Reviewer's report

Title: Reliability of the TekScan MatScan(R) system for the measurement of postural stability in older people with rheumatoid arthritis

Version: 1 Date: 2 May 2012

Reviewer: Anna L Hatton

Reviewer’s report:

This is a nicely written paper which presents data for the between-session reliability of the TekScan MatScan® system for measuring postural sway parameters in adults with rheumatoid arthritis. The study findings will be of value to both clinicians and researchers interested in postural stability measurement in people with arthritic disease.

Major Compulsory Revisions:
None

Minor Essential Revisions:

Abstract:
In the methods section, please clarify that double-limb quiet standing was assessed. Please add this detail throughout the manuscript.

Background:
Pg 3. para 1: The first paragraph contains good definitions of postural stability and postural sway. However, it would be nice to see some text clarifying what we understand by the phrases ‘base of support’ (e.g. defined by the outer boarders of the feet etc.) and ‘active neural control’ [of the COM position in space].

Methods:
Pg 5, para 1: Equipment – I would question whether Figure 1 is necessary. If the authors believe Figure 1 enhances their manuscript, I would suggest they improve the format of the figure (i.e. editing of individuals graphs in a separate document, rather than presenting a screen shot). This figure is also misleading as it presents postural sway data over a duration of 19.95 seconds - when in the current study, postural control is reported to be collected over 30 seconds.

Pg 6, para 2: Procedure – Between-session reliability of the TekScan® system was assessed on two separate occasions approximately one hour apart. The authors should justify why this time frame was selected. From a clinical perspective, testing sessions 24hr or 1-week apart would be more relevant; however, it is understandable that longer time frames would also be likely to
succumb to larger error due to potential changes in the inflammatory disease condition etc., and this was not the aim of the study. I suggest the authors justify their chosen methodology.

Pg 6, para 2: Please can the authors clarify instructions given to participants, during the 1hr waiting period between testing sessions (e.g. were they allowed to walk around the University [which could have led to fatigue], remained seated in a room, permitted to have refreshments?). How did the authors control this aspect of the test procedures?

Pg 6, para 2: Trials were repeated three times with eyes open (EO) and eyes closed (EC) to obtain a mean value. Were the visual conditions block-randomized – further clarification is required.

Pg 6, para 2: The authors state that ‘Each participant was asked to step off the pressure mat and rest for 30 seconds between repetitions to avoid fatigue’. What happened during the 30 seconds rest period – did participants remain standing or were they seated?

Data Analysis:

Pg 7, para 1: I suggest the authors provide more detail relating to how the TekScan data was processed. Were the full 30 seconds of sway data analysed?

Pg 7, para 1: Please clarify methods for obtaining the estimated true scores

Pg 7, para 1: Treatment of outliers in the data – included or excluded in the analysis?

Results:

Pg 8, para 1: Could the authors please report whether all participants completed the trials. Any corrupt or missing data?

Discussion:

Pg 9, para 3: The authors suggest that measurement error may have occurred as a result of inherent variability of postural control parameters within their study sample. I suggest that the authors review this text within the context of their study aim – to assess between-session reliability over 1hr. Please add a little more detail, perhaps relating to specific demographics and clinical characteristics that could lead to such measurement error.

Pg 10, para 1: I suggest the authors delete the text ‘and during gait’ from the second sentence of this paragraph, to keep the text closely aligned to their study aims relating to standing balance.

Pg 10, para 1: The authors state that ‘In healthy adults, postural control is maintained through flexibly and smoothly changing between these systems in order to maintain stable equilibrium’. The phrase ‘flexibly and smoothly changing’
may be misleading, suggesting that different sources of afferent input and muscle activity are used independently of each other, one at a time, in order to maintain balance, when in fact, they may be used in combination. I suggest the authors review this wording.

Pg 10, para 2: The authors state that ‘In the current study, the mean of three test measurements of 30 seconds was taken to stabilise the variable’. Again, the term ‘stabilise’ is misleading in the context of the study – please review.

Pg 10, para 3 – Pg 11, para 1: The authors highlight the importance of vision for postural control. In agreement with previous research, the current study found greater AP and ML sway with eyes closed relative to eyes open. The authors should consider the importance of this text within the context of their study: more clarity is required. It may be advantageous for the authors to provide evidence that postural sway data collected in the current study is of a similar magnitude, and comparable, to that reported in previous research in people with RA, with eyes open and/or eyes closed.

Pg 11, para 2: I suggest the authors are more specific in summarising their study findings, stating their population: ‘The results of the current study suggest that researchers and clinicians can confidently use the TekScan MatScan® to assess postural control in quiet standing in older adults with RA’.

Pg 11, para 3: The authors may like to consider other areas for future research including: assessment of the reliability of the TekScan MatScan® during more complex, dynamic balance tests in people with RA.

Figures:
Please add units of measurement to the Figures/Figure legends.

Discretionary Revisions:
None

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