

THE EFFECTIVENESS OF DRY NEEDLING FOR REDUCING PAIN IN CASES OF HAMSTRING SPASM IN ATHLETES IN PEMATANGSIANTAR

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Abstract

*Among the postural muscles, the hamstrings are the ones most prone to tightness at around 68.56%. The prevalence of tight hamstrings is very high, especially among athletes. **Objective:** Therefore, the aim of this research is to determine the effectiveness of dry needling for reducing pain in cases of gastrocnemius spasm in athlete. This was carried out using PICO searches in several databases such as Google Scholar. There were 5 journals that met the criteria and showed the results that Dry Needling can be applied to Reduce Pain for Hamstring Spasm cases such as with a dry needling size of 0.30 mm*50 mm and a fast in fast out technique. literature using A Quasi-Experimental Study research design, A Double-Blind Randomized Sham-Controlled Pilot Trial, Preliminary Results of a Randomized Within-Participant Clinical Trial, RCT and measurements VAS, NRS with $p < 0.05$. Experimental group using Dry Needling. It can be concluded that Dry Needling is effective in reducing pain in athletes*

Keywords: Athlete, Dry Needling, Gastrocnemius Spasm and Reducing Pain

INTRODUCTION

Flexibility is considered the most important component, required For Different musculoskeletal activities that improve performance. The most common problem faced by athletes and the general public, especially young adults, is flexion defects, particularly in the hamstring muscles. Muscle tightness is considered the most common cause or is often determined as a predisposing factor to muscle injuries. Based on their function, muscles are divided into two types, phasic or postural muscles. And thigh behind example Which Of these types, postural muscles are more susceptible to tightness and shortening.

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The hamstrings are broad muscles located in the posterior compartment of the thigh. They primarily act as hip extensors and also act as important knee flexors. Among postural muscles, the hamstrings are the most prone to tightness, at 68.56%. The prevalence of hamstring tightness is very high, especially among college students and student-athletes. Tightness or muscle shortening is defined as muscle hyperactivity due to loss of inhibitory muscle tone, resulting in persistent contraction.

Range of motion Hamstring tightness limitations considered not enough its reach from 160° at full knee extension while maintaining hips still flexion 90° Various technique moment This available For released hamstring and lengthen shortened fibers, hamstring can also be treated using various existing techniques, including therapy manual, intervention medical and surgical. Similarly targeting soft tissue trigger points or non-trigger points of structures.

Trigger points (TrPs) are a common, localized source of musculoskeletal muscle pain and are classified as active or latent, depending on their association with symptoms. The clinical distinction between active and latent TrPs is that active TrPs reproduce pain symptoms. Which experienced by somebody, While latent TrPs can appear without spontaneous symptoms, and when they do appear, they do not proliferate a person's symptoms. It has been observed that latent TrPs can induce motor dysfunction, such as stiffness, limited range of motion, and muscle fatigue, supporting their clinical relevance.

LITERATURE REVIEW

Anatomy and Physiology of the Hamstring Muscle

The hamstring muscles are a broad group of muscles located in the posterior compartment (back) of the thigh. Functionally, these muscles have a crucial dual role, acting as both a hip extensor and a primary flexor of the knee. Based on their function, the human muscular system is divided into two main types: phasic muscles and postural muscles. The hamstring muscles are classified as postural muscles, which makes them naturally more susceptible to tightness and shortening.

Hamstring Flexibility and Spasms in Athletes

Flexibility is the most essential physical component in supporting various musculoskeletal activities to maximize performance, especially for athletes. The most common problem athletes face is flexion defects, which lead to hamstring strains.

The prevalence of hamstring tightness is very high, reaching 68.56%. This tightness or shortening of the muscle is clinically defined as muscle hyperactivity resulting from the loss of inhibitory muscle tone, resulting in sustained contraction (spasm). Limitations due to this stiffness can be identified if the range of motion (ROM) is less than 160° when the knee is fully extended while maintaining the hip at 90° of flexion.

Pain Trigger Points (TrPs)

Muscle spasms often trigger the formation of trigger points (TrPs), which are a common source of localized musculoskeletal pain. TrPs are classified into two types:

Active TrP: Trigger points that directly reproduce the specific pain symptoms currently being experienced by the sufferer.

