IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Effectiveness Of Self-Static Stretching Vs Self-Foam Rolling Among Gym Beginners With Delayed Onset Muscle Soreness (DOMS) In Thigh Muscles-A Comparative Study.

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Abstract: Scientific evidence gathered during the past few decades has allowed the identification of the most efficient training strategies for improving physical performance. However, maximizing the performance capacity of an individual is not only a matter of training, it also depends on optimal balance between training and recovery in order to prevent maladaptation to accumulated psychological and physiological stress induced by training load.

Objective: To compare the effect of self-static stretching vs self-foam rolling to reduce pain arising out of DOMS. Method: Total Participants were divided into group A and group B equally and they performed self-foam rolling and self-static stretching respectively, post strength training for three days. Pain intensity was assessed using Numerical Pain Rating Scale (NPRS), pre-intervention and 12 hours post-intervention for three days. The evaluated outcome measure values were compared to reach to a conclusion. Results: This study provides the evidence for short term effectiveness and also proves the efficacy of Foam rolling and stretching in reducing pain intensity in DOMS. In comparison between these intervention for their effectiveness, it was found that Foam rolling is more effective than stretching in reducing pain intensity of DOMS. Conclusion: The present study concludes that self-foam rolling as well as self-static stretching is effective in reducing pain in gym beginners

with DOMS. In addition, results supported that among Self- Foam rolling and Self-static stretching, self-foam rolling is more significantly effective in reducing pain intensity using (NPRS) in gym beginners with DOMS.

Context:

Aim: To compare effectiveness of self-static stretching vs self-foam rolling among gym beginners with DOMS in thigh muscles.

Setting and Design:

Study Design- Comparative study (experimental study approach)

Study Setting- Gyms in and around Jalgaon city.

Materials and Method:

Study Sample- Gym beginners (joined gym < one month).

Sample Size-30 Subjects.

Criteria for selection:

Inclusion criteria-Gym going males and females. Gym beginner (joined gym < one month). Moderate to severe DOMS post-strength training (NPRS-above six).

Exclusion criteria-History of any severe musculoskeletal injury/surgery. Suffering from febrile illness. Currently under any type of medications like NSAIDS (Non-Steroidal-Anti-inflammatory Drugs). Subject not able to participate in the given intervention.

Ethical Clearance: The institutional ethics committee granted the study's ethical approval. All the study participants provided their written, informed permission.

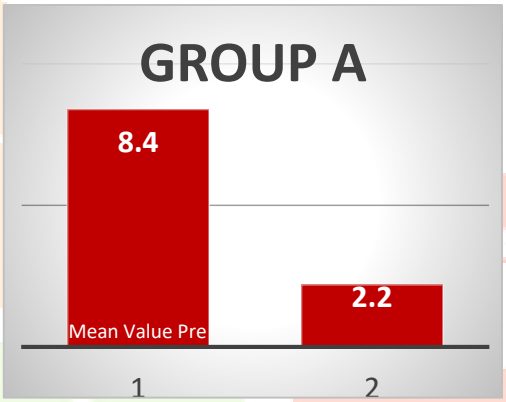
Procedure: The Ethical clearance was taken from the ethical committee prior to the commencement of the study. Subjects were taken according to the inclusion and exclusion criteria. Prior to starting the study, the procedure was explained and a written consent form was taken from the subjects. An evaluation sheet was given to the subjects to fill the demographic data, history and NPRS Score pre-intervention. Total Participants were divided

into group A and group B equally and they performed self-foam rolling and self-static stretching respectively, post strength training for three days. NPRS score, was evaluated every 12 hours postexercise for three days each. The evaluated outcome measure values were compared to reach to a conclusion.

