Review Article

Physiotherapy and Occupational Therapy Journal
Volume 17 Number 2, April - June 2024
DOI: http://dx.doi.org/10.21088/potj.0974.5777.17224.6

Comparative Study between the effects of Passive Stretching and TENS in Delayed Onset Muscle Soreness (Doms)

Mandeep Kumar Singh

How to cite this article:
Mandeep Kumar Singh. Comparative Study between the effects of Passive Stretching and TENS in Delayed Onset Muscle Soreness (Doms). Physio. and Occ. Therapy Jr. 2024;17(2):111-115.

Abstract

Background and purpose: delayed onset muscle soreness (doms), also sometimes called as muscle fever, describes a phenomenon of muscle pain, muscle soreness or muscle stiffness peaking between 1 and 5 days post-activity. It is common in patients with overwork weakness. This study is done to find the efficacy of passive stretching and tens in the treatment of doms. The main purpose is to evaluate that which of the two mainstay of treatment is more effective in the treatment of doms. Subject: thirty subjects were participated in this ongoing trial to study the effectiveness of passive stretching and tens in two groups of fifteen each.

Method: subjects were randomly assigned to two groups; Group A and Group B. In group a, fifteen subjects were treated with passive stretching once daily for a period of seven days. Treatment was given in 15 repetitions with hold time of 10 seconds and rest time of 5 seconds respectively. Remaining fifteen subjects were treated with tens in each sitting once daily for a period of seven days. Vas was the tool used to measure the pain score. Mcgill pain questionnaire was used to assess the type of pain.

Result: paired t-test was applied between Group A and Group B at 1st, 3rd and 5th day. The result shows that passive stretching is more effective than tens as can be interpretated from the vas score. Interpretation and conclusion: the study shows the significant change in both groups. When post-test value was compared with pre-test value in intergroup comparison; Group A showed better result as compared to Group B.

Keywords: Delayed onset muscle soreness; Visual analog scale (vas); Passive stretching; Tens; Soft tissue manipulation (massage); Myofascial release; Mcgill pain questionnaire.

INTRODUCTION

Hough gave the first detailed description of ***"Delayed Onset Muscle Soreness (DOMS)"*** in **1902**. It is a widely recognized entity and is experienced by nearly everyone during his/her lifetime. It is perception of pain, stiffness and discomfort in the skeletal muscles following physical activity or exercise that involves increased intensity, longer duration, unfamiliar movements, or eccentric muscular work such as downhill running or plyometric or any other physical activity usually eccentric, to which an individual is not accustomed. This discomfort is a normal response and most people experience it to some extent. But if such feeling in muscles occurs a day or so after a workout is known in the scientific community as ***Delayed Onset Muscle Soreness***. Because nobody wants to go around saying that mouthful, most usually just call it "DOMS" for short.[1]

Author Affiliation: Professor, Department of Paramedical, Doon PG College, Dehradun 248001, Uttarakhand, India.

Corresponding Author: Mandeep Kumar Singh, Professor, Department of Paramedical, Doon PG College, Dehradun 248001, Uttarakhand, India.

E-mail: mandy03oct@gmail.com

Recieved on 29.07.2024 **Accepted on** 28.08.2024

Even though DOMS has been under scientific scrutiny since the turn of the century, at the present time, the actual biological process behind it remains a mystery. What is known is that DOMS is a complex process, and every piece of the puzzle uncovered, makes it all the more mysterious. It is also sometimes called as muscle fever.[2]

After a workout it is quite common and quite annoying, particularly if you are just beginning an exercise program or changing activities. For the new exerciser who wakes up one day and goes a three mile walk, followed by push-ups and sit-ups, there is bound to be some muscle pain and soreness the next day or two. This is a normal response to unusual exertion and is part of an adaptation process that leads to greater stamina and strength as the muscles recover and build. The soreness is generally at its worst within the first two days following the activity and subsides over the next few days.[3]

Delayed onset muscle soreness occurs hours after the exercise is over. This is much different than the acute pain of a pulled or strained muscle. A muscle tear, is felt as an abrupt, sudden, acute pain that occurs during activity that is often accompanied by swelling or bruises.[4] It's known as Delayed Onset Muscle Soreness (also called "DOMS"), and it's both loved and reviled by exercise fanatics. Loved, because many people view DOMS as a sign that yesterday's workout was effective, but hated at the same time because in severe cases, Delayed Onset Muscle Soreness can prevent you from comfortably hitting the gym again.[5] Although DOMS is experienced widely, there are still controversies regarding its origin, etiology, and treatment.

Aims:

Aim of the study is to find the effectiveness of Passive Stretching and TENS in the treatment of patients with Delayed Onset Muscle Soreness.

