BESS Scores Observed in Real Time Versus with Slow-Motion Video Recording
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Abstract
INTRODUCTION: The Balance Error Scoring System (BESS) is a subjective clinical balance assessment frequently used by various healthcare providers. A test administrator records the number of pre-defined errors committed by the test subject as they perform a number of balance stances. PURPOSE: The purpose of this study was to determine if there is a difference in the number of observed errors when scoring the BESS in real time versus watching a slow-motion video recording. METHODS: 43 subjects (60.0 ± 6.76 yrs) performed a familiarization trial immediately followed by an experimental trial. All trials were recorded on video and BESS scoring was completed by a Certified Athletic Trainer. RESULTS: Total BESS scores evaluated in real time and evaluated with slow-motion video were 11.07 ± 4.10 and 11.23 ± 4.77 respectively. Paired samples t-test reveals no significant difference between the means. CONCLUSION: Our results conclude that there is no significant difference in observed errors when scoring BESS in real time vs. slow motion video.

INTRODUCTION:
All activities of daily living require the ability to maintain balance in order to coordinate musculoskeletal responses. BESS was created to be a low-technology cost- and time-effective method to evaluate the complexity of the CNS on balance in both athletic and clinical settings when there is limited access to expensive high-technology units with longer testing durations. There are studies noted to have used video recordings, but none showed evidence to slow-motion analysis. The purpose of this study was to analyze the correlation between regular motion playback and slow-motion playback of the stances to identify if there were errors not recorded.

Methods
43 subjects (60.0 ± 6.76 yrs) volunteered to participate in this study. After receiving informed consent, subjects performed a familiarization trial of the Abbreviated BESS, immediately followed by an experimental trial. Each trial included 3 stances performed for 20 seconds on a firm surface. Stances included bipedal, non-dominant tandem, and non-dominant single leg. Each trial was recorded using an Apple iPad approximately 15 feet from the participant. All recordings were later analyzed by a Certified Athletic Trainer in both real time and slow-motion playback.

Results

<table>
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<tr>
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<th>Mean ± SD</th>
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<tbody>
<tr>
<td>Age</td>
<td>60.10 ± 6.76</td>
</tr>
<tr>
<td>BMI</td>
<td>25.23 ± 4.33</td>
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<tr>
<td>BESS Real Time</td>
<td>11.07 ± 4.10</td>
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<tr>
<td>BESS Slow Motion</td>
<td>11.23 ± 4.77</td>
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| Paired Samples t-Test   | t(42) = -0.39, p = 0.698 |

Discussion
The overall performance of BESS evaluations have been identified using video-tapped results and later scored by either multiple test-raters or a single rater. However, none have investigated the potential differences that may exist when scoring BESS performance in real time versus slow motion. Our results indicate that no significant differences exist in the number of observed errors recorded when scoring the Abbreviated BESS in real time versus slow motion.

References