

A comparative study of dry cupping therapy, dry needling therapy and mets for improving hamstring flexibility in football players

Rohith G¹, Murali R^{2*}, Parthasarathy R³

Department of Physiotherapy, Meenakshi College of Physiotherapy, Meenakshi Academy of Higher Education and Research

*Corresponding Author
Mr. R. Murali

Article History

Received: 12.07.2025

Revised: 14.08.2025

Accepted: 05.09.2025

Published: 08.10.2025

Abstract: *Background:* Range of motion and flexibility play critical roles in musculoskeletal pain, sports performance, and rehabilitation. This study compared the benefits of METS, dry needling therapy, and cupping therapy for increasing hamstring flexibility in football players. *Methods:* Thirty football players were randomly assigned to cupping therapy, Dry needling therapy and METS with 10 subjects in each group. Subjects were tested to check their hamstring tightness according to the intervention such as Active knee extension test and sit and reach test were performed as dependent variables. The treatment includes Cupping therapy, Dry needling therapy and METS. The subject in this clinical study is a Male football with hamstring tightness aged 18 - 24 years underwent treatment for 4 weeks and to correct hamstring tightness, involving Cupping therapy, Dry needling therapy and METS. *Results:* The sit and reach test and active knee extension test revealed statistically significant in the three groups. The group A which underwent cupping therapy for hamstring tightness for 4 weeks thrice a week showed significant changes and improved hamstring flexibility. The group B which underwent dry needling therapy for hamstring tightness for 4 weeks thrice a week showed significant changes and had much improved hamstring flexibility than cupping therapy and METS. The group C which underwent METS for hamstring tightness for 4 weeks thrice a week showed significant changes. *Conclusion:* Based on the available evidence and from the outcome measures, this study conclude that physiotherapy management using Ultra sound, strengthening abdominal and adductors muscles and stretching have a positive effect on osteitis pubis. During these exercises the duration and severity of participant's pain were reduced and this is indicated by improvement in their sport activity.

Keywords: Hamstring Tightness, The active knee extension test, Sit and reach test, Musculoskeletal pain, Cupping therapy, Dry needling therapy, Football players.

INTRODUCTION

A reduction in the muscle's capacity to flex causes muscle tightness by limiting the range of motion at the joint where the muscle acts. Athletes most frequently suffer from hamstring injuries, which are caused by tightness in the hamstring muscles. These injuries take a long time to heal, cost a lot of money in medical expenses, and lower an athlete's level of performance. One form of complementary medicine for treating and relieving pain is cupping therapy. Cupping therapy has been used to treat a range of conditions, including carpal tunnel syndrome, headaches, neck aches, and low back pain. Following the publication of several recommendations for the treatment of musculoskeletal disorders, cupping therapy is anticipated to become a new trend in sports medicine when used in conjunction with functional exercises or movement patterns.¹ A common practice in Eastern medicine, cupping therapy is currently becoming more and more well-liked in Western medicine. The paucity of research to date may restrict the application of this technique by clinicians. The basic idea is to apply a vacuum to a cup that is placed on the skin, drawing the skin into it and leaving it there for five to ten minutes. The cellular reactions brought about by the negative pressure encourage muscle relaxation, which contributes to increased range of motion. Most of the research that are currently

available looks at how cupping affects ROM, pain, and function. Ankle sprains, headaches, carpal tunnel syndrome, low back, neck, knee, and shoulder pain are among the most researched outcomes in the literature on cupping. The aspects of perceived function, disability, and quality of life that have been previously studied are also related to cupping. Although the hamstrings have not been specifically studied, blood flow changes in the posterior shoulder and back have been measured prior to, during, and following cupping therapy. Thus, cupping can support both pain relief and increased range of motion in addition to helping with tissue healing. Cupping has been shown in a limited number of studies to be effective in improving range of motion in the neck, knee, hip, and back. While cupping has been beneficial for increasing range of motion (ROM) in certain muscles, more research is required to confirm the effect on muscles of the lower extremities, such as the hamstring ².

