Reviewer’s report

Title: Alteration in global motor strategy following lateral ankle sprain

Version: 1 Date: 5 January 2014

Reviewer: Jay Hertel

Reviewer’s report:

General Comments: The authors describe the results of a descriptive laboratory study examining kinetic and kinematic measures during performance of the Star Excursion Balance Test (SEBT) in a group of soldiers with and without recent history of lateral ankle sprain. The primary findings are that in addition to maximal reach deficits (the typical clinical outcome of the SEBT), there are differences in center of mass (COM) excursions and proximal joint excursions (knee flexion, pelvis excursion) in the ankle injured group. The authors do a nice job of presenting a large volume of biomechanics results in a concise manner. The discussion could be strengthened with more content on the clinical implications of their results while keeping in mind that ultimately the SEBT is a non-instrumented clinical test of dynamic balance. Specific recommendations for edits to improve the manuscript are included below.

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

1. Abstract: The manuscript file that I reviewed did not include an abstract.

2. Line 60: The results of the kinematic differences associated with SEBT performance related to lateral ankle instability (references 18, 19, 54, should be summarized in this paragraph and related to what additional information will be learned by quantifying changes in COM during completion of the SEBT tasks.

3. Statistical Analysis, general: While technically correct, this section is very difficult to follow. I suggest revising this section to include individual paragraphs describing the analyses used to achieve each of your 3 objectives. Consider the use of subheadings to guide the reader.

4. Results, general: With a few exceptions, the results section text emphasizes the reporting of the significance level (p-values) of the statistical tests but makes no mention of the magnitude of differences identified between groups. Reporting the magnitude of differences in the unit of measure (mean difference with 95% confidence interval) or a standardized effect size (such as Cohen’s d with 95% confidence interval) would greatly help the reader in the clinical interpretation of these results.

5. Line 240: “Unlike the MRD,...” – I disagree with the tenor of this statement. You can't lose sight of the fact the SEBT was developed as a non-instrumented test of dynamic balance that could be easily implemented in clinical practice.
settings. Deficits in maximal reach distance are frequently used by clinicians to identify motor control deficiencies in their patients – I would bet that most clinicians would argue that the SEBT, as quantified by maximal reach distance, provides an estimate of global motor control in their patients. I think the emphasis should be placed on the differences you identified (using complex laboratory instrumentation) providing insights into why the maximal reach deficits are present in ankle-injured patients. Emphasize how your findings add to the understanding of the reach deficits.

6. Discussion, general: The discussion is lacking a paragraph on clinical implications of these results. In the last sentence of the conclusion you recommend that clinicians “pinpoint the specific variables that are more likely to accelerate and enhance motor control recovery”. While this is a reasonable conclusion, you never elaborate on this point in the body of the discussion. Specifically, how can clinicians use these results to improve dynamic balance and overall function in their ankle-injured patients? One option, albeit suboptimal, would be to simply teach the test – have patients practice the SEBT while lowering their pelvis and flexing their knee more and straightening up faster after maximal reach. A preferable option would be identifying specific arthrokinematic and neuromuscular impairments (limited functional ROM at individual joints, specific muscle group inhibition and/or weakness, faulty intermuscular coordination patterns,...) that are driving this altered behavior and performing rehabilitation exercises to specifically address the identified impairments in an effort to improve global function, not just SEBT performance.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. Line 66: What is the operational definition of “quality of motor control”? This concept needs to be presented in the introduction.

2. Line 70: It is not clear what all of the “global variables” being measured are – please clarify.

3. Line 75: Were the volunteers all males?

4. Line 80, Control group: Were the control group subjects free of a history of lateral ankle sprain or other substantial lower extremity orthopaedic injuries?

5. Figure 1 legend: Operationally define the shaded grey area around each the mean of each variable (range?, SD?, 95% confidence interval?, other?).

6. Figures 2 & 4 legends: Indicate what the error bars represent on the graphs (see figure 1 legend comment above).

7. Table 1: Define what is meant by “NP” in the last column.

Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)

1. Line 64, Objectives: The addition of research hypotheses to match each
objective would strengthen the manuscript.

2. Line 177: Include 95% confidence intervals around these mean differences.

3. Line 184/Line 189: The reporting of non-significant trends in results is always tricky. Supporting these statements with results on the magnitude of the differences seen will help to support these interpretations.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: I DECLARE THAT I HAVE NO COMPETING INTERESTS.