A critical appraisal of "The Effect of Corrective Splinting on Flexion Contracture of Rheumatoid Fingers"

By

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Abstract

Chronic conditions are becoming more prevalent with our aging population increasingly becoming the majority and the growing use of technology. To answer the clinical question surrounding the effectiveness of splinting for contractures, the article “The Effect of Corrective Splinting on Flexion Contracture of Rheumatoid Fingers” was appraised for strengths and weaknesses and assessed for credibility. The introduction provides the background and importance of this critical appraisal surrounding the interest in the effectiveness of splinting in treating contractures associated with chronic conditions like rheumatoid arthritis. The methods detail the process of literature review including database selection, key words, limitations, inclusions/exclusions, and initial hit count. The results appraise each section of the article for strengths and weaknesses in order to assess usefulness or possible application of the treatment methods discussed. Overall, this article did not present enough credible evidence to definitively prove splinting is a safe and effective treatment for contractures associated with chronic conditions like rheumatoid arthritis. However, this article does provide insight and encouragement for further studies to investigate splinting as a promising treatment.

Key words: Contracture, Rheumatoid Arthritis, Splint, Range

Introduction

With the widespread normalization of online school and business during the COVID-19 pandemic, technology has become increasingly engrained in everyday life. The full impact of this increased digital influence will not be completely understood for decades. However, one theory suggests that the increased use of fingers to interact with technology may increase the incidence of conditions such as rheumatoid arthritis and carpal tunnel syndrome. Splinting is one method suggested to treat contractures that are associated with RA and other chronic conditions. This article was chosen in order to answer the clinical question, "Can splint treatment be used to improve functional range of motion for patients with contractures?" and was appraised for strengths and weaknesses.

Methods

Pubmed.gov was used throughout the literature research for this appraisal. Words like "contracture", "established contracture", and "contracture splint" were used to narrow down the search. The searches were limited to "clinical trial" and "randomized controlled trial" to make sure the articles included treatment. They were also limited to "humans" which helped to rule out any animal trials. The only inclusion used is that the study must include patients with contractures. No exclusion criteria were used. There were 46 hits prior to article review.

This article was published in the Journal of Hand Therapy in 2002. The authors are Cecilia W. P. Li-Tsang, OT(C), MPhil, PhD, Leung Kim Hung, MBBS, FRCS, and Arthur F. T. Mak, MSc, PhD. This study was conducted at The Hong Kong Polytechnic University, Hung Hom, Hong Kong. I chose this article because it addresses my clinical question and presents with both desirable and undesirable qualities which provides a more extensive learning opportunity

for clinical appraising. The other articles I reviewed appeared very weak and had too few participants. This article started with a strong introduction by presenting a very detailed knowledge of previous literature and the associated implications which was a large factor in the selection process.

Results

Summary of the study

These researchers were looking to test if finger splints would help with finger flexion contractures in patients with rheumatoid arthritis. To test this, they took a group of 24 participants and randomly split them into two groups where each received one of two types of splints: dynamic or static. All of the participants were tested for ROM, grip strength, and the Jebsen Hand Function Test prior to and post treatment. They were monitored for 6 weeks for baseline testing which ensured their RA was stable and then followed a splinting program for 6 weeks. At the end of 12 weeks, they found that there was a significant improvement in the grip strength of PIP joints. There was no statistical difference between the groups for active extension of the PIP but there was a significant difference for active flexion. Overall, there was no significant difference between the static and dynamic splint groups. In conclusion, they claim splint treatment helps correct flexion contractures which then improves grip strength and overall hand function. They also admit that due to some problems during the experiment, there may be flaws in the data and further testing will be needed.

Appraisal of the study introduction

This article successfully introduces the concept of RA and its pathogenesis as well as past experiments and their associated conclusions despite the literature being split on support for splinting. The references included in the introduction support the credibility of this paper because all but one appear to come from credible journals. The authors addressed all the critical variables and explained many of them well.

