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The influence of postural differences on movement speed

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【Purpose】 This study aims to investigate the influence of posture control, especially pelvic tilt, on response and movement speed during the acceleration phase from squat start position.

【Method】 Subjects were 13 collegiate male soccer players, and they undertook 2.5 m forward sprints from two different squat positions: a pelvic-neutral position (NP) and a posterior tilt position (PT). Subsequently, we measured sprint time, start speed, ground reaction force (GRF), and electromyography (EMG) activity in the biceps femoris (BF), rectus femoris, rectus abdominis (RA), and multifidus. In addition, 2D motion analysis from the sagittal plane was undertaken and

trunk tilt, upper back tilt, pelvic tilt, and center of gravity (COG) were calculated.

【Result】 Start speeds in the PT condition were significantly slower than those in the NP condition. In this condition, the COG was in more back backward, and the GRF was smaller. Moreover, EMG values in the BF and RA were smaller in the PT condition than in the NP condition.

【Discussion】 These results showed that posterior pelvic tilt causes a back-leaning COG, a lower level of activity in the BF and RA, and a smaller GRF. These kinetic and/or kinematic changes could potentially hinder movement speed during the acceleration phase.