Reviewer's report

Title: Effects of home-based resistance training and neuromuscular electrical stimulation in knee osteoarthritis: a randomized controlled trial

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Reviewer: Nicolas Place

Reviewer's report:

The present manuscript aims to compare the effects of home based resistance training or NMES on functional tests, muscle force and muscle CSA with a RCT design. The manuscript is well written and well-referenced but some important points need to be addressed to improve the impact of the paper, particularly in the Methods and the Discussion sections.

Major Compulsory Revisions

Methods

P.5: More information is needed in the resistance training group paragraph: apart the duration of the session, we have no idea of what was done (how many repetitions, how many series for each exercise, was there any specific order to perform the 5 exercises…) and how this was done. This is important if one wants to replicate the protocol.

P.6: same comment with NMES; what was the position of the subject? Which knee angle was used? Was the exercise performed in isometric condition? Was motor threshold reached for the subject during the electrically-induced contraction…?

P.6: I don’t understand what has been considered as a “maximum stimulation intensity comfortably tolerated”: what this maximally tolerated or comfortable intensity? This has to be clarified.

P.8: I guess the tests that have been used (25m walk test, repeated chair stand test, stair climb test) have been previously shown to be valid and reliable for the OA population. Please mention some references here. If these tests have not been validated yet, results from the manuscript cannot be considered as valid.

P.11: Did the authors perform a two-way, repeated measures ANOVA (group x time)? If that is indeed the case (and what I would expect), results from Tables 2 and 3 should be merged. Furthermore, what was the sample size considered for statistical analysis (n=10, n=10 and n=6 for the three groups, as indicated in Table 3)?

Results:

P.13: the absence of change in quadriceps muscle force is very surprising, given the increase in muscle mass. In previous studies (refs 19 and 20), increase in
muscle mass was accompanied by improvement in muscle force. Could this be due to the fact that the patients were obese subjects and thus that the relatively low stimulation intensity used in the present study combined with the most probably important fat layer limited the efficacy of NMES? Apparently not if subjects showed hypertrophy...

It would be interesting to assess if there is any correlation between the gain in muscle CSA and the improvement in the functional tests. If there is a significant correlation, this might indicate that improvement in contractile properties could partly explain these improvements. Then it may be that voluntary activation decreased after the training period, which would be very surprising as both resistance and NMES training modalities showed increased muscle activation in previous studies.

Discussion:
In the present form the Discussion is too descriptive; authors do not explain their findings.
- How to explain the functional improvements?
- Why weren’t functional improvements associated to muscle strength gain?
- How to explain that a bigger muscle is not stronger?

Authors should not avoid these questions in the Discussion; I think one of the main limitation is the absence of any measurement of voluntary activation (surface EMG, twitch interpolation,…) and this should be mentioned too.

**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.