The age of the references mentioned in the introduction are a cause for concern because most of them are over 10 years old which may indicate outdated or irrelevant data. Although they explain the experiment's concept well, they give little detail or explanation on how splints work which could be confusing for those who are unfamiliar with this topic.

Appraisal of the study methods

The methods are logical and very well written. This article had a very well-balanced patient group demographics. They gave a lot of good information on how the tests were performed, adjustments made to the splints, and instructions for use of the splints. This study could be replicated easily unless those types of splints have been replaced by newer versions leaving the older versions hard to attain. The outcome measures and methods used were substantially supported by the literature for validity.

The difficulty in blinding patients and clinicians in this experiment is a weak point for this paper. The principles of this experiment make blinding difficult, but the article is additionally vague about who was blinded except that the therapist who did the pre- and post-treatments was blinded. The attrition mentioned in this paper should be questioned as they do not clarify when patients were excluded because of a decline in their conditions. If any patients were removed from the program after treatment had begun, they could be skewing the data and

ignoring possible risks of treatment. Also, patients were self-administering treatment which can lead to large inconsistencies in treatment time and possibly effectiveness.

Appraisal of the study results

The results are decently organized but have very few strengths. They follow the procedures by first discussing the baseline period and how the lack of significant difference from pre- to post- baseline function contributed to the later experimental data. Additionally, the tables make it easy to identify statistically significant data.

This article's results include many weaknesses. First, they introduce three hypotheses in the introduction but only accept a single null hypothesis in the results. Inconsistency extends into the outcome measures. In the methods they mention three different ranges of motion to be measured but only one is displayed in the tables in the results. The results also lack units for the data in the tables and figures and lack any mention MCID or NNT, which could be helpful for any reader that is unfamiliar with this topic.

Appraisal of the study discussion

The discussion section is very strong because they expanded on their results and compared their findings to past data as well as highlighted the more clinically relevant improvements. This article mentions several previous studies and references to further discuss implications and suggest future studies. The researchers were candid about limitations to the study recognizing that that the duration of splint wear was patient reported and hard to monitor.

The references mentioned in the discussion share the aforementioned problem of being quite old and possibly outdated or irrelevant. The largest limitation of this study is the fact that the scientist could not monitor subjects for proper use or wear time so the data may not be as accurate as the scientists would wish. As previously mentioned, this could affect the accuracy of

the findings. Also, this article appears to over conclude the findings by claiming that statistically significant results are clinically significant as well.

Discussion

This study showed the strengths and weaknesses associated with answering the clinical question, “Can splint treatment be used to improve functional range of motion for patients with contractures?” by exposing the difficulties with this experimental model and presenting the results associated with successful treatment. Clinically, the usefulness of splints as an alternative to surgical release for contractures could lead to better overall management of several chronic diseases associated with contractures.

Based on this article alone, I would not implement this treatment. This article shows statistically significant changes in several measures but only one measure has a possibility of being clinically significant. The lack of clarity surrounding attrition and how the study was blinded may lead to concerns about safety and risk. However, this treatment is versatile and very accessible to patients. If the reasons for attrition were clarified and were unassociated with treatment, this treatment appears to have very little risk and could be widely beneficial to several conditions that are associated with contractures. Overall, the benefits may slightly outweigh the potential risks, but it may not be in any meaningful way. Additional current literature review in support/rejection of treatment and a confirmation of a low safety risk would improve confidence in this treatment. To improve the argument in support of splinting, additional studies should be conducted on the lasting effects post-treatment and further investigating mechanisms of effective treatment use.

According to this article, splinting is an effective way to treat contractures. This statement is over concluding the findings of this study and should not be applied to future

patients. However, this paper is a useful foundation for conducting future studies and would be very applicable to framing a future experimental design. With future knowledge and skills, there would still be hesitancy in implementing this intervention. Safety is the questionable part of this study and future knowledge could support or oppose the use of splinting.

In conclusion, splinting is a promising treatment for contractures which are often associated with chronic conditions like rheumatoid arthritis, but should be implemented with caution, education, and careful monitoring.