

A critical appraisal of “Magnetic Resonance Imaging and Clinical Outcomes of Laser Therapy, Ultrasound Therapy, and Extracorporeal Shock Wave Therapy for Treatment of Plantar Fasciitis: A Randomized Controlled Trial”

By

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Abstract

This is an appraisal of an article analyzing the effectiveness of laser therapy, extracorporeal shockwave therapy, and ultrasound in the treatment of plantar fasciitis. This article was chosen for appraisal because it furthers research for the clinical question asking of the effectiveness of extra corporeal shock wave therapy versus stretching for decreasing pain in patients with plantar fasciitis. The article was found through searching PubMed and Medline Complete. The strengths of this article include the detailed methods and in depth results, the blinded radiologist, and random group assignments. The weaknesses found in the article included the lack of control group, lack of blinding, short follow up period, and lack of background information of the participants included in the study. It would not be recommended to apply these interventions in the physical therapy clinic because of the several weaknesses present in the article. However, statistically significant results were found in laser therapy and ESWT. With the in depth methods, a physical therapist could replicate the intervention and trust that some significant differences will be made. Overall the article provides great detail for procedures but too many limitations to use as evidence to apply the interventions in the physical therapy.

Key words

Plantar Fasciitis, Extra Corporeal Shock Wave Therapy, Pain, Physical Therapy

Introduction

This critical appraisal was done to research the clinical significance of extracorporeal shock wave therapy and its' effects on decreasing pain in patients with plantar fasciitis. Plantar fasciitis is an extremely common condition that physical therapists' see in the clinic. Although there has been a lot of research conducted over this condition, the incidence of clients with this condition continues to rise so it still requires more attention. Finding out ways to decrease pain is very important for a client's quality of life as well as compliance for further treatments. With all these aspects considered, the clinical question was: Does stretching exercises decrease pain in adult patients with plantar fasciitis compared to extra corporal shock wave therapy?

Methods

The research for this article appraisal was completed through database researching. The databases used were Medline Complete and PubMed with the keywords: Plantar Fasciitis, Pain, Stretching, Extra Corporeal Shockwave therapy, Treatment. The limitations of this search was the time of article publishing for example with stretching, most research was done many years ago so it is not as up to date and new as ESWT. Another limitation was that most authors were MDs and PhDs, which is very reliable however not physical therapist driven. The inclusion criterion for this search was: general population with plantar fasciitis, full article availability, and the article needed to be in the English language. The exclusion criteria included any diseases or other injuries associated with plantar fasciitis. The total hits found including the criteria above was about 50.

The article that was chosen to be appraised was from The Journal of Foot and Ankle Surgery and was published in 2017. The authors are all MDs that represent Celal Bayar University Medical School in Manisa, Turkey. This article was chosen for critical appraisal

because of the recent publication as well as comparing multiple treatments for plantar fasciitis. It provides a sound study that covers multiple aspects of plantar fasciitis and was done efficiently and effectively.

Results

Summary of the study

This study was conducted to analyze the different therapeutic effects of ultrasound, laser therapy and extracorporeal shock wave therapy for patients with plantar fasciitis. The design of this study was a prospective, comparative, clinical study with the investigators unaware of the treatment groups. There were a total of 60 participants that were separated randomly (blind to both the researchers and participants) into the 3 groups. One investigator performed each therapy and another investigator performed all outcome measures. All patients were assessed before and after 1 month of treatment using the visual analog scale (VAS), heel tenderness index (HTI), American Orthopaedic Foot and Ankle Society (AOFAS) ankle-hindfoot scale, Roles–Maudsley score, and MRI. Out of 60 participants initially, 54 participants were analyzed for the primary outcome and 52 patients were analyzed for MRI. The results showed that the thickness of plantar fascia thickness decreased in all 3 groups. However, the treatments using laser therapy and extracorporeal shock wave therapy resulted in similar outcomes and were more effective than US therapy in improving pain and function.

Appraisal of the study introduction

The introduction demonstrated multiple strengths in this article. One of the strengths was that it was very in depth and informative about each therapy used and the injury itself. The author used a great amount of literature, most of which was very credible, to form the rationale

for this study to truly compare each of these treatments. The authors also addressed the critical values that were present in the title individually and explained them each thoroughly.

The authors did have some weakness in the introduction as well. They provided a good amount of information about the treatments, but more information regarding the therapeutic effects of each treatment would be necessary to truly introduce the idea of this study. The outcomes were not addressed very thoroughly in the introduction and this caused some slight confusion when looking forward into the study as to how the outcomes would be measured. Many of the sources used in the introduction were strong, however there were a few that were weaker literature that require more examination to see why the authors utilized those few sources.

