. Mirwald RL, Baxter-Jones ADG, Bailey DA, and Beunen GP (2002) An assessment of maturity from anthropometric measurements. *Med Sci Sports Exerc* 34:689-694