Author’s response to reviews

Title: The Effect of Massage on Localized Lumbar Muscle Fatigue

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PDF covering letter
Reviewer #1: Dr Michael Callaghan

1. “Methods: There is no power size calculation, so how did the authors arrive at n = 29?”

Power analysis data have been inserted in the Methods section. A power of 70% was used due to the financial feasibility of this project.

2. “There has been no effort to check reliability of their procedures for the EMG and MF. Procedure”

Test-retest reliability analysis results have been added to the Results section.

3. “I am not sure what happened to the electrodes after the 1st test and during the massage. If they were removed, then there has been no attempt to ensure precise replacement. If they were not removed, then I cannot see how the massage was performed”.

The electrodes were removed after Load I under both conditions (massage, rest). A detailed description of the procedure has been added to the Methods section.

4. “What was the rationale behind 5 minutes of massage?”

The rationale has been described in the Discussion section.

5. “There should be a name for the software used. If they used the Biopac was it AcKnowledge software? “

Acqknowledge was used for data acquisitions and Labview based customized software was used for further off-line analysis. The description has been added in Methods section.

6. “Other EMG parameters have been omitted such as the CMRR, the Filters, differential input impedance etc.”

Details of EMG data acquisition settings have been added to the Methods section.

7. “Why was the sampling rate set at 1000Hz, when it should processed at 1024hz for FFT EMG Analysis”

Raw EMG signals were first sampled at 1000 Hz and then, FFT was processed at 1024 Hz off-line. We have determined that the data acquisition sampling and FFT processing rates utilized in our study are common for this type of EMG study. The description of the procedure has been added in the Methods section.

8. “EMG analysis is difficult to interpret. Examples of the types of decline for MDF and MNF and increase for the RMS should be given in figures”.

The figures have been added.
9. “Results: I am surprised the authors do not relate their results more to other massage studies that have shown essentially the same results (i.e. the subjects record subjective improvement, in this case a decrease in VAS, but there is no objective improvement). See Hemmings et al. Brit.J.Sports Med. 2000; 34(2): 109-114).”

Hemmings et al. and other relevant references have been cited in the Discussion section.

10. “Table 2 is very cumbersome and off putting. It is difficult to understand what the authors want to relay. This should be simplified somewhat without being superficial”.

Table 2 has been simplified.

11. “In table 5 the authors should consider the clinical meaning of their VAS scores. For example, the ‘Comparison measure’ means would be 6,6,1 and the ‘Compared measure’ 6,7,0 if rounded up or down to the nearest whole integer. This should be highlighted in the discussion”.

Interpretations of the small mean difference in VAS changes have been highlighted in the Discussion section.

12. “Discussion: Paragraph 3 of the discussion should be an ideal section for the authors to describe their hypothesis as to how massage would affect the physiology of fatigued muscle, but they fail to do so. The essential question is: ‘How would massage ease muscle fatigue physiologically.’ The authors get confused over this as in the Background section they cite Goats (ref 3) saying it has not been fully elucidated and then cite the 2nd paper by Goats (ref 13) stating that decreased fatigue is a main expected outcome. Which is it?”

The Background and Discussion sections have been clarified by the addition of supporting references.

13. “There should be a paragraph citing the limitations of the study. An important limitation is that of an ‘in-laboratory’ experiment rather than an ‘in-the-field’ study. Some massage therapists will certainly look at this study and state that they perform massage for longer than 5 minutes on athletes who exercise for longer than 90 seconds and that the study has no relevance. I think it would be wise for the authors to be prepared for this by accepting these limitations”.

A statement noting the limitations of the study has been added to the Discussion section.

14. “References.....”

Corrections were made.

Reviewer #2 Dr Peter M Tidus

Discretionary revisions

1. “Check for minor grammatical errors".
Corrections were made.

Compulsory revisions
1. “Include a caveat in your methods noting the reliability of the changes reported in your EMG measures to directly relate (in degree) to muscle fatigue”.

Test-retest reliability data have been presented. MNF- and MDF- EMG decline data (indicating fatigue) have been presented in figures.

2. “Describe the massage in more detail (type of massage, method etc.). What were the qualifications of the person(s) administering the massage?”

A detailed description has been added to Table 1.

3. “Did the electrode placements interfere with massage in any way?”

As described in the comments for Reviewer 1, all electrodes were removed before massage treatment and rest. An explanation has been given in the Methods section.

4. “Discuss the potential for massage inducing a placebo effect in regard to the differences in the subjective feelings of fatigue noted in the study”.

Issues regarding placebo and psychological effects have been added to the Discussion section.