

POSTURAL STABILITY PERFORMANCE BETWEEN SEDENTARY AND ACTIVE SUBJECTS WITH THE BIODEX STABILITY SYSTEM

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INTRODUCTION: Postural stability (PS) has been defined as the ability to maintain an upright posture within the base of support (Lee and Lin, 2007) and is considered to be an important indicator of musculoskeletal health and physical performance. This study examined the PS performance between sedentary and active subjects using the Biodex Balance System (BBS) with well intra-class correlation coefficient (Hinman, 2000).

METHOD: Thirty-nine physically active (PA, age: 20.2 ± 1.6 years; height: 162.9 ± 7.7 cm; mass: 54.7 ± 8.9 kg) college students and sixty-four sedentary (S, age: 19.6 ± 0.8 years; height: 164.5 ± 6.8 cm; mass: 56.0 ± 7.8 kg) college students with no previous pathology in the lower extremities were study participants. Subjects were tested without footwear and completed three, 20 seconds trials attempting to maintain their balance at stability level eight on the BBS. Overall Stability Index (OSI), Anterior/Posterior Index (API), Medial/Lateral Index (MLI) were obtained under 3 conditions: bi-lateral stance (BS), dominant single leg stance (DS), and non-dominant single leg stance (NS) and the order of the condition was randomized. These indexed are standard deviations assessing fluctuations around the zero point and the dominant leg was determine by kicking ball. Independent-samples *t*-test was employed to investigate the difference between PA and S college students.

RESULTS: The means and standard deviations of the three test conditions are shown in Table 1. During the Level 8 condition, the PA had significant lower OSI and API under DS and NS condition. However, no significant differences were found in MLI between PA and S.

Table 1 Postural Stability Performance with the BBS at Level 8

	OSI			API			MLI		
	BS	DS	NS	BS	DS	NS	BS	DS	NS
PA	0.7±0.3	0.9±0.3*	0.9±0.4*	0.5±0.2	0.6±0.2*	0.6±0.3*	0.4±0.2	0.6±0.3	0.6±0.3
S	0.8±0.4	1.1±0.6	1.0±0.5	0.5±0.3	0.8±0.4	0.7±0.4	0.4±0.2	0.6±0.4	0.6±0.3

* represented significant lower sway index ($p < .05$) in PA students than in S students.

DISCUSSION: A higher PS performance index was identified overall in sedentary young adults. Specifically a higher score in the AP direction occurred when the participant had difficulty maintaining the platform in a level position about this plane of motion. A high score in the A/P direction may indicate poor neuromuscular control of: 1) the quadriceps and/or hamstring muscles; and 2) the A/P compartment muscles of the lower leg.

CONCLUSION: Physically active students had better PS than sedentary students. In addition, different postural control strategies might be used during different postural tasks.

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