

**A critical appraisal of “Strengthening of the Hip and Core Versus
Knee Muscles for the Treatment of Patellofemoral Pain: A
Multicenter Randomized Controlled Trial”**

By

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**In partial fulfillment of the
requirements for the course:**

PT 7240 Evidence-Based Practice in Physical Therapy

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November, 2021

Abstract

This critical appraisal will examine the work of the aforementioned research study. This paper will provide brief background information on patellofemoral pain, the condition being looked at. In addition, the clinical question and the basis of this critical appraisal shall be introduced. This appraisal progressively breaks down the article from beginning to end. Starting from the article's introduction all the way to its references. The strength and weaknesses of this study will be discussed, and the clinical implications explored. Finally, it will be assessed whether or not the clinical question was answered adequately and what this means moving forward.

Key words

Patellofemoral pain, pfp, strength

Introduction

Patellofemoral pain or pfp has been a rather mysterious injury that has affected many. It's a mysterious injury simply due to the fact that up to this point, no one truly knows the exact cause of it. With that being said, the approach to treating such an injury can also be quite opened ended. The purpose of this critical appraisal is to see if the literature is able to provide any definitive data as to what kind of approach should be taken to treat pfp. In which case, the question became does lower extremity strength training improve symptoms for patients presenting with patellofemoral pain syndrome?

Methods

In order to find the most appropriate research article to use, the main two databases that were utilized were Pubmed and PEDro. With these databases, keywords such as pfp and strength were used when performing the search. Filters such as full free text, randomized clinical trial and dates no earlier than 2010 were used to narrow the search for an appropriate article. The articles had to meet inclusion criteria that consisted of focusing on patellofemoral pain as opposed to other knee conditions, as well as focusing on strengthening as an intervention. This is due to the common belief that patellofemoral pain could possibly stem from muscle imbalances. Approximately 150 hits were found prior to reviewing possible articles.

This article was published in the Journal of Athletic Training in 2015. It was written by Reed Ferber, Lori Bolgla, Jennifer E. Earl-Boehm, Carolyn Emery, and Karrie Hamstra-Wright. This article was chosen out of the final three as it firstly was the most recent study of the three. In addition, this article was able to further answer the original research question that broadly

pertained to the lower extremity and was able to divide it to more specifically the hip vs the knee. All in all, this article presented with the most thorough study of them all. With that being said, one of the elements that contribute to this is that the outcome assessors were blinded to the group assignments of the patients. This is important as preventing any bias in their measures is crucial to the study. The inclusion and exclusion criteria were thorough to allow for patients to have a niche and cohesive set of symptoms and history to consider. Lastly, the study used the visual analog scale and anterior knee pain scale which have both been reported to be valid and reliable outcome measure

Results

Summary of the study

Patellofemoral pain or pfp is a condition stemming from overuse. This study acknowledges that although previous studies have looked at the benefits of hip and core training on the effects of pfp, there have been no studies that have directly compared hip and core to the traditional approach of a knee focused program. This study was done as a single-blind RCT that took place at four different sites in four different cities. 721 patients with pfp were screened and only 199 met the inclusion criteria for the study. Regarding which limb to focus on for patients presenting bilaterally, the limb that was most affected was chosen. The results found that of the 199 patients, 157 patients reported success. With 89 of 111 being patients who followed the HIP protocol, and 68 of 88 following the KNEE protocol. Both groups presented with improved strength, but the HIP protocol resulted in greater strength in hip abduction, hip extension, and core endurance than the KNEE protocol. Although both protocols improved strength and pfp

symptoms, the most glaring result was that those in the HIP protocol showed improvement a week earlier than the KNEE protocol did.

Appraisal of the study introduction

The introduction of this piece provides a thorough background of patellofemoral pain that consists of symptoms, activities that exacerbate the condition, as well as the main populations that are affected. It then goes on to acknowledge prior studies that have examined strengthening and its effects on pfp. However, the authors did point out that although prior studies have looked at strengthening the muscles around the knee and the muscles around the hip, there have been no studies that have directly compared the two. With this acknowledgement, the authors proceed to introduce their study and the main, as well as secondary variables that were being examined.

