Author's response to reviews

Title: Six-week high-intensity exercise program for middle-aged patients with knee osteoarthritis - a prospective, randomized, and controlled study

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Author's response to reviews: see over
Response and comments to reviewer:

Thank you for your wise and useful comments, and for giving us the opportunity to further improve our manuscript.

1. **Outcome measures**
   a. Regarding the 12-month follow-up, we agreed to the comment and dropped the 12-months analyses throughout the study.
   b. We limited the outcome measures by excluding the 12-month follow-up, and by focusing on the paired analyses.
   c. We reorganized the manuscript, so that tests of functional performance are reported as secondary outcome measures, after the main outcome.
   d. The baseline KOOS scores were dissimilar, but not statistically different. However, by paired analyses throughout the manuscript, we limited the risk of comparing different groups.

2. **Tables** are reorganized, with exercise and control group as columns and variables presented as rows.
   a. In Table 1, Total group column and modified Edworthy scores are removed. Instead KOOS baseline scores are included.
   b. Table 2 have become Table 3. Results are averaged for right and left limb.
   c. Table 3 have become Table 2. Paired analyses only, and 12-month follow-up excluded.
   d. Table 4. Paired analyses only, and 12-month follow-up excluded. We have reduced the risk of type-1 error by using PCS and MCS scores.
   e. Titles for tables changed to ‘descriptives’ instead of ‘results’

3. **Statistical analysis.**
   a. A paragraph about the power is added to the discussion. Power analysis this study was originally based on levels of circulating neuropeptides, as described. The original design of the study was to study effect from exercise on levels of circulating neuropeptides in patients with knee osteoarthritis. A similar study had previously been carried out on patients with rheumatoid arthritis. Patients’ self-estimated symptoms, function and quality of life were collected and the impact of exercise on these items were addressed in the present study. However, we performed a post-hoc power analysis, which now is described in the discussion, in ‘critical assessments’.
   b. The section called hypothesis information is excluded.
   c. Intention to treat-analyses were performed in the 12-month follow-up. The patients from control group who chose to exercise, were still included in the control group in the 12-month analysis. Since the data from 12-month follow-up are removed, this is no longer a question.

4. **Results**
   a. The paragraph ‘Compliance with and efficacy of program’ are reported after the main outcomes.
   b. Only paired analyses are reported
   c. The paragraph ‘Hypothesis generating information’ is excluded
5. **Discussion**
   a. Main message – the limited generalisability are addressed by elucidation of the group of patients included in this study population.
   b. Statements regarding efficacy for some but not all, and QOL as assessment in OA interventions are excluded.
   c. The expression regarding the ‘conflicting results’ between Deyle et al. and Fransen et al. have been somewhat changed, to reduce the risk of being misunderstood. Our point is that Fransen et al. suggested that the result from exercise is modified by joint space width, while Deyle et al. showed improvement in self-reported pain and function as well as 6-minutes walked distance, even after controlling for joint space narrowing.

6. **Conclusions**
   a. The possible explanations to lack of effect in this study (study power, selected population, short intervention, intensive exercise) have been discussed in the previous section. The exercise program was targeted towards these patients, by modifying the exercise program used in a previous study in patients with rheumatoid arthritis (mentioned above), as stated in the method section, p 5. As most of the exercises were performed in closed chain, exercises involving hip muscle strengthening also involved muscles across the knee. Abdominal muscles are needed to achieve proximal stability, which is considered as a prerequisite to improve and be able to use knee function.