



# Effects of Dry Needling on Muscle Spasticity in Adults with Neurological Disorders: A Systematic Review



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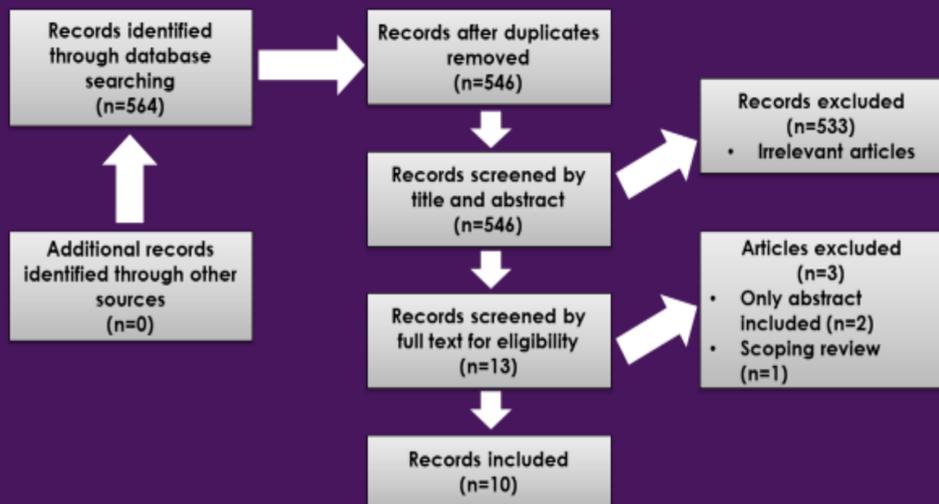
## INTRODUCTION & PURPOSE

Spasticity is a motor disorder associated with lesions of the central nervous system including cerebral vascular accidents (CVA), Multiple Sclerosis, Parkinson's disease, and other neurological disorders.<sup>1,2</sup> Throughout literature, spasticity associated with neurological disorders have been demonstrated to result in mobility, activities of daily living (ADL), and decreased quality of life (QOL).<sup>3</sup> Dry needling (DN) is skilled intervention with a focus to reduce or restore impairments of body structure and function leading to improved participation and QOL.<sup>4</sup> The purpose of this was to determine the effects of DN on muscle spasticity in adults with neurological disorders.

## METHODS

A literature search of Cochrane, CINAHL, Google Scholar, and ProQuest was conducted using the search terms: (dry needling) AND (spasticity OR hypertonia OR dystonia). Search limits: English, journals, human subjects, 2009-2019. Selection criteria: Adults 18+ with neurological disorders and interventions included dry needling as treatment for spasticity. Each study was independently assessed by two reviewers for methodological quality based on Oxford Levels of Evidence.

## PRISMA



## OXFORD SCORES

Article Authors	Research Method	Oxford Score
Sanchez-Mila et al <sup>1</sup>	RCT	2
Fakhari et al <sup>3</sup>	Single group, pretest-posttest clinical trial	2
Mendigutia-Gomez et al <sup>5</sup>	Cross over double-blind RCT	2
Salom-Moreno et al <sup>6</sup>	RCT	2
Hadi et al <sup>7</sup>	Case series	4
Ansari et al <sup>2</sup>	Case report	5
Ghaffari et al <sup>8</sup>	Case report	5
Calvo et al <sup>9</sup>	Case report	5
Tang et al <sup>10</sup>	Case report	5
Tavakol et al <sup>11</sup>	Case report	5

## RESULTS

564 articles were screened for eligibility. After detailed appraisal, 10 articles met selection criteria: 5 case reports, 1 case series, 1 pretest-posttest cohort study, and 3 RCTs. Levels of evidence ranged from 2-5. Sample sizes ranged from 1 to 34 subjects (120 total), mean age ranging from 48-62 years old with 119 participants having had a CVA, and 1 with a ependymoma brain tumor. Treatment parameters varied widely with durations ranging from a single session to 9 sessions of DN and follow-up ranging from one day to 30 days post intervention. No adverse events were reported. Primary outcome measures for spasticity included: Modified Modified Ashworth Scale,<sup>6,10</sup> Modified Ashworth Scale,<sup>1-3,5,7,11</sup> H-reflex,<sup>2</sup> Hmax/Mmax ratio,<sup>2,3</sup> and tensiomyography.<sup>9</sup> All studies reported reductions in spasticity with 5 studies finding statistically significant improvements.<sup>1,3,5-7</sup> Secondary outcomes were reported with improvements at the impairment level which included muscle length,<sup>7</sup> range of motion,<sup>2,3,5,10,11</sup> pain,<sup>5,6</sup> and motor performance<sup>1</sup> (Fugl-Meyer motor subscale), and at the functional level which included hand dexterity<sup>3,11</sup> (box and block test), balance<sup>1</sup> (computerized dynamic posturography), and mobility<sup>7,11</sup> (TUG).

## CONCLUSION

There is low to moderate evidence in support of using dry needling to decrease spasticity in adults with neurological disorders, specifically in patients with a CVA.<sup>1-3,5-10</sup> Successful applications of dry needling targeted shoulder,<sup>5,11</sup> arm,<sup>2</sup> and wrist flexor<sup>1,3,8,11</sup> spasticity to increase ROM, and the gastrocnemius<sup>1-3,5,6,8,9,11</sup> to decrease plantar flexor spasticity and ultimately improve gait.<sup>2,3,5,7,10,11</sup> Limitations included a lack of follow-up and small sample sizes. Further high level research is needed to determine long-term outcomes of dry needling in spastic muscles and its effectiveness in relation to functional outcomes, in conjunction with other PT interventions.

## CLINICAL RELEVANCE

Overall, there was a short-term decrease in spasticity of target muscles after DN. Evidence also included improvements at the impairment and functional levels after the use of DN. Based on the evidence, PTs should consider the use of DN in conjunction with standard PT interventions as a safe, feasible option to improve spasticity and impact other targeted outcomes in adults with neurological disorders.

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