Statistical analysis used:

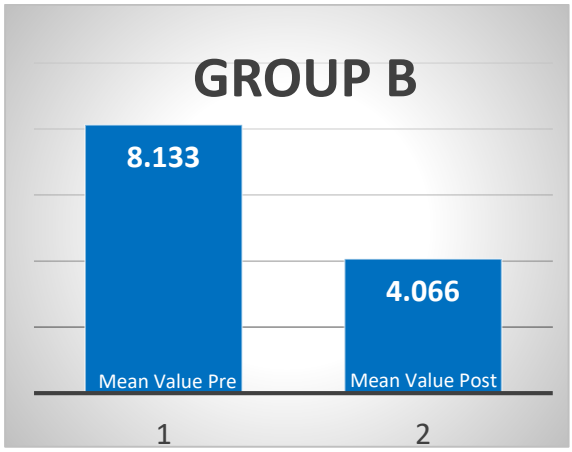
Results: The present study included 30 subjects with DOMS who met the inclusion criteria. The subjects were equally divided into two groups by convenient sampling. Group A and Group B both consisted 15 subjects. Group A received Self- Foam Rolling and Group B received Self-static stretching for DOMS.

Comparison of pre and post intervention NPRS of group A



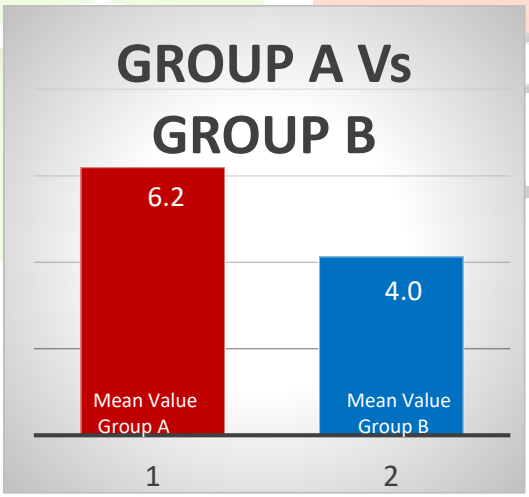
Test	n	Mean	Mean Difference	SD	T Value	P Value	Level of Significance
Pre	15	8.400	6.200	0.7368	22.186	<0.0001	Extremely significant
Post	15	2.200		1.207			

Comparison of pre and post intervention NPRS of group B



Test	n	Mean	Mean Difference	SD	T Value	P Value	Level of Significance
Pre	15	8.133	4.067	0.6399	8.792	<0.0001	Extremely significant
Post	15	4.066		1.870			

Comparison of pre and post intervention NPRS of group A and group B



Group	n	Mean	SD	T Value	P Value	Level of Significance
A	15	6.200	1.082	3.928	<0.0001	Extremely significant
B	15	4.067	1.727			

Conclusion: The present study concludes that self-foam rolling as well as self-static stretching is effective in reducing pain in gym beginners with DOMS. In addition, results supported that among Self- Foam rolling and Self-static stretching, self-foam rolling is more significantly effective in reducing pain intensity using (NPRS) in gym beginners with DOMS.

Therefore, it can be used as a post-strength training treatment and can also be implemented in gym beginners in order to reduce the severity of DOMS, it will also aid in improving physical fitness and it will help to reduce absenteeism from gym and improve quality of life.

Hence, Foam Rolling can be safely used for reducing pain related to DOMS.

Keywords: Stretching, Foam Rolling, Delayed Onset Muscle Soreness

Introduction: Training can induce repeated eccentric contraction [1] and tissue vibration [2] that can lead to muscle damage, tissue inflammation, DOMS. This exercise induced perturbations can lead to reduction in the muscular force [3,4,5]a disturbed sense of position [6,7]decreased physical performance [8,9] increased risk of injury. [10,11] One of the most common training-induced effects is DOMS, that is the soreness felt most strongly 24 to 72 hours after the exercise. It is thought to be caused by eccentric exercise, which causes microtrauma to the muscle fibers. It is important to optimize the recovery period in order to manage muscle damage and alleviate DOMS thereby allowing individual to feel less fatigued and decrease risk of injury or maladaptation to training load. DOMS can be treated and prevented by ice pack, compression clothing, hot bath, contrast heat and cold treatments and also performing stretching exercises, and stretching among this, is often used in clinical practice of physical therapy and sports training. [12] Moreover, physiotherapy treatment such as Self Myofascial Release with foam roller first used in 1987 by Sean Gallagher, an American physiotherapist has been gaining popularity among physiotherapists.