There are no glaring weaknesses within the introduction. Although, one could view the dates of the pieces of literature that are referenced and say that some may be outdated. With the literature ranging from 1999-2013. However, given the fact that the results of 2013 seem to agree with results from 1999, one could also conclude that the results could simply be the standard.

Appraisal of the study methods

The research design was experimental, prospective, longitudinal, and single-blinded. The study was able to gather a considerable sample size with 199 subjects further validating the results of the study. The inclusion and exclusion criteria were rather thorough as well. The intervention for each group was described clearly and in detail as the authors also provided a list of all exercises

that were performed for each group. With this information, there should be no trouble in replicating this study. The outcome measures were also discussed adequately, and their validity and reliability justified by referenced literature.

As thorough of a study this was, there a couple obvious weaknesses in the design. One of them being the fact that the study did not have a control group. Another design flaw was not implementing some kind of placebo exercise within each group, as even though subjects were blinded to their assignment of HIP or KNEE protocol, one could easily tell which group they were in based on exercises. This could possibly have provided unwanted bias within the subjects and affected results.

Appraisal of the study results

The results were presented in a clear and detailed manner, as the authors were able to provide their data in figures and tables in addition to their written results. The results are presented in the same order in which the research questions were asked at the beginning of the article. The results were also able to address all five hypotheses that were made in the article's introduction. All outcome measures were reported, and each presented to be statistically significant with each having a p value of $<.05$. There did appear to be any significant weaknesses in the results section.

Appraisal of the study discussion

Although the authors began by simply repeating the results that were aforementioned, they did present further dialogue regarding those results. Discussed were possible factors that could have

influenced the results. Within this discussion, several previous studies were discussed, and results compared, as well as protocols.

The authors were also able to acknowledge the limitations of their study. Firstly, acknowledging the fact that they did not have a control group to compare to. In addition, even though the outcome measures used are valid and reliable, the authors felt that they could have implemented more outcome measures to better distinguish results between the two interventions. Lastly, they recognize that this study lacked a follow-up to ensure that the effects of these interventions were long lasting. To their credit however, they have since began conducting a follow-up study to this original experiment in order to do just that.

Discussion

Although the results of this study proved to be statistically significant, that does not always necessarily translate to being clinically significant. In this case however, the results have proven to be significant in both areas. With something like range of motion where two degrees can be statistically significant but negligible in the clinic, any sort of improvement in pain could be monumental to a patient. Which is the case with the interventions examined in this study. This study has not only answered the question of “Does lower extremity strength training improve symptoms for patients presenting with patellofemoral pain syndrome?”, but it has taken it a step further by examining specific regions of the lower extremity.

This study has shown that either of the interventions whether it be the HIP protocol, or the KNEE protocol has shown to improve symptoms for those dealing with patellofemoral pain. There is a possibility however that these interventions could exacerbate the condition considering that pfp is considered an overuse injury and continuing to exercise could cause further complications. Given that

the results of this study have shown significant improvement in pain for the subjects, with the HIP protocol achieving such in quicker fashion, it is hard to argue that the proven benefits could be overshadowed by what can only be deemed as conjecture at this point with the potential risks. So long as these interventions are implemented by trained individuals who know how to assess the situation and their patients/subjects, it is unforeseeable that clinicians would not do their best to minimize potential risks in the first place. This stance on the interventions being beneficial could have further solidified if the study has also presented with control group. Although it is never safe to assume, one can provide an educated guess and infer that providing some kind of logical intervention would be more beneficial than providing no intervention.

Given the way this study was planned, executed, and interpreted, there is enough confidence in the validity of this article to consider using it as evidence with future patients. Not only do the results prove to be significant, but previous literature has also indicated such findings. The interventions provided in this study could easily be implemented in a clinical setting for clinicians of all experience levels. This is due to the fact that there is no complex manual therapy being done, no intricate modality being implemented that would require training, or any other elaborate intervention. It is simply performing exercises.

After all that has been discussed, this study has shown the benefits of two different approaches for treating such a mysterious condition that is patellofemoral pain. Even with its flaws and limitations, there is no denying the results of this study and the profound impact it can and will have in a clinical setting. Perhaps the question to look at now is if an intervention that combines both HIP and KNEE protocols could prove to be more beneficial than either alone?