After athletes with dark circles all over their bodies appeared during the 2016 Olympics, cupping therapy gained international attention.¹ This increased the practice's appeal in Western societies, but there isn't enough solid proof to conclude that cupping significantly improves musculoskeletal disorders. The research on cupping points to the benefits of tissue mobilization and distraction for a range of ailments,

including low back pain (LBP). Limited lumbar range of motion (ROM), which is linked to lower functional status, decreased independence, and an increased risk of falls, is a common symptom of low back pain.³ A well-liked intervention to treat muscle soreness and dysfunction is dry needling (DN). The physiological mechanisms that DN elicits are the subject of numerous theories; however, the functional effects are primarily anecdotal. The occurrence of a local twitch response seems to amplify these effects. An involuntary contraction of muscle fibers caused by a spinal cord reflex after the affected fibers have been needled is known as a local twitch response. Few studies have looked at the effects on soft tissue flexibility of dry needling, despite the fact that many have detailed the benefits of the technique for treating pain.⁴ One physiotherapy intervention that has been used with patients who have lower back pain is dry needling (DN). 56 male patients with chronic lower back pain were enrolled in a clinical trial and divided into two groups: the DN group (n = 29) and the control group (n = 27); both groups had undergone eight weeks of traditional rehabilitation (occupational therapy, physiotherapy, and exercise therapy) prior to enrolling in the DN trial. The DN group significantly outperformed the control group both during treatment and at follow-up, according to the authors' findings. Myofascial trigger point (MTrP) DN was examined in 11 randomized controlled trials (RCTs) and 802 patients.

The results of the systematic review and meta-analysis suggested that DN of MTrPs can be used to treat LBP, especially when combined with other therapies, as it can effectively reduce the severity of the condition. According to the results of a systematic review and meta-analysis of 16 RCTs, DN can effectively reduce pain and disability associated with lower back pain (LBP). Moreover, DN is beneficial for conditions related to the spine, such as LBP, according to the results of a recent scoping review. The effects of DN in patients with LBP and hamstring tightness have not yet been studied. Thus, the current pilot study set out to examine the immediate and long-term effects of DN on hamstring muscle tightness, pain, and function in individuals suffering from long-term nonspecific low back pain. In order to better develop a larger, more robust randomized clinical trial, the purpose of this pilot study was to determine the power and to justify the protocol in patients with chronic low back pain and tight hamstring muscles.⁵ Point of triggering an acupuncture-style needle is inserted into the skin and muscle where an MTrP is located during the process known as dry needling. Once the trigger point is deactivated, the needles are removed. Stretching exercises are usually performed after dry needling. There is ongoing discussion regarding the precise mechanism of action of dry needling. Analgesic effects may be elicited by interrupting motor end-plate noise with the often occurring localized twitch response.

Stretching exercises and the elimination of a localized twitch response relax the actin-myosin bonds in the tight bands. According to some studies, when a localized twitch response is elicited during dry needling, there may be a greater degree of pain relief and range-of-motion restoration.⁶ The MET is a manual therapy primarily used in osteopathic medicine that involves voluntary isometric contractions in a target muscle group. Comparable to proprioceptive neuromuscular facilitation, MET has been shown to be more successful than traditional static stretching or joint mobilization methods (which use isometric contractions) in promoting the elongation of shortened muscles. Moreover, it helps to increase the range of motion in joints with limited range of motion, strengthens muscles, and facilitates the lymphatic or venous pumps' ability to drain bodily fluids and blood.⁷

Patients who exhibit symptoms of a painful musculoskeletal system, such as tightened muscles and abnormal joint activity, may benefit from muscle energy techniques (METs). One of the most active structural techniques is the METs, where the patient applies muscle strength and then doses the technique themselves. After that, the patient is told to contract the agonist muscle isometrically against the physical therapist's resistance. After that, the muscle spindle is subjected to this contraction for three seconds in order to experience the neurophysiological inhibitory effect.⁸ For lengthening the shortened tissue, Energy Technique [MET] was better than manual therapies such as massage, stretching, cryotherapy, and others. The definition of muscle energy technique is a type of soft-tissue treatment where the patient's muscles are actively used from a carefully regulated position, in a particular direction, and against a precisely executed counterforce applied by the therapist. Mitchell claims that MET gently increases muscle flexibility and restricted range of motion (ROM) regardless of the underlying causes of restriction. The primary characteristic that sets Muscle Energy Technique apart from the majority of manual therapy techniques is the patient's active participation.⁹ This study briefed that the lack of flexibility of the hamstring muscle can disturb the performance of the player. In this study the players are moved through the three different treatment protocol such as Cupping therapy, Dry needling therapy and METS and checked for the best treatment for improving the flexibility of the hamstrings. Major need for the study is to focus on the improvement of the hamstring flexibility. The current study was aimed to compare that effect of Cupping therapy, Dry needling therapy and METS in improving the hamstring tightness. The Goal of the therapy is to correct the Hamstring tightness.

MATERIAL AND METHODS

Study Design - Comparative study

Study Settings - OPD, Meenakshi faculty of physiotherapy

Sampling Techniques - Conventional

Sample Size - 30 subject
Duration of study - 4weeks.

