Reviewer's report

Title: Vastus medialis motor unit properties in knee osteoarthritis: a descriptive study

Version: 1 Date: 12 August 2011

Reviewer: Kristina Calder

Reviewer's report:

Reviewers Report

Dear Editor,

The manuscript entitled ‘Vastus medialis motor unit properties in knee osteoarthritis: a descriptive study’ is a well-written manuscript and important in its field. Research investigating neuromuscular mechanisms of osteoarthritis is limited, especially at the motor unit level. This study utilizes needle electromyography to gain insight into potential alterations that may be occurring at the focal muscle level, with the advantage of also recording global muscle activity with the decomposition based electromyography system. The main limitation of this system is the inability to record muscle activity during maximal contractions. It would have been nice to see recordings from different percentages of maximum, not just 20% to see if motor unit recruitment strategies are also different at low-levels of MVC. The changes in motor unit recruitment and rate coding strategies observed in the OA group are findings that lead to a number of potential explanations, which helps advance the field in the direction that future studies can go. I have addressed a few grammatical errors and have made some discretionary/minor essential reviews in the following paragraphs.

Minor Essential Revisions:

1. Abstract. Last sentence of background, add ‘to’ after ‘The purpose of this study was’
2. Abstract. In the results paragraph you need to clarify that the size-related changes and MUP firing changes were found during the submaximal contractions.
3. Background: line 10. You state that ‘MU activity is altered in models of disuse, aging, pain and disease’. What are these alterations? Provide a sentence or two on what has been found.
4. Background: At the very end of your background section state what your hypothesis is
5. Methods: in the ‘Motor unit properties’ paragraph, first sentence, change to: “…..from both an intramuscular concentric needle electrode and surface recording electrodes.”
6. Methods: in the ‘Motor unit properties’ paragraph, your first use of S-MUPs is
introduced with spelt out in long form, therefore that should read “The MUP train further serves as a time-locked trigger to extract individual surface motor unit potentials (S-MUPs) from the…..”

7. Methods: in the ‘Motor unit properties’ paragraph, when discussing how the needle and surface EMG signals were acquired….when you state the active electrode was applied to the belly of the vastus medialis, and tell the reader your means to determine its location, you need to also clarify here that you placed the active electrode over the motor point of this muscle as it is a monopolar recording.

8. Figure 1. This figure is not at all clear in the print out, so make sure it passes the quality check.

9. Results section: did you compare the males/females within each group to make sure no differences in MUPs? If so, should state that you compared the males and females within each group and found no differences. If not, this should be addressed.

10. Results section: second paragraph, 7th line. “The area-to-amplitude ratio (ARR)” needs to be changed to (AAR).

11. Discussion: Need to address the fact that the knee OA group may not actually be doing an MVC (or getting as close to an MVC) compared to the healthy group due to pain.

12. Discussion: It is mentioned that duration and AAR are not as affected by electrode position, but you should also address the point that needle-MUP duration is not a reliable measure.

13. Discussion: paragraph that starts with: “Alternatively, the recruitment of larger MUs…..” The third sentence in this paragraph, “as a result, the discharge rate…..” is very awkward/confusing, can you reword this.

14. Discussion: The second sentence following the above mentioned (12), “it has been shown in experimental pain models that MU firing rate……” Needs a reference.

15. Acknowledgment at funding section. “MB is supported by….needs to be changed to “MJB”

16. Reference section: reference 5 is missing information about journal page numbers and volume

17. Reference section: reference 16 is missing information about journal page numbers and volume

18. Table 1. It would look nicer/read easier if you lined up all the +/- in the control and OA columns

19. Figure Legend. Figure 2. What you state is represented as your control (open bars) and OA (solid bars) is different than what is in your actual figure.

**Level of interest:** An article of importance in its field
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