

[Athletic Training]



Assessing Postural Stability in the Concussed Athlete: What to Do, What to Expect, and When

Alexander Ruhe, MChiro, PhD,^{*†‡} René Fejer, MSc, PhD,^{§||} Axel Gänsölen, MD, PhD,[¶] and Wolfgang Klein, MD, PhD^{||}

Context: Postural stability assessment is included as part of the diagnostic and monitoring process for sports-related concussions. Particularly, the relatively simple Balance Error Scoring System (BESS) and more sophisticated force plate measures like the Sensory Organization Test (SOT) are suggested.

Evidence Acquisition: Relevant studies were identified via the following electronic databases: PubMed, MEDLINE, EMBASE, Web of Science, ScienceDirect, and CINAHL (1980 to July 2013). Inclusion was based on the evaluation of postural sway or balance in concussed athletes of any age or sex and investigating the reliability or validity of the included tests.

Study Design: Clinical review.

Level of Evidence: Level 4

Results: Both the SOT and the BESS show moderate reliability, but a learning effect due to repetitive testing needs to be considered. Both tests indicate that postural stability returns to baseline by day 3 to 5 in most concussed athletes. While the BESS is a simple and valid method, it is sensitive to subjectivity in scoring and the learning effect. The SOT is very sensitive to even subtle changes in postural sway, and thus, more accurate than the BESS; however, it is a rather expensive method of balance testing.

Conclusion: Both tests serve the purpose of monitoring balance performance in the concussed athlete; however, neither may serve as a stand-alone diagnostic or monitoring tool.

Strength of Recommendation Taxonomy: B

Keywords: concussion; sports; balance; Balance Error Scoring System; Sensory Organization Test

As concussion awareness and diagnosis has changed significantly, there is wide variability in the literature on the epidemiology of concussion. The incidence of sports-related concussion in high school and collegiate athletes is 0.28 per 1000 athlete-exposures, or 5% of the total number of injuries across different sports.^{11,24} This equates to 1.6 to 3.8 million concussions annually in the United States alone.²⁶

Despite this already alarming number, there is growing concern that concussion may be underreported in sports.^{2,31} Apart from athletes failing to report a concussion for various reasons,³¹ team physicians may employ too high thresholds for⁴⁴ or simply miss the diagnosis.

A fast and accurate diagnosis of concussion is important, particularly in light of potential long-term neurological deficits

From [†]School of Health Professions, Murdoch University, Murdoch, Australia, [‡]Praxis für Chiropraktik, Wolfsburg, Germany [§]Spine Centre of Southern Denmark, Hospital Lillebaelt, Middelfart, Denmark, ^{||}Institute of Regional Health Services Research, University of Southern Denmark, Odense, Denmark, and [¶]Klinikum Wolfsburg, Department of Trauma Surgery, Orthopedics and Hand Surgery, Wolfsburg, Germany

*Address correspondence to Alexander Ruhe, MChiro, PhD, Praxis für Chiropraktik, Porschestraße 1, 38440 Wolfsburg, Germany (e-mail: a.ruhe@chiropraktik-wolfsburg.de).

The authors report no potential conflicts of interest in the development and publication of this manuscript.

DOI: 10.1177/1941738114541238

© 2014 The Author(s)