2.1. Inclusion criteria

- Male football players.
- Age group: 18 to 24

2.2. Exclusion criteria

- Previous Injury.
- Pre Surgery to lower limb.
- Neuromuscular weakness.
- Back injury.
- Recent Fracture.

2.3. Procedure

The subject in this clinical study is are male football players with hamstring tightness aged between 18-24 years underwent treatment for 4 weeks and to correct the hamstring flexibility by using the treatment protocols such as Dry cupping therapy, Dry needling therapy and METS. The patient had no medical history of Previous Injury, Pre Surgery to lower limb, neuromuscular weakness, Back injury and Recent Fracture. The patient was informed by written and verbal consent. Active knee extension test and Sit and reach tests were performed prior to check the hamstring flexibility

RESULTS AND OBSERVATIONS:

2.4. Treatment protocol for hamstring tightness:

2.4.1. Cupping therapy

- Dry cupping therapy for the Hamstring muscle with the cups being placed over the muscle belly, origin and insertion for duration of 6 minutes, weekly thrice for 4 weeks.

2.4.2. Dry Needling therapy

- Dry Needling therapy for the Hamstring muscle with the Needles being placed over the muscle belly, origin and insertion for duration of 7 minutes, weekly thrice for 4 weeks.

2.4.3. METS

- Thomson test position - 20 secs hold.



Figure 4. Active knee extension test

The length of the hamstring muscles and the range of active knee extension in the hip flexion position are measured using the Active Knee Extension Test. An increased risk of lower limb injuries and a changed lordotic posture have been linked to the length of the hamstrings.



Figure 5. Sit and Reach test

One linear flexibility test that can be used to gauge how extensible the lower back and hamstrings are is the sit-and-reach test. This flexibility test was first published in 1952 by Wells and Dillon, and it's likely the most popular. Its application requires little skill training, its administration is straightforward, and the test's equipment is reasonably priced. Additionally, it is a field test that is simple to conduct in a community setting with a sizable population.

Dry cupping therapy for hamstrings



Figure 6. Dry cupping therapy

It is provided to the hamstrings for duration of 6 minutes with a total of 4 cups over the hamstring muscle including 2 at the belly and one each at the origin and insertion.



Figure 7. Dry needling therapy

Dry Needling therapy for the Hamstring muscle with the Needles being placed over the muscle belly, origin and insertion for duration of 7 minutes



Figure 8. METS

Thomson test position – 20 secs hold.

Active knee extension test

The length of the hamstring muscles and the range of active knee extension in the hip flexion position are measured using the Active Knee Extension Test. An increased risk of lower limb injuries and a changed lordotic posture have been linked to the length of the hamstrings.

Sit and reach test

One linear flexibility test that can be used to gauge how extensible the lower back and hamstrings are is the sit-and-reach test. This flexibility test was first published in 1952 by Wells and Dillon, and it's likely the most popular. Its application requires little skill training, its administration is straightforward, and the test's equipment is reasonably priced. Additionally, it is a field test that is simple to conduct in a community setting with a sizable population.

Table 1.Represents the intra group pre and post comparisons

Paired *t*- test, * *p*- value < 0.05 - statistically significant.

		Mean	Std. Deviation	<i>P</i> -value
Group A (Dry needling)	SRT Pre test	7.60	1.506	
	SRT Post test	13.30	1.418	< 0.001*
	AKE Pre test ®	30.00	4.295	
	AKE Post test ®	16.40	5.502	< 0.001*
	AKE Pre test (L)	30.30	4.547	
	AKE Post test (L)	15.80	5.692	< 0.001*
Group B (Cupping)	SRT Pre test	7.50	1.434	
	SRT Post test	9.50	1.581	< 0.001*
	AKE Pre test ®	32.00	3.055	
	AKE Post test ®	22.40	2.757	< 0.001*
	AKE Pre test (L)	32.20	2.440	
	AKE Post test (L)	22.70	3.020	< 0.001*
Group C (METS)	SRT Pre test	7.50	1.434	
	SRT Post test	10.30	1.337	< 0.001*
	AKE Pre test ®	31.90	2.514	
	AKE Post test ®	21.60	2.221	< 0.001*
	AKE Pre test (L)	32.00	3.055	
	AKE Post test (L)	21.70	1.767	< 0.001*

The Statistical analysis made with sit and reach test and active knee extension test revealed statistically significant in the three groups. The group A which underwent cupping therapy for hamstring tightness for 4 weeks thrice a week showed significant changes and improved hamstring flexibility. The group B which underwent dry needling therapy for hamstring tightness for 4 weeks thrice a week showed significant changes and had much improved hamstring flexibility than cupping therapy and METS. The group C which underwent METS for hamstring tightness for 4 weeks trice a week showed significant changes.