***Objectives*:**

- To Study the effects of Passive Stretching in the treatment of patients of Delayed Onset Muscle Soreness.
- To Study the effects of TENS in the treatment of patients of Delayed Onset Muscle Soreness.
- To compare the effects of Passive Stretching and TENS in the treatment of patients of Delayed Onset Muscle Soreness.

Statement of the Study

To compare the effectiveness of Passive Stretching and TENS in the treatment of patients with Delayed Onset Muscle Soreness aged more than nineteen years and less than 36 years.

Need of the Study

The main purpose of the study is to evaluate which of the two mainstay of treatment is more effective in the prevention of Delayed Onset Muscle Soreness whether Passive Stretching or an electrotherapeutic modality TENS i.e. Transcutaneous Electrical Nerve Stimulator.

Need of Study:

- To improve the muscle strength by passive stretching.
- To find out the improvements in Pain using Transcutaneous Electrical Nerve Stimulator.
- To increase muscle strength, power and endurance.

Overview of the Study

The variables that will be assessed include functional strength, muscle tenderness, active ROM, passive ROM and pain. Pain was measured and recorded on Visual Analog Scale. Active and Passive Range of Motion was measured using a goniometer.

To overcome the random sources of error in the experimental design, care was taken to ensure that all measurements were performed on or with the same equipment, and around the same time of day. Where applicable, the equipment was calibrated pre-testing. Subjects received the same instruction, motivation (verbal encouragement) and feedback during all testing, and the same researcher administered the tests.

Inclusion and Exclusion Criteria

Inclusion Criteria: Normal individuals, non-smokers, age group: 20-40 years, not received passive stretching or tens before, muscle tenderness, muscle soreness, stiffness, swelling, pain, loss of mobility or reduced range of motion, loss of strength, acute muscle twitches or spasms, fatigue and weakness.

Exclusion Criteria: Individuals with: hyperpyrexia, cardiac problems, neurological

problems, hypertension, any implants and infection.

Hypothesis

Null Hypothesis:

TENS is more effective than Passive Stretching in the treatment of patients with Delayed Onset Muscle Soreness.

Alternative Hypothesis:

Passive Stretching is more effective than TENS in the treatment of patients with Delayed Onset Muscle Soreness.

The data of the pain score is to be analyzed to prove the null hypothesis true; from the data as the total number of subjects to be observed is thirty so the student's paired t-test suits the best for analyzing the data obtained during the study (data was observed on the basis of VAS score).

METHODOLOGY

Sample

A Sample of thirty DOMS patient were selected through selective random sampling technique based on inclusion criteria. They were randomly allocated to two groups: Group A & Group B.

Design

An experimental design study

Sample Collection:

Simple Random Sampling

Sample Size:

- Group A with 15 individuals
- Group B with 15 individuals

Period of Study

Seven Days

Method of Selection and Assigning:

Subjects were screened after that and those fitting the inclusion criteria and found to have clinically symptoms of DOMS and were presented with proposal of study. Written consent was taken from volunteers and the procedure was explained to them in details.

The subjects for the study were chosen randomly and were assigned to two groups.

Group A: The patients were subjected to passive stretching exercises

Group B: The patients were subjected to TENS

Instrumentation

Gonieometer:

TENS:

McGill Pain Questionnaire:

Space And Facilities:

Location for data collection and treatment protocol were with respective Hospitals from where the subjects were enrolled.

Protocol:

The subjects were divided into two groups, both groups consisted fifteen subjects. Group A were subjected to passive stretching exercises & Group B were subjected to TENS. Both Groups were given treatment for duration of seven days. Subjects were given training daily.

The baseline measurement for pain intensity was taken before the commencement of study. The second reading for the same was taken after 3rd day of intervention and the third readings were taken for the same at the 5th day of post intervention.

Main emphasis was given on muscle group i.e. Deltoid, Calf, Biceps and Quadriceps Muscles.

Procedure: The subject is divided into two groups: Group A and Group B. In Group A *Passive Stretching exercises* were given and for Group B TENS was given.

Measurement of Pain Intensity:

The visual analog scale is of 10cms horizontal line used to access subjective level of pain intensity. The left end mark of VAS was labeled as '0' (measuring no pain) and the right end marked as '10' (most severe pain imaginable). The scale has 1 cm inter-division from 0-10 indicating increasing pain intensity. The patients were instructed to rate their average pain intensity on VAS.

Interventions:

Before starting with the intervention in the both groups, the subjects were given handouts regarding exercises to carry out and precautions to overcome further complications. The treatments for both the groups were given daily for seven days.

