Reviewer's report

Title: Tai Chi and Vestibular Rehabilitation Improve Vestibulopathic Gait via Different Neuromuscular Mechanisms: Preliminary Report

Version: 1 Date: 15 February 2004

Reviewer number: 1

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General

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

3-24 through 4-2. It would be helpful to define VR and TC more precisely earlier in the introduction. It is difficult to keep track of what you are talking about – does VR just consist of gaze stabilization exercises, or does it incorporate whole body movements such as TC. If it does, what is so different about VR and TC, operationally?

4-15 to 16. Please clarify. When you use the word “trend” do you mean it isn’t a significant effect? If there is an effect, is it more prominent in persons with impairment? The term “functional limitation” is very vague.

4-18. I find this hard to follow (non sequitur). What is the definition of a “improvement in lower extremity motor control”. I don’t see how the previous two sentences lead one to this hypothesis, other than in the most vague of all connections.

5-9. I count 53 subjects here, but only 36 were studied. Please confine yourself to the subjects that completed your protocol.

5-10. What were your criteria for UVH and BVH. Did all UVH patients have calorics? What were the results (range)? Did all BVH patients have calorics and/or rotatory testing? What did it take to call a patient a BVH? It is not enough to refer to a previous paper (10).

5-17. Dropping out for “health related issues” is too vague. Did they drop out because they got tired of the program, because they had something serious happen (die perhaps)?

5-18. Please indicate that the informed consent process was reviewed by your local IRB, if true.

6-4. and most of paragraph. This is too vague. We don’t need to know about the instructor’s experience or objectives. We do need to know what was done and for how long.

6-13. A little more detail about the warm-up exercises would be helpful. How much time was spent upright during the class?

6-15 and most of paragraph. This is too vague. We don’t need to know the objectives, intentions or theoretical background of the VR program. We do need to know what exactly was done and for how long.
7-20. Please move this sentence earlier, with the description of subjects. A problem is that there were 8 BVH in the TC group vs. 5 BVH in the VR group. It is well known that balance in UVH patients can be nearly normal. With BVH patients, it depends on their degree of deficit (unfortunately we do were not provided this information).

If the BVH patients were severe, and the UVH patients were nearly normal in their balance, as most are, differences between the two groups might be reasonably attributed to the subject composition, as there are nearly twice as many BVH in the TC group.

7-25 to 8-6. Which of these time-distance measures measure stability and why? It might help if you defined “stability”, in a mathematical way, and then said why the measured values quantify “stability”.

8-19 paragraph. Please comment about whether the measures you have chosen to reflect “trunk stability”, in some way are related to “balance”, or “overall stability”.

8-26. There seem to be an immense number of paired t-tests. Was the value chosen for significance corrected using the Bonferonni or similar method?

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

3-8. The last sentence needs to be reworded because of the unclear referent – gaze stability vs. both gaze stability and balance retraining.

3-14. Surely there are more references than [15] whose main distinguishing feature seems to be that it is written by one of the authors.

3-15 Surely there are more references than [17] whose main distinguishing feature seems to be that it is written by one of the authors.

3-23. Do the locomotor exercises intended to heighten somatosensory input actually do this? How do exercises increase sensory input?

4-6. Is should be was.

4-21. is should be was.

Please use past-tense when you discuss things taking place in the past (i.e. 6-25).

9-11. Why are greater values for stance duration and length, “improvements”? Perhaps they were already optimal when they started and any changes were detrimental. Again, there are a lot of t-tests here, with no suggestion of a Bonferonni correction.

9-17. Again, a lot of t-tests without a correction. One wonders if any of these changes are significant if one included a Bonferonni correction. If not, they need not be described in this much detail – it would suffice to say that there were no significant changes. Wouldn’t it be good to increase concentric MEE, but bad to increase eccentric MEE? Here I am speaking from an efficiency standpoint. Wouldn’t you expect practice to make people more efficient?
10-3 through 10-14. Again I suspect that due to multiple t-tests, none of these changes are significant.

This paragraph seems to be the key one differentiating VC and TC. In figure 1, the error bars are “95% confidence intervals” (of what?). SEM would make it a little easier to decode. More clarity in the writing would be helpful to determine what you expected and what you found here.

Remander of results section – same comments regarding lack of clarity in writing and neglect of Bonferonni corrections.

12 6-8. Please explain in more detail how your first hypothesis comparing the two groups was “indirectly supported” by data which showed no between-group differences. As previously mentioned, a rationale for this hypothesis is also missing.

12 10-11. Again, a rationale for this hypothesis is missing. When using multiple t-tests, without the Bonferonni correction, it is possible for seemingly significant associations to appear purely by chance.

13-19. What exactly were the warm up exercises and how long did subjects spend on them?

13-25. How does increase ankle ROM improve ankle MEE? Wouldn’t ankle strength be the more direct variable?

14 11-18. This all seems very tenuous and speculative.

As a general comment, the discussion is too long and too speculative.

Figure 1. Please clarify what these bars are. What is the 95% confidence interval for (? Data vs mean ?)
Figure 2. Same comment

Tables:
Table 1 – could be condensed and inserted as text.
Table 2 – numerical format is not very instructive. Might eliminate entirely in favor of figures
Table 3 – numerical values are again not very instructive,. Might eliminate entirely in favor of figures.

Discretionary Revisions (which the author can choose to ignore)

8-7 to 8-18. Would it be correct to say that improved motor control, or more precisely, more efficient movement, would be reflected by a higher ratio of concentric MEE to total MEE?

9-8. One wonders if the two groups were different in vestibular function.

14-1,2 This seems very tenuous, especially given the numerous t-tests. How do we know that the changes in MEE are optimizing?
What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

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

Quality of written English: Acceptable

Statistical review: Yes