Table 2. Represents the comparison of outcomes between three study groups

		N	Mean	Std. Deviation	P - value
SRT Pre test	Group A (Dry needling)	10	7.60	1.506	0.980
	Group B (Cupping)	10	7.50	1.434	
	Group C (Mets)	10	7.50	1.434	
	Total	30	7.53	1.408	
SRT Post test	Group A (Dry needling)	10	13.30	1.418	<0.001*
	Group B (Cupping)	10	9.50	1.581	
	Group C (Mets)	10	10.30	1.337	
	Total	30	11.03	2.173	
AKE Pre test ®	Group A (Dry needling)	10	30.00	4.295	0.340
	Group B (Cupping)	10	32.00	3.055	
	Group C (Mets)	10	31.90	2.514	
	Total	30	31.30	3.385	
AKE Post test ®	Group A (Dry needling)	10	16.40	5.502	<0.001*
	Group B (Cupping)	10	22.40	2.757	
	Group C (Mets)	10	21.60	2.221	
	Total	30	20.13	4.539	
AKE Pre test (L)	Group A (Dry needling)	10	30.30	4.547	0.410
	Group B (Cupping)	10	32.20	2.440	
	Group C (Mets)	10	32.00	3.055	
	Total	30	31.50	3.452	
AKE Post test (L)	Group A (Dry needling)	10	15.80	5.692	<0.001*
	Group B (Cupping)	10	22.70	3.020	
	Group C (Mets)	10	21.70	1.767	
	Total	30	20.07	4.842	

One Way ANOVA *P - value < 0.05 - statistically significant

DISCUSSION

Aim of the study was to compare the effectiveness of Cupping therapy, dry needling therapy and METS in improving the hamstring flexibility in football players and to find out the best of the three treatment methods. In this study the players were assessed for hamstring tightness using sit and reach test and active knee extension test. In this study the players were assessed with hamstring tightness and underwent treatment such as cupping therapy, dry needling therapy and METS for improving hamstring flexibility which were performed for 4 weeks and the parameters were assessed before and after the treatment. There are several possible studies shoes positive outcomes of hip groin and pelvic floor muscles exercise training improves the reduction

in pain and improves the muscles strength and provides the stability over the pelvic floor region. Study done by Kim Jae Eun in 2019 proved that cupping therapy can be used as an option for improving the ROM and flexibility of the hamstring muscle in soccer players. Research done by Parisa alaye in 2023, proved that Hamstring flexibility can be effectively increased with dry needling. Dry needling for hamstring tightness can relieve tightness and improve hamstring flexibility in just one session. The results indicate that Dry Needling is a new approach to treating hamstring flexibility. Study done by Faizan Ahmed in 2023, proved that The METs is effective for improving hamstring flexibility. METs may have a slight edge in efficacy, supporting its continued use in clinical practice.

CONCLUSION

Based on the available evidence and from the outcome measures, this study conclude that Dry needling therapy has a positive effect and is much more effective than cupping therapy and METS in improving the hamstring flexibility. After the treatment protocol the hamstring flexibility was checked using the outcome measures which showed better results than cupping and METS. In future, this study can be done with large data with larger sample.

REFERENCES:

1. https://www.researchgate.net/publication/319567134_Effect_of_Cupping_Therapy_on_Range_of_Motion_Pain_Threshold_and_Muscle_Activity_of_the_Hamstring_Muscle_Compared_to_Passive_Stretching
2. <https://cdr.lib.unc.edu/downloads/zc77sv62j>
3. The Effects of Stretching versus Static and Dynamic Cupping on Lumbar Range of Motion: A Randomized Control Trial - ProQuest
4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5046961/>
5. Acute and Short-Term Effects of Dry Needling in Patients with Chronic Nonspecific Low Back Pain and Hamstring Tightness: A Pilot Study (hindawi.com)
6. Effectiveness of Dry Needling for Upper-Quarter Myofascial Pain: A Systematic Review and Meta-analysis | Journal of Orthopaedic & Sports Physical Therapy (jospt.org)
7. Healthcare | Free Full-Text | Effect of Muscle Energy Technique on Hamstring Flexibility: Systematic Review and Meta-Analysis (mdpi.com)
8. Static Stretching versus Stretching with Traction in Backache (researchgate.net)
9. 25-libre.pdf (d1wqtxts1xzle7.cloudfront.net).