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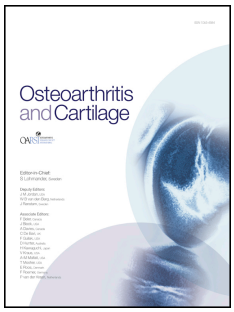

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Letter to the editor:

Response to the comments on "Effects of high intensity aquatic resistance training on body composition and walking speed in women with mild knee osteoarthritis: a 4-month RCT with 12-month follow-up"

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We thank you for taking an interest in our recent article and spending the time to evaluate its content at such depths. A number of important aspects have been raised and we will strive to answer them fully in order of the original letter.

Most participants in randomised controlled trials (RCT) are volunteers, which is the most common recruitment method in this field[1]. In daily practice, the adherence of most patients may not be as high as in RCTs. This introduces a selection bias preventing the generalization of results from RCT's to real life daily. In our study, recruited participants are women with mild knee osteoarthritis (OA), thus they are preclinical. Recruitment of this population would be difficult using another method. We would like to highlight that there was no inclusion criteria for enthusiasm. Participants did have to give written consent to be randomised into one of the two treatment arms, as is normal for RCT studies. We hypothesize that the training, its delivery, i.e., skilled instructors, the group dynamics and enjoyment were also, in part, a positive reason for the high adherence.

The primary outcome for our AQUAREHAB project was the biochemical composition of cartilage with symptoms and functional capacity as secondary outcomes. The results of the primary outcomes are reported in our earlier article[2]. The previously validated 2km walking test uses the calculation (116.2 – 2.98x(walking time, min) – 0.11x(final heart rate) – 0.14x(age) – 0.39x(body mass index)) to estimate cardiorespiratory fitness[3]. Walking speed, calculated from walking time, was the preferred outcome in this study as it represents the participants' functional capacity and is not an estimation. Exclusion of this clarification from the study protocol was an oversight on behalf of the authors.

As pertained to in the introduction of the original article[4], training for 3 hours a week leaves plenty of time per week for other leisure time physical activities (LTPA), that could easily affect both cartilage health as well as functional capacity and body composition[5]. In previous aquatic exercise studies, LTPA is not reported. Throughout our study, LTPA was similar in both groups after exclusion of the intervention. Adjusting for LTPA or baseline values did not change the overall results of the primary analysis. We did not include the adjustments for baseline or LTPA values due to the clear

group homogeneity. We were also interested if overall LTPA over the 16 months study period was more important for the chosen outcomes in this paper, than inclusion in a 4-month intervention. The results of the secondary analysis suggest that while higher levels of LTPA, in part, has an effect on body composition, walking speed, i.e. functional capacity needs to be separately trained. However, we acknowledge in our discussion, there are many other factors including diet that might have influenced the results.

The description of each training session is reported in the supplementary data of our previous article and includes the minor change of one session from resisted to barefoot training from the protocol study[2]. Clarity and openness of reporting the intervention content, allowing accurate replication, is rarely achieved in aquatic exercise studies. The high adherence and group dynamics ensured that all participants trained within the target heart rate zone, preventing differentiation between those who trained at low and high intensities.

The included population, i.e. women with mild knee OA, are situated earlier in the OA continuum[6] than those included in the referred Cochrane review[7]. Therefore, care must be taken before making a direct comparison due to different study populations as well as research questions asked. The degree of pain and functional impairment experienced by the subjects at recruitment in the dimensions of the Knee injury and Osteoarthritis Outcome Score (KOOS) questionnaire were so low did not expect to observe a significant change. The management of knee and hip OA is changing, there is a shift from treating pain and loss of function at the end stage of the disease to management systems that to prevent it in early OA. Therefore, we did not claim this to be a treatment but as a possible exercise option in the management of early knee OA and possibly help in disease prevention.

Modern healthcare professionals need a variety of evidence based exercise options available to choose from, with patient choice being central in treatment selection. Aquatic resistance training is just one of those options, there is no such one size fits all in exercise prescription. The high

adherence to the training suggests that, at least in women, the training modality is popular. Aquatic exercise is recommend to those who cannot exercise on land due to pain; therefore, it is reasonable to suggest this is also a viable intervention in the treatment of later stage osteoarthritis.

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No other authors

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Conflicts of interest

No conflicts of interest

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