Latent TrPs: Trigger points that can appear without spontaneous symptoms. While not directly painful, latent TrPs have been clinically proven to induce motor dysfunction, such as muscle stiffness, limited range of motion, and muscle fatigue.

The Concept of Dry Needling Therapy

Dry Needling (DN) is an interventional procedure for treating joint and muscle pain that involves inserting fine filament needles (similar to acupuncture needles) precisely into the area where pain is felt (trigger points). This procedure is called "dry" because the needles do not contain or inject any medication into the body.

How Dry Needling Works:

Restores Blood Flow and Nutrients: When muscles are overused and spasm, the tissue

struggles to receive an adequate blood supply, resulting in a lack of oxygen and nutrients. This condition makes the area more acidic and triggers pain. Acupuncture stimulates trigger points to restore normal blood flow.

Endorphin Release: Mechanical needle insertion stimulates the central nervous system (brain) to release endorphins, which are the body's natural pain relievers.

Reducing Abnormal Electrical Activity: Neurophysiologically, Dry Needling has been shown to reduce abnormal electrical activity that is characteristic of dysfunctional muscle endplate areas, thus providing a neuromodulatory effect and mechanical release in tense muscles.

Pain Measurement Instruments

In evaluating the effectiveness of therapy, pain measurement is a key indicator. Some commonly used valid instruments in these studies include:

Numeric Pain Rating Scale (NRS) / Verbal Numeric Scale (VNS): A scale in which patients are asked to assign a number from 0 ("no pain") to 10 ("worst pain imaginable") to represent the intensity of their pain.

Visual Analogue Scale (VAS): Uses a 10 cm (or 100 mm) line with anchor points on the left ("no pain") and right ("extreme pain"). The patient marks the points on the line. The VAS is considered highly sensitive because it can measure changes in pain scale in more specific millimeters.

METHOD

This research uses a literature review approach. A literature review is an integrated analysis (not just a summary) of scientific papers directly related to the research question. This means that the literature demonstrates the correspondence between the papers and the formulated research question. A literature review can be a stand-alone work or an introduction to a larger research paper, depending on the specific needs. (University of West Florida, 2020).

The research question follows the PICO format: (P=Population) athletes affected by Hamstring Spasms, (I=Intervention) Dry Needling, (C=Comparison) no comparison, (O=Outcome) Dry Needling is effective in reducing pain in Hamstring Spasms. Reviewed research journal article limited by inclusion and exclusion criteria, with taking journal has a time span of the last 10 years, namely 2013-2023 . Articles will be reviewed if they meet the following **inclusion criteria** : (i) the research subjects are

athletes who have thigh pain due to conditions related to spasms hamstring with range age 18– 60 years old .

Article study will rejected If the authors met the following **exclusion criteria** (i) research use method systematic review, (ii) journal study in lower year 2013, (iii)The subject refuses to participate. Writer Get it information based on Database journal like Google Scholar Overcome in study will be accepted by writer every effect intervention from every article impact or no sample study. For summarize The author summarizes the article data based on

Research subjects, age and gender of participants, type of intervention given (both in terms of frequency, duration and tools for measuring the effectiveness of the intervention).

Research instruments used: **Numeric Pain Rating Scale** : Scale Scale assessment evaluation similar with VASE restricted in end most left with "no pain" And in end most right with “pain worst Which Can imagined” (or something similar).). The difference is that, instead of using an unmarked line, the numbers from 0 to 10 placed in a way evenly across the page. The patient is instructed to circle number Which represent amount the pain that they experience on moment evaluation. Variations of scale This is scale numeric verbal (VNS), in where the patient is asked to verbally state a number between 0 and 10 Which in accordance with intensity painful they are now This. Profit NRS And VNS is validated .

