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# Cortical activity, kinematics and trunk muscles activity response to pelvis movements during unstable sitting

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## ABSTRACT

**BACKGROUND**: Balance control is a leading component of human motor activities and its impairment is associated with an increased risk of falling, lower back pain due to impaired motor control mechanism. A prolonged sitting position at the workplace is one of the risk factors of reduced postural control and lower back pain.

**OBJECTIVE**: To evaluate theta and alpha waves cortical activity, trunk muscles activity and kinematics in static sitting, dynamic sitting on different platforms: simple wobble board (WB) and wobble board on bearing surface (WBB).

**METHODS**: The kinematics of body segments, electromyography of five trunk muscles, electroencephalography of 32 scalp electrodes were measured during balance tasks in sitting position for 17 subjects with a continuous seated position at the workplace.

**RESULTS**: Cortical power on WBB1 increase in fronto-central ($p < 0.05$) region while on WBB2 increase in centro-parietal region ($p < 0.05$). WBB2 increase more muscles compared with WB2. The amplitude of movement of ASIS, Th10 can be seen lower on WBB compared with WB ($p < 0.05$).

**CONCLUSIONS**: Literature is limited when comparing physiological and biomechanical parameters in a dynamic sitting. The main aspect is to show WBB which can increase personalized sitting and improve trunk motor control during hours of prolonged sitting.

**KEYWORDS:** electromyography, electroencephalography, occupational sitting, trunk control, wobble board.