Reviewer's report

Title: Study Protocol: Does isolated hip strengthening for patellofemoral pain syndrome give better long term results than traditional quadriceps based training? A randomised controlled trial.

Version: 1 Date: 16 November 2014

Reviewer: Michael Skovdal Rathleff

Reviewer's report:

This study protocol aims to examine the effect of hip strengthening versus quadriceps strengthening compared to a control group with free physical activity. As this is a study protocol that appears to be fully funded, I will only comment on the specific aspects of the study protocol that might benefit from further clarification.

Minor essential revisions

Introduction L57: There are a few studies looking at the incidence and prevalence, also within closed populations. Consider revising and referencing a couple of the key papers that might reflect your study population.

Introduction: L61-67: This sections deals with the etiology of PFP but reference none of the most important prospective studies that examine risk factors for PFP. Consider looking at the review on risk factors by Lankhorst et al. This will help strengthen your arguments made here. Lankhorst et al. J Orthop Sports Phys Ther. 2012 Feb;42(2):81-94

Introduction: L68-L75. This sections deals with the treatment of PFP however, none of the recent systematics reviews on the treatment of PFP is mentioned. Please consider adding these, as this will help the reader seeing how your study builds upon previous research and how your study will fit into the literature.

Introduction: L80. "Women with PFPS have been found to be weaker in hip abduction and external rotation compared to healthy controls [26]." The Prins review that you cite was recently updated by our group. Please consider referencing the new review which was published in the BJSM.

Introduction: L90: Please add your hypothesis.

Methods:

L156: The treatment protocol is very difficult to follow and replicate. Most basic descriptors of an exercise protocol are missing. Please add time under tension, range of motion, intensity (e.g. 10 repetition maximum), training to failure and pain during exercise. Please take a look at Toigo and Boutelliers paper “New fundamental resistance exercise determinants of molecular and cellular muscle adaptations”. They have a good description of which exercise parameters that should be reported.
L160: Please add a rationale for why you progress using increased number of repetition and not through e.g. increased intensity or number of sets.

L166: What is the rationale for using these quadriiceps exercises? Also, please add more information on the exercise protocol.

L156-L166: What is the rationale for using these two exercise protocols and not some of previously used exercise protocols that have been tested in previous RCTs?

L271: How will you measure compliance to home-based exercises?

L271: Do you plan on using the compliance data in an analysis? It would be interesting to see if there is an association between compliance and effect. Consider adding this as a pre-planned analysis.

L308: “The inclusion of a control group is important, as there is conflicting evidence regarding the effectiveness of specific training compared to patient education, natural course and placebo [52, 53]”. You reference a study protocol (Rathleff et al. BMC 2012). The results from this trial have been published recently in BJSM and show a better effect of patient education and exercise compared to patient education alone. Please consider adding the reference to this RCT.

L308: Recently a new RCT was published that compared quadriiceps exercises with hip+core exercises. This is very similar to your trial. It would be good to add the results from their trial in your introduction. Ferber et al. J Athl Train. 2014 Nov 3

**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 have no conflicts of interests to declare.