Reviewer's report

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

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Reviewer: Kohei Watanabe

Reviewer's report:

General Comments

The purpose of the present study was well defined. The method and results were appropriate and well documented, however some part of them was questionable. So, authors should modify or add some description. Discussion was well stated and supported by the results in the present study and previous studies. Small number of the subject would be limitation of this study. Moreover, there was large variability in severity of OA and weakness of force capacity for patient group. Consideration of interindividual difference of them for patient group would need to fully understand the results of the present study.

Discretionary Revisions

[Title]
“a descriptive study” may not be appropriate.
Authors can omit subtitle.

[Abstract]
-Background
“… motor unit (MU) properties in a cohort of participants with ….” could be rephrased as “… motor unit (MU) properties in participants with ….”

[Background]
“These results……(not greater) MU recruitment.”
This description may be hard to understand for the readers. Authors need to rephrase or separate two or three sentences simply.

[Second line in Discussion]
“N-MUPs and S-MUP, provide…” could be rephrased as “N-MUPs and S-MUP provide…”

[Methods]
To show duration of knee OA (in years or month) can supply valuable information to understand characteristics of the subjects for OA group.

[Discussion]
Insertion of “number of Figure or table” after the sentences related with the results of the present study would lead to know whether authors are discussing for the result in the present study or not.

For example,
- Third paragraph in Discussion
  “Alternatively, recruitment……observed in the OA group (Table 1).”
  “The significant of such small … control participants (1Hz) (Table 1) is questionable,”
- Fourth paragraph in Discussion
  “It is surprising … subjects was observed (Table 1)”

[Figure 1]
Please insert title into top of each panel group (MUP template; MUP stability; …; Firing Graph) in Figure 1.

Major Compulsory Revisions
[Beginning of Background]
Because MVC test is the way to assess muscle weakness, assessment of muscle weakness in knee OA using MVC would be a matter of course. Thus, authors should state that there are little data about motor unit activation in knee OA patients during submaximal contraction in this sentence if there are no studies to report about motor unit activation in knee OA patients during submaximal contraction.

[Methods, Motor unit properties, …about MU architecture and health.]
Mean of “health” is difficult to understand. Please rewrote in different word or add an explanation.

[Methods, Needle and surface EMG signal were …]
Why did author select vastus medialis muscle within the four muscle components of quadriceps femoris muscle group. Please explain.

[Methods]
It is suspected that detection of individual MUP is difficult in surface EMG at 20% of MVC because of superimposition of two or more MUP. Authors should demonstrate or explain validity of decomposition at this force level in detail.

[Results]
Surface EMG signal (shape of action potential) is strongly influenced by
subcutaneous tissue thickness (Farina et al. 2004, JAP). Also, there is a strong correlation between subcutaneous tissue thickness and BMI (Ludescher et al. 2011, Clinical Endocrinol (Oxf.)). In this study OA group has high BMI, thus subcutaneous tissue thickness in OA group may greater than control group. Authors should discuss the effect of subcutaneous tissue thickness on the results obtained in the present study.

[Methods, Results and Discussion]
There is large variability in WOMAC Score in OA group, meaning that the individual subjects in OA group have different severity of OA. Moreover, large variability was demonstrated in weakness of MVC for OA group (approximately -45% ~ +1% to average value of control group).

From these results, consideration of interindividual difference in severity of OA or MVC could lead to understand the results for OA group obtained in the present study. Thus, it would be needed analysis or discussion of the results related with interindividual difference in these characteristics for OA group.

**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 below.