Neuromuscular Control and Balance

The Expanded Automatic Assessment of Postural Stability: The xAAPS

Researchers at Temple University (Philadelphia, PA) have created the Expanded Automatic Assessment of Postural Stability (xAAPS), a system that tracks personnel as they perform a series of movement assessments. The xAAPS then scores those movements in the same way that a trained human observer would. Because the xAAPS uses inexpensive off-the-shelf sensors and a custom Windows application, it can be deployed anywhere and operated by anyone.

Building on the first generation AAPS that evaluated static posture (*Glass et al., 2018*), the proof-of-concept xAAPS system implements three of the seven movements of the well-known Functional Movement Screen (FMS), and the core technology can be readily adapted for other movement screens or action as needed. The xAAPS is built around commodity markerless motion tracking devices such as the Microsoft Kinect v2.0 and other depth cameras such as the Orbbec Astra.

The researchers have performed a validation experiment with the xAAPS, comparing its scores to those from an experienced human observer for FMS deep squat, hurdle step, and in-line lunge movements from healthy adults (n = 26) (*Napoli et al., 2018*). The xAAPS performed better than random classification and produced accuracies of 92.3 percent for the deep squat, 84.6 percent for the hurdle step, and 69.2 percent for the in-line lunge. These results demonstrate that the xAAPS can be a valuable in-field expedient to evaluate dynamic balance without the need of human scorers.

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REFERENCES:

Glass, S. M., Napoli, A., Thompson, E. D., Obeid, I., & Tucker, C. A. (2018). Validity of an Automated Balance Error Scoring System. J Appl Biomech, 1-16. doi:10.1123/jab.2018-0056

Napoli, A. G., Stephen; Tucker, Carole; Obeid, Iyad. (2018). The Expanded Automatic Assessment of Postural Stability: the xAAPS. Paper presented at the Military Health Research Symposium, Kissimmee, Fl.