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## ***Inter-Rater Agreement of a Functional Dual-Task Test Developed for the Assessment of Sports Related Concussions***

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### **INTRODUCTION**

There is growing evidence to support the implementation of a dual-task test within the current assessment of Sports Related Concussion (SRC) and return-to-play (RTP) criteria. However, the current process for assessing SRC primarily evaluates motor and cognitive performance under single-task (i.e. Impact Test, SCAT, BESS, etc.), which may not be an appropriate representation of sports-related performance. As a result, a novel dual-task assessment was developed that could be utilized by Certified Athletic Trainers as part of their initial assessment and RTP protocol following an SRC. The purpose of this study was to assess the inter-rater agreement of this novel dual-task assessment.

### **METHODS**

A healthy group of active participants (n=8, age=21.16±0.75 years, height=1.69±0.07 m, weight=68.20±10.21 kg) were locally recruited to perform the dual-task assessment. The dual-task assessment included a motor task and a cognitive task. The motor task consisted of traversing a 10 ft. by 10 ft. box as quickly as possible while maintaining forward orientation for 15 seconds. The cognitive task consisted of a color-word Stroop test for 15 seconds. These tasks were first performed independently of one another to establish the single-task performance. Following single-task performance, both tasks were performed concurrently to establish dual-task performance. A continuous dual-task cost was quantified as the percent change between the single-task and the dual-task performances. Two raters were trained to implement the dual-task assessment in a standardized

manner. Both raters assessed the single-task and dual-task portions of the dual-task assessment. Dual-task cost was then calculated by each rater for each subject. Intra-class correlation coefficient (ICC) was used to quantify the inter-rater agreement of the dual-task cost. ICC estimates and their 95% confident intervals were calculated using SPSS statistical package version 24 (SPSS Inc, Chicago, IL) based on a mean-rating (k = 2), absolute-agreement, 2-way mixed-effects model.

### **RESULTS**

ICC estimates revealed that the inter-rater agreement between both raters was excellent for motor cost assessment (ICC=0.936) and excellent for cognitive cost assessment (ICC=0.925).

### **CONCLUSIONS**

These results reveal that the inter-rater agreement of the novel dual-task test is excellent, suggesting that this test can be reliably assessed with a single rater. It is, however, likely that this inter-rater reliability can still be improved by the utilization of two raters, one for the motor portion and one for the cognitive portion. Further research should aim to assess the intra-rater reliability and the minimally detectable change that occurs naturally within dual-task performance.

**KEY WORDS:** *Dual-task, concussion, reliability*