Visual Analogue Scale: The Visual Analogue Scale (VAS) is a 10 cm long line. with a statement anchor in The left side (no pain) and the right side (extreme pain). Patients are asked to mark their current pain level on a line. They may also be asked to mark maximum, minimum, and average pain. The examiner scores the VAS by measuring the distance in centimeters (0 to 10) or millimeters (0 to 100) from the “no pain” anchor point. The scores tend to correlate with numerical ratings, but some researchers argue that the Visual Analog Scale more sensitive to change small in pain because it can be measured in millimeters and therefore shows a change in pain from 47 to 53, both of which would be a 5 on the scale. Evaluation Painful Numeric. However, No There is research supporting that the Visual Analog Scale is more accurate when measured in centimeters than when measured in millimeters, and there is also no research on what would represent a reliable change on the VAS. This suggests that difference in for example, the difference

between 47 and 53 may not be significant and should be considered as equivalent pain ratings.

Dry Needling: a procedure for treating joint pain And muscle with method stab acupuncture needles around the area that triggers the pain to improve blood flow. This procedure is called "dry needling" because the needle inserted into the patient's body is "dry" or does not contain any medication. This procedure is usually performed to treat injury on joint And tendon pain head, nerve pinched, painful on pelvic pain, cramps, and spinal pain. During the needle insertion process, the patient may experience pain or discomfort. So, There is Also Which No You won't feel anything because the needle used is very small. However, this procedure is very beneficial. For relieve tension muscle. Dry Needling is used to stimulate the point trigger flavor painful or tension to improve blood flow. So, when muscles are overused, muscle tissue will struggle to receive an adequate blood supply. When blood flow is inadequate, muscle tissue will not receive the oxygen and nutrients it needs to function and rest normally. This, will make network in around the point center flavor painful will become more sour. When here it is, patient will feel Sick. So, the needle inserted by the doctor will stimulate the pain center point to restore blood flow as usual. Puncture This Also will stimulate the brain to release endorphins. This hormone is very useful for relieving pain. Some people can actually feel it immediately. feel subside flavor Sick and improvement ability move after The dry needling session is complete. However, many people require more than one session to experience the benefits.

RESULTS AND DISCUSSION

Of the 5 journals obtained, they have been researched through *Screening, eligibility, and inclusion*. *Dry needling is used to stimulate trigger points for pain or tension to improve blood flow. Therefore, when muscles are overused, the muscle tissue will have difficulty receiving an adequate blood supply.* **Table 1. Comparison of Experimental and Control Groups**

Reviewer	Participant		Intervention		Measureme nt	Results	Design Study
	Intervention group	Control group	Experimental group	Control group			
Qaisar Ali Khan, et al (2023)	n= 32 18-40 years old	-	<i>Dry Needling</i>	No intervention	VASE	P < 0.005	A Quasi-Experimental Study
Alberto Javier-Ormazábal, et al (2023)	n= 20 18 - 60 Year	-	<i>Dry Needling</i>	No intervention	VASE	p < 0.05	A Double-Blind Randomized Sham-Controlled Pilot Trial
Albert Pérez-Bellmunt, et al (2021)	n= 50 Unknown	-	<i>Dry Needling</i>	No intervention	VASE	P > 0.05	Preliminary Results of a Randomized Within-Participant Clinical Trial
Luis Baraja-Vegas, MSc, et al (2019)	n= 46 Unknown	-	<i>Dry Needling</i>	No intervention	NRS	P < 0.05	RCT
Luis Baraja-Vegas et al (2019)	n=20 Unknown	-	<i>Dry Needling</i>	No intervention	NRS	P < 0.05	RCT

Based on literature studies In the review, the author found that from 168 samples, the average results were dominated by athletes aged 18-60 years. From the many literatures found, most of the literature used a research design of A Quasi-Experimental Study, A Double-Blind Randomized Sham-Controlled Pilot Trial, Preliminary Results of a Randomized Within-Participant Clinical Trial, RCT and measurement of VAS, NRS with $p < 0.05$. The experimental group used *Dry Needling* while the control group was not given any intervention.