Foam rolling is a method of self-myofascial release. This technique requires an individual to use their body weight during rolling a specific body region over a dense foam cylinder. [13] Thus, the aim of the study was to determine and compare effectiveness of foam roller vs conventional stretching in prevention and recovery of DOMS.

Subject and Method: Total 30 subjects were included in the study. To select the subjects convenient sampling was done and a criteria for selection was set.

Criteria for selection:

Inclusion criteria: Gym going males and females. Gym beginner (joined gym <one month). Moderate to severe DOMS post-strength training (NPRS- above six).

Exclusion criteria-History of any severe musculoskeletal injury/surgery. Suffering from febrile illness. Currently under any type of medications like NSAIDS (Non-Steroidal-Anti-inflammatory Drugs). Subject not able to participate in the given intervention.

Subjects were taken according to the inclusion and exclusion criteria.

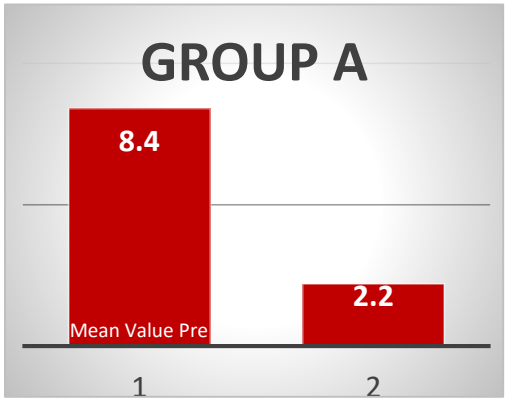
Prior to starting the study, the procedure was explained and a written consent form was taken from the subjects.

An evaluation sheet was given to the subjects to fill the demographic data, history and NPRS Score pre-intervention.

Participants from group A and group B performed static stretching and foam rolling respectively, post strength training for 3 days. NPRS score, was evaluated every 12 hours postexercise for three days consecutively. The evaluated outcome measure values were compared to reach to a conclusion.

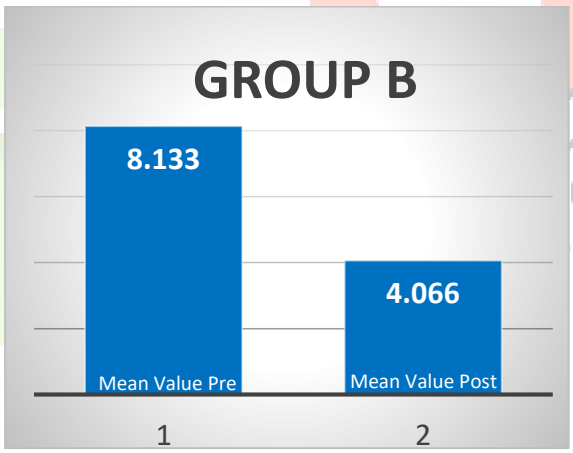
Results: The present study included 30 subjects with DOMS who met the inclusion criteria. The subjects were equally divided into two groups by convenient sampling. Group A and Group B both consisted 15 subjects. Group A received Self- Foam Rolling and Group B received Self-static stretching for DOMS.