Group A: This group received passive stretching exercises for the affected group of muscles. Affected muscle group was stretched with a hold time of 10 seconds and then relaxed for 5 seconds.

This process was repeated for fifteen times once daily for seven days. Subjects were assessed on Visual Analog Scale on the alternate days. Main emphasis was given on muscle groups i.e. Deltoid, Calf, Biceps and Quadriceps Muscles.

Group B: This group received treatment with TENS. It was given to the patient with an intensity of for fifteen minutes once daily for a period of seven days. Subjects were assessed for pain on Visual Analog Scale on the alternate days. Main emphasis was given on muscle groups i.e. Deltoid, Calf, Biceps and Quadriceps Muscles.

Data Analysis

An unmatched, control based experimental design was used for the study. The VAS scores were collected as the measurement of pain intensity. The baseline for pain intensity (pre intervention day 1) was collected, followed by 2nd reading after 3rd day of intervention and the 3rd reading was collected at 5th day (post intervention). These data were analyzed. Independent t-test was used to compare the difference pain intensity VAS reading in these groups.

The paired t-test was used to compare in VAS within the groups. Multiple comparisons were done to calculate the significance in VAS within the group at the end of 1st and 5th day.

Statistics were performed and analysis of result was done using paired t-test at 5% level of significance.

RESULTS

Demographic Data & Clinical Data:

On analysis of the available data of thirty subjects, the demograophic parameters i.e. age, height, weight were comparable in both the groups without any statically significant difference. Table 2 below shows the detail of mean and standard deviation of these scores.

Table 3 shows within group comparison of VAS. It gives the mean and the end 0, 3, 5 days standard deviation of the VAS. The VAS readings are significant at the end of 5 days.

Table 4 shows within group comparison of VAS readings. These are significant in both Group A and Group B.

Significant improvement was seen in level of pain between 0-3 days, 3-5 days and 0-5 days in both groups.

Table 1: Comparison of VAS in Both Groups at the end of 0, 3 & 5 days

Variables	Visual Analog Scale		
	VAS 0	VAS 3	VAS 5
Group I	8.33	4.93	1.40
Group II	8.27	5.80	2.47

DISCUSSION

Most previous studies on rehabilitation of DOMS have shown that this can be managed by the various conservative measures effectively. The conservative approach includes muscle strengthening exercises, contrast water bath, gentle stretching, soft tissue manipulation (Myofacial release), nonsteroidal anti-inflammatory medication, cryotherapy, therapeutic ultrasonics, TENS and many other. The wide variety of conservative measurements shows a lack of consistent measurements shows a lack of consistent satisfaction with any approach also. The individual improvement by the use of passive stretching and TENS has been shown. But no comparative study has been done.

The purpose of my study was to find that which of two mainstay of treatments is more effective either passive stretching or TENS.

In my study, results reveal that subjects in experimental Group A showed a significant improvement after Passive Stretching applied on them.

On comparison between Group A and Group B, it was seen that there was no statistical significant difference between the pre-intervention score of Group A and Group B, i.e. Passive Stretching and TENS group.

On further comparison between Group A and Group B after the intervention of respective treatments, it was seen that there was a statistical significant change in the intervention score of Group A and Group B.

Thus indicating that those participants who were involved in the treatment with Passive Stretching have a significant result on prevention from Delayed Onset Muscle Soreness. There was much more significant improvement in pain in Group I as compared to Group II.

CONCLUSION

The study showed that there is significant change

in both groups. When post-test value was compared with pre-test value in intergroup comparison of the two Groups (Group A patients were treated with Passive Stretching and Group B patients were treated with TENS), Group A showed better result as compared to Group B.

So, it can be concluded that both mainstay of treatments i.e. Passive Stretching and TENS are effective in the prevention of a condition called as *"Delayed Onset Muscle Soreness"* but Passive Stretching is more effective.

The dependent variable of pain which was assessed by the Visual Analog Scale was found to be improved in both the groups, but the maximum pain relief was found to be obtained in Group I.

The study therefore concludes by rejecting the Null Hypothesis. Passive Stretching is more effective in relieving DOMS as compared to TENS.

REFERENCES

1. Kedlaya D, Lorenzo CT. Postexercise muscle soreness. Medscape; 2014.
2. Serafini A. The epic history of biology. Springer; 2013.
3. Bompa TO, Di Pasquale M, Cornacchia L. Serious strength training. Human Kinetics; 2012.
4. Lieber RL, Fridén J. Morphologic and mechanical basis of delayed-onset muscle soreness. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 2002;10(1):67–73.
5. Muldoon T. The Ignatian workout: Daily exercises for a healthy faith. Loyola Press; 2009.