Appraisal of the study methods

The methods section of the article provided many strengths. The first strength was that it was an experimental (RCT) and prospective study. The group assignments were done completely at random, blinded to both the participants and researchers. This study being randomized is a great strength to have in regards to ensuring less bias and more reliability. There also was some blinding to this study, the radiologist analyzing the MRI was completely blinded, giving that specific outcome measure a single-blind status. Another strength of the methods was that the interventions for each group were described very thoroughly as well as the procedure of data collection. The primary outcome measures were also described in great detail and references were also given to research the reliability and validity of the tools used.

Although the methods produced many strengths, weaknesses were also present in this section. The study was done as a RCT, but it was done over a very short period of time (1 month) and blinding was not possible due to the type of treatments. There was also no control group

which is difficult to truly measure effectiveness when there is no true control to compare to. Multiple participants (different amount from each group) dropped out of the study for various reasons which can cause some differences in the data. There was also no statement in the article about the differences (sociodemographic, age, prognostic) between the participants which makes it difficult for readers to know if the results could be applied to their patients.

Appraisal of the study results

The results section produced many strengths. To start, the results were very organized and discussed each outcome measure that was utilized in the methods. It also has a lot of detail explaining the significance of each result. The results as whole also answer the overall question. Each aim of this study was addressed in great detail as well as explained. There were also findings in the results that can be considered clinically meaningful. These findings include: the laser therapy and ESWT showing significant differences in AOFAS scale, VAS scores in daily activities, first steps in the morning and with exercise. The standard deviation of these scores did not go low enough to matching the before treatment scores, so this showed that for each participant, some improvement was made.

There were also several weaknesses present in the results. One of the weaknesses was that although each outcome measure was expressed, some were expressed in much more detail than others. The figures in the results showed a vast amount of information which is to some extent a strength, however it also made the figures somewhat difficult to follow. Because of this research having 3 different treatments, it an elevated amount of information in just a few figures. The final weakness present in the results section was that there was no mention of MCID or NNT in this article.

Appraisal of the study discussion

In the discussion section of this article the authors go into very in depth detail of the meaning of these findings which is very beneficial for the reader to understand the significance of this study. The authors also referred to previous research multiple times throughout this section. The authors provided multiple references throughout the discussion and most of the evidence used was considerably strong. Limitations (short time period, no control group) were also addressed which is a strong attribute to this article so that the readers can take into account what should be changed for future studies. The conclusions the researchers made were very reflective of the results and were not over concluded. The authors were honest with the outcomes that were not very conclusive and they discussed in greater detail about the outcomes that were conclusive.

The discussion section only presented with a few overall weaknesses. The first weakness was that there were a few references used that could be considered weak evidence. One article in particular was withdrawn from publishing. Further examination should be done about the information the authors gathered from the weak sources. Another weakness of this article is that no further studies were suggested even though the authors stated the multiple limitations the present study had. It should be recognized that further study is encouraged so that the authors could further validate their research. The final weakness of this study was that there was no specific indication of the clinical significance of the study.

Discussion

This study is very helpful for practicing physical therapists because plantar fasciitis is an extremely common condition. It is important for clinicians to see this research so that they can find what the best treatment plan is for patients. This study was done comparing 3 very common

treatments and using a variety of outcome measures to truly see what their impacts are on function as well as pain. This article was relevant to the clinical question because this study goes very in depth with the outcomes and MRI measuring thickness to see how beneficial this treatment is for patients. This article helps in determining if this treatment can be just as helpful or even more helpful in reducing patient's pain in plantar fasciitis in comparison to primarily utilizing stretching techniques.

This article provides many strengths in favor of applying the interventions that were proven significant in the clinic. However, the weaknesses outweigh the strengths in multiple aspects throughout the study which proves that more research should be done and this should not be the sole evidence to applying the interventions given in the article. The potential benefits of utilizing the results from this study in the clinic would be that the ultrasounds and ESWT showed significant results no matter what for every patient that received the treatment. However, the risks would be that the study did not indicate specifics about the population used, the treatment was only done over a very short period of time, and none of the researchers were truly blinded. The potential risks greatly outweigh the benefits because of these very significant weaknesses. The improvements this article needs to reduce the argument against is creating a control group so that blinding is possible, creating a larger window of treatment time, and supplying more information about the participants so that readers can apply the information in the clinic to specific patients.

The evidence presented in this article does not provide enough validity to make a clinician consider using the interventions for future clients. The evidence does not include some vital information for a clinician such as the age and background of all the participants. Also, with the study not having a blinding component to the actual methods, it makes it difficult to know if

there is bias present in this study or not. However, with the weaknesses listed above, the application of this intervention could be done safely because of how in depth the article presents performing these techniques. Going based solely off of results and methods, these interventions could be done safely with a person who has proper knowledge, skill levels, and resources.

This article provided many strengths as far as researching protocols. However, applying the interventions used in this study in a clinic is discouraged. There is too much vital information left out of this article to truly apply the findings in a clinic. It is crucial that more research is conducted with changes to the several limitations of this study to verify these findings. However, the conduction of this study is done very well and can be referenced for future studies as a baseline. This article overall produces some very useful information that should be taken into account for future studies and not necessarily implemented in a clinical setting.