Comparison of pre and post intervention NPRS of group A



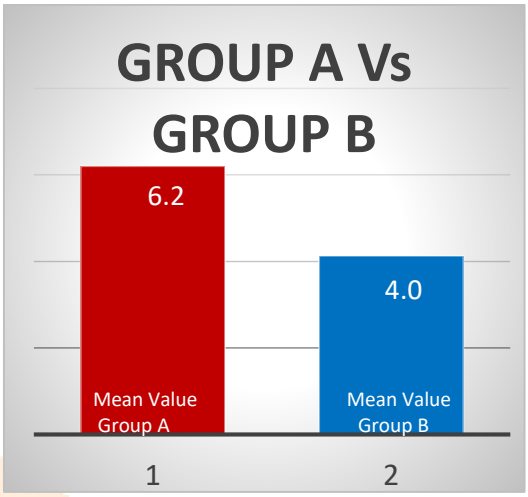
Test	n	Mean	Mean Difference	SD	T Value	P Value	Level of Significance
Pre	15	8.400	6.200	0.7368	22.186	<0.0001	Extremely significant
Post	15	2.200		1.207			

Comparison of pre and post intervention NPRS of group B



Test	n	Mean	Mean Difference	SD	T Value	P Value	Level of Significance
Pre	15	8.133	4.067	0.6399	8.792	<0.0001	Extremely significant
Post	15	4.066		1.870			

Comparison of pre and post intervention NPRS of group A and group B



Group	n	Mean	SD	T Value	P Value	Level of Significance
A	15	6.200	1.082	3.928	<0.0001	Extremely significant
B	15	4.067	1.727			

Discussion:

This study was designed to compare the effectiveness of Self-Foam rolling and Self-Static stretching in males/females with DOMS. This study provides the evidence for short term effectiveness and also proves the efficacy of Foam rolling and stretching in reducing pain intensity in DOMS. In comparison between these intervention for their effectiveness, it was found that Foam rolling is more effective than stretching in reducing pain intensity of DOMS.

Statistical analysis proves that both foam rolling and stretching are significantly effective in reducing pain of DOMS with p-value <0.0001 for NPRS. When comparing between groups the study shows that there is more significant effect of Foam rolling in reducing pain intensity with p value 0.0001 than stretching. Hence, the study accepts alternate hypothesis.

Delayed-onset muscle soreness is characterized by variable amounts of muscle tenderness, stiffness, and pain that can fluctuate from slight muscle stiffness on palpation to severe debilitation of performance of individuals in the gym.[14,15]

The occurrence of DOMS may be due to a combination of several factors, including -

(1) physiologic damage to sarcomeres during intense exercise, such as tearing of Z-lines[16]

(2) a reduction in strength due to acute muscular fatigue[17]

(3) increased inflammation[17]

(4) trepidation resulting from the pain of movement.[17]

The most common mechanisms why foam rolling proves to be effective in DOMS are decreased edema, enhanced blood lactate removal, and enhanced tissue healing, [17] are mainly due to the increase in muscular blood flow. [17]

Increased blood flow hinders the margination of neutrophils and reduces prostaglandin production, subsequently decreasing inflammation. [17]

Foam rolling-induced muscular blood flow also increases oxygen delivery, which encourages mitochondrial resynthesis of adenosine triphosphate and the active transport of calcium back into the sarcoplasmic reticulum. [17] Regardless, the action of foam rolling, similar to massage, could increase muscular blood flow and result in an enhanced recovery from DOMS in other ways. For example, foam rolling may have a systemic biochemical effect. [17] Rolling-related biochemical changes include

(1) increased circulating neutrophil levels [17]

(2) smaller increases in postexercise plasma creatine kinase [17]

(3) activated mechanosensory sensors that signal transcription of COX7B and ND1, indicating that new mitochondria are being formed and presumably accelerating the healing of the muscle [17] and

(4) less active heat-shock proteins and immune cytokines, reflecting less cellular stress and inflammation. [17]

These biochemical changes applied constant pressure to the muscle. Perhaps the constant pressure on the muscle from foam rolling resulted in biochemical changes mentioned above.

However, researchers should examine the frequency, intensity (amount of pressure placed on the foam roller), time (immediately postexercise versus other time points), and type (sweeping pressure versus undulations) of foam rolling that optimizes DOMS recovery after intense physical performