

ORIGINAL RESEARCH

AN INITIAL EVALUATION OF THE BTRACKS BALANCE PLATE AND SPORTS BALANCE SOFTWARE FOR CONCUSSION DIAGNOSIS

Daniel J. Goble, PhD¹

Kristin A. Manyak, MS, ATC²

Thomas E. Abdenour, DHSc, ATC²

Mitchell J. Rauh, PT, PhD¹

Harsimran S. Baweja, PT, PhD¹

ABSTRACT

Background: As recently dictated by the American Medical Society, balance testing is an important component in the clinical evaluation of concussion. Despite this, previous research on the efficacy of balance testing for concussion diagnosis suggests low sensitivity (~30%), based primarily on the popular Balance Error Scoring System (BESS). The Balance Tracking System (BTrackS, Balance Tracking Systems Inc., San Diego, CA, USA) consists of a force plate (BTrackS Balance Plate) and software (BTrackS Sport Balance) which can quickly (< 2 min) perform concussion balance testing with gold standard accuracy.

Purpose: The present study aimed to determine the sensitivity of the BTrackS Balance Plate and Sports Balance Software for concussion diagnosis.

Study Design: Cross-Sectional Study

Methods: Preseason baseline balance testing of 519 healthy Division I college athletes playing sports with a relatively high risk for concussions was performed with the BTrackS Balance Test. Testing was administered by certified athletic training staff using the BTrackS Balance Plate and Sport Balance software. Of the baselined athletes, 25 later experienced a concussion during the ensuing sport season. Post-injury balance testing was performed on these concussed athletes within 48 of injury and the sensitivity of the BTrackS Balance Plate and Sport Balance software was estimated based on the number of athletes showing a balance decline according to the criteria specified in the Sport Balance software. This criteria is based on the minimal detectable change statistic with a 90% confidence level (i.e. 90% specificity).

Results: Of 25 athletes who experienced concussions, 16 had balance declines relative to baseline testing results according to the BTrackS Sport Balance software criteria. This corresponds to an estimated concussion sensitivity of 64%, which is twice as great as that reported previously for the BESS.

Conclusions: The BTrackS Balance Plate and Sport Balance software has the greatest concussion sensitivity of any balance testing instrument reported to date.

Level of Evidence: Level 2 (Individual cross sectional diagnostic study)

Keywords: balance, BTrackS, concussion, diagnostic accuracy, sensitivity

CORRESPONDING AUTHOR

Daniel Goble

Assistant Professor and SMARtLab Director

Department of Exercise and Nutritional Sciences

San Diego State University

5500 Campanile Drive, San Diego, CA, 92182, USA

Tel – 619-594-7272

Fax – 619-594-6553

E-mail: dgoble@mail.sdsu.edu

¹ San Diego State University, School of Exercise and Nutritional Sciences, College of Health and Human Sciences, San Diego, CA, USA

² San Diego State University, Department of Athletics, San Diego, CA, USA

Disclosure of Potential Conflicts of Interest – Dr. Goble holds an equity stake in Balance Tracking Systems Inc, the parent company for BTrackS. This conflict of interest was mitigated by limiting his involvement in all aspects of data collection and analysis. Authors Manyak, Abdenour, Rauh, and Baweja have no conflicts of interest.