Table 2. Dose Kinesiotapping

Reviewer	Type of Intervention	Therapeutic Dosage And Duration Therapy
Caesar Ali Khan, et al (2023)	<i>Dry Needling</i>	A needle having size of 60-70* 0.3mm, inserted into the posterior compartment of the thigh, manipulating the needle following Pistoning technique which includes the insertion and withdrawal of the needle in the form of screwing, inserting and withdrawing of the needle without fully withdrawing from the skin which in turn elicited local Twitch response. A single session functional dry needling was performed for 1 min, 20 sec on each point
Alberto Javier-Ormazábal, et al (2023)	<i>Dry Needling</i>	The treatment consisted of a single session of DN with disposable stainless steel needles (0.3 mm × 40 mm, Agupunt, Barcelona, Spain) with a pistoning technique performed at 1 Hz for approximately 30 s for the IG, whereas for the Hamstring a single session of sham DN using a monofilament, without introducing it through the skin but simulating the sensation of the needle for 30 s, was carried out.
Albert Pérez-Bellmunt, et al (2021)	<i>Dry Needling</i>	A single dry needling treatment session was performed on the experimental limb in the latent TrP discovered during the exploration of the gastrocnemius muscle. If multiple TrPs were found, dry needling was applied on the most painful latent TrP in one gastrocnemius muscle. With participants in a prone position, 0.30 mm × 50 mm disposable stainless-steel needles (3B Scientific, Paterna, Spain) were inserted into the skin over the latent TrP
Luis Baraja-Vegas, MSc, et al (2019)	<i>Dry Needling</i>	Needling was applied with disposable needles of 0.30 mm*50 mm (3B Scientific, Father, Spain) that were inserted into the skin over the TrP. Once the TrP was located, the overlying skin was cleaned with an antiseptic.
Luis Baraja-Vegas et al (2019)	<i>Dry Needling</i>	The needling procedure was applied with disposable stainless needles of 0.30 mm*50 mm (3B Scientific, Paterna, Espana) that was inserted ~ into the skin over the TrP area

Based on study Which has done, researchers find that Dry Needling Which can applied on *Reduce Pain* For case Hamstring Spasm such as with dry needling size 0.30 mm * 50 mm and fast in fast out technique

This study shows that FDN when using the piston technique can be increased. And released in a way significant shortness of breath hamstring with results clinical Which better in patients with shortened hamstrings. This procedure provides immediate hamstring release which improves activities of daily living. in this study is For know impact directly from functional dry needling on the length of the hamstring shorten muscle and to find out where this intervention has an effect on LEFS compared to other procedures that require many sessions and are time consuming.

As time passes clinical outcomes are very important for patients which may vary in between technique Which different. After analyzing the data, this pre-test posttest clinical trial recommend matter That after that application of functional dry needling to the hamstring muscles for 1 minute, manipulating each for 20 seconds, subjects showed a significant increase in length And function hamstring activity We observed that a single session of functional dry needling can increase hamstring muscle length.

There is considerable evidence supporting the effectiveness of DN in the treatment of spasms in musculoskeletal disorders. However, its use in treatments aimed at improving gait has hardly been studied, especially in pwMS. Reports case previously get results were similar to our hypothesis, confirming our initial hypothesis that DN appears to improve walking speed measured by T25FW. However, in our study, factor clinical Which most important is the T25FW difference for pwMS, defined as a change from baseline of approximately 17.2% to 20% or 2.7 seconds, has not been achieved. Although impact DN to style walking in different patient populations with neurological disorders needs further investigation, it is known to reduce the abnormal electrical activity that characterizes MTrPs in spastic muscles. And trigger a disturbance mechanical in the area endplate Which dysfunctional [42]. On patient stroke, DN has proven own effect on speed walk [17], whereas In other neurological conditions similar to pwMS, it is still unknown whether DN has a clinical effect. When assessing pwMS, it is also important to consider qualitative changes in gait, as DN also shows neuromodulatory effects. on level Which different. This implies that some patients may experience improvements in self-perceived walking capacity despite not achieving clinically relevant changes in quantitative gait parameters.

CONCLUSION

Effectiveness One session 1 minute stab dry needles Which functional can increase length hamstring, by reduce tightness muscle hamstring Which shorten. More carry on, study This show that dry functional stab needle can improve function extremities lower affected by shortening of the hamstring muscles. **Suggestion** Required study systematic review which compared Dry Needling with different additional interventions in different samples

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