

A critical appraisal of “Effects of dry needling on poststroke spasticity, motor function and stability limits: a randomised clinical trial”

By

Chelsea Seifert, SPT

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

PT 7240 Evidence-Based Practice in Physical Therapy

Department of Physical Therapy

Angelo State University

Member, Texas Tech University System

November 6, 2022

Abstract

This paper appraises an article published in *Acupuncture in Medicine* in 2018 by one student and two research chairs at Rey Juan Carlos University in Spain. The study looks at the effects of dry needling on muscle spasticity, motor function, and stability limits in patients post-stroke. An introduction to the clinical question that led to the appraisal of this article precedes the methods described to search for the article. A summary of the work is provided before an appraisal of the introduction, methods, results, and discussion is offered. Next, a discussion about the clinical relevance to current practice and an argument for using the intervention is given. Lastly, there is a brief conclusion about the overall appraisal of the article.

Key words: Dry Needling, Muscle Spasticity, Stroke

Introduction

The search focused on dry needling as an intervention for spasticity in patients post-stroke. As a future clinician interested in working with patients who have acquired neurological injuries, I felt it was good to learn more about an intervention that seems to be growing in popularity across all physical therapy disciplines. In addition, having seen dry needling done in clinics many times before, I wanted to learn more about if it helps with muscle spasticity. This train of thought led me to my clinical question: “Will dry needling decrease muscle spasticity and improve range of motion in stroke patients?”

Methods

The databases used were: PubMed, APTA, and the ASU Library Database. The keywords for the search were dry needling and stroke, muscle tonicity, and muscle spasticity. The limits on the search were free full article, full article, clinical trial, randomized clinical trial, and peer-reviewed where applicable. I used these limits to make finding a complete article with an experimental design easier. Articles excluded were those that didn't focus on dry needling as the primary intervention for patients with strokes for muscle spasticity. The intervention of dry needling could be used on any part of the body as long as the outcome measures tested for muscle spasticity. With the limits that I placed on the search, I got a total of 54 hits between all three of the databases used.

The article chosen for this critical appraisal was published in *Acupuncture in Medicine* in 2018. The authors are Zacarías Sánchez-Mila, Jaime Salom-Moreno, and César Fernández-de-las-Peñas from Rey Juan Carlos University in Alcorcón, Spain. I chose this article for critical appraisal because of the things that caught my attention while reading it the first time. In addition, the things that caught my attention made me wonder if this study was actually

randomized (e.g., the experimental group had more subjects assigned to it, and they were already at a higher level of functioning than the control).

Results

Summary of the study

The article is about the effects of dry needling in stroke patients with spasticity. The researchers compared the outcomes of 26 participants that were randomly assigned to 2 groups: Bobath only and Bobath plus dry needling (DN+). They used the Modified Modified Ashworth Scale to assess spasticity, the Fugl-Meyer Motor Scale to assess changes in motor impairment, and computerized dynamic posturography to evaluate balance and control of movement. They performed all of these tests both before and 10 minutes after a single session. The results showed significant differences between measurements for both groups but more significant for the DN+ group than the Bobath-only group. The results concluded that dry needling does improve spasticity, motor function, and stability in post-stroke patients. However, a larger sample size is needed to confirm the results.

Appraisal of the study introduction

The introduction of the article is comprehensive in providing background information. The literature review in the introduction was thorough. It helped to provide the aim of the study: expand on the literature available for dry needling after stroke and document how dry needling affects spasticity, motor function, and stability limits. The rationale behind the aim of the study is sound.

While the authors did a good job of providing a sound rationale for the study, they do not mention if there is a study out there that has already looked into the abovementioned variables. There's also no mention of the variables being tested until the last paragraph. In addition, not all

of the literature cited in the introduction was current or from primary sources. There are several citations from 1975, 1980, 1994, and 1996. For an article published in 2018, the sources used should come from more recent literature than articles written up to 43 years prior. Not all of their sources came from actual journals, either. Three of their citations came directly from the *Cochrane Database of Systematic Reviews*. It is unclear if this is a negative because *Cochrane* is known to be a reliable database, but the appraiser felt it was worth mentioning.

Appraisal of the study methods

The methods of the study describe a longitudinal, prospective, randomized control experiment. Inclusion and exclusion criteria were clear and allowed for twenty-six subjects to participate without attrition. The researchers employed both a between-subjects and within-subjects design. Both the researchers who enrolled patients in the study and outcome assessors were blinded to the placements of the subjects, and the same experimental protocol was used on all subjects with the exception of dry needling. Outcome measures were well-defined, and validity and reliability were mentioned for all but one of the measures. In addition, the data collection was clear.

