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Correlation Between Volitional and Functional Balance Control in Healthy Young Athletes

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CONTEXT

Balance testing is an integral component of the evaluation of the concussed athlete. Balance deficits resulting from sensory-integration problems can be determined with a multitude of laboratory-based, computerized dynamic posturography measures, however current protocols currently utilize only one of these measures of balance. The Stability Evaluation Test (SET) protocol, utilizes the 6 testing conditions of the Balance Error Scoring System (BESS) to provide an objective analysis of the athlete's functional balance control based on the individual's postural sway velocity. The Limits of Stability (LOS) test quantifies impairments in an individual's ability to volitionally displace their center of gravity (COG) to their stability limits without losing balance, however, the LOS is not widely used in concussion protocols. A correlation between the LOS test and SET has not yet been established in a healthy, non-concussed population, therefore it is unknown if the LOS is a clinically relevant measure.

OBJECTIVE

To determine if volitional and functional balance control are correlated.

DESIGN

Prospective cross-sectional design.

SETTING

University research laboratory.

PATIENTS or OTHER PARTICIPANTS

Ninety-eight healthy intercollegiate athletes participated (age 20 ± 1.6 years, height 185.60 ± 7.16 cm).

INTERVENTIONS

All participants completed the SET and LOS testing protocols on the Natus NeuroCom® VSR Sport System.

MAIN OUTCOME MEASURES

Reaction time (sec), movement velocity (deg/sec), endpoint excursion (%), maximal excursion (%), and directional control (%) on the LOS test; sway velocity (deg/sec) on the SET.

RESULTS

The LOS was not correlated with SET for any of the outcomes (Reaction Time, $R = -0.068$; Movement Velocity $R = 0.035$; Endpoint Excursion $R = -0.116$; Maximal Excursion $R = -0.055$).

CONCLUSIONS

The lack of significant correlation between LOS and SET may indicate different construct measures. Clinicians should consider incorporating both measures into current concussion protocols.

Grothaus, Cripps, Laurent, Fullenkamp
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