The experiment was blinded; however, it was a single-blind study. The subjects knew which group they were in based on whether they had dry needling. This could lead to some placebo effect among the experimental group. The authors did not mention demographical similarities and differences in the study, but the clinical differences were found to be statistically significant between groups for two measures: the Fugl-Meyer Lower Exercise scale and the sensory measurements. There also wasn't much detail given about the types of exercises performed or where the needle was placed for the dry needling of the tibialis posterior. The

statistical tests performed were not explained as to why they were chosen for the data analysis either.

Appraisal of the study results

The results section of the article was clear and well-organized. It addressed the clinical question proposed by the appraiser, the hypothesis, and the aim of the study. All outcome measures are reported in the same order the methods presented them in, making it easy to follow along. The tables given are clear and accurate. A confidence interval of 95% was given for the results, as well as the minimal clinically important difference for the Fugl-Meyer scale (6 points).

While presented clearly, the results section did not show all the tables mentioned in the article. There was a link to supplementary tables, but whenever that link is clicked, it takes the reader to the article's abstract and not any tables. In addition, the authors didn't provide a significant p-value for the results, which would be nice to include for people who aren't sure what a statistically significant finding is. They also did not calculate the number needed to treat for the intervention.

Appraisal of the study discussion

The discussion of this study indicates the meaning of the results well and ties them into the currently existing literature. The authors mentioned that future studies of this intervention would need to address the limitations of the study they performed (i.e., larger sample size, more treatments, and long-term follow-ups). In addition, they mentioned that their findings were not clinically significant in terms of the Fugl-Meyer Scale. Their conclusion was concise and reflected the results in only two sentences.

While all the citations used were current, one of the citations provided was from the *Cochrane Database of Systemic Reviews* and not a primary source.

Discussion

The clinical significance of this study to current physical therapy practice and relevance to my clinical question is that dry needling can help relieve spasticity and improve the passive range of motion for patients post-stroke. The findings were evident in that spasticity was reduced across the board for all subjects in the study. Still, the results were more marked in the subjects who received dry needling on top of traditional interventions used for patients who have had strokes.

I believe that dry needling is an effective intervention in relieving muscle spasticity and improving the range of motion compared to traditional, non-invasive interventions. The benefits of dry needling based on the study are that the patient will have less spasticity, leading to an improved passive range of motion. This, in turn, can lead one to think that dry needling could improve a patient's active range of motion and motor function. Although the findings of the study were that the improvement in motor function was not clinically significant, there was still an improvement.

The risks of dry needling are pain for the patient, an adverse reaction to noxious stimuli could be seen, and the risk of exposure of the therapist to bloodborne pathogens. However, if performed by a therapist trained in dry needling safety and signs to watch for, dry needling is a safe intervention to use.

Improvements for the argument for using dry needling as an intervention for patients with strokes are that more studies could be done on larger populations to prove its effectiveness. Unfortunately, the literature on dry needling as an intervention strategy for improving muscle spasticity is limited, and the sample size for this study was small.

Based on what I have seen in the clinic when I begin working as a clinician in a neurological setting, I will use dry needling as an intervention. The findings of this article do prove that dry needling can be an effective intervention in treating muscle spasticity and improving the range of motion. Therefore, it gives me confidence that this intervention will prove helpful in a clinical setting on patient outcomes.

While I have some confidence in the validity of this paper, I find it suspicious that the groups in the experiment were not equally split in the beginning. There were 12 subjects in the control group and 14 placed in the experimental group. This causes me to wonder if the subjects were randomly assigned and why the groups didn't have 13 subjects each. It seems that the authors of the study may have intentionally done this to potentially skew the results in favor of the dry needling group. Because of this, I do not have as much confidence in this paper as I would like to in order to implement dry needling in my practice based solely on this research paper.

I believe that with more research, education, and proper training, I can anticipate safely implementing dry needling in a clinical setting. I believe this because I have seen it done safely many times by clinicians. In addition, the safety precautions for both the therapist and patient are thorough and in place at all times during the administration of the intervention.

In conclusion, the article was found to have some critical pieces missing (e.g., equal group sizes, current literature from all primary sources, all relevant tables, a double-blind design, etc.). However, even though some elements were missing, this article focused on the effectiveness of dry needling regarding muscle spasticity, motor function, and postural stability. While this study found dry needling to have significant changes on these outcomes, it is essential

to note that not all of the results of the study were clinically significant. Therefore, this intervention will need to be studied more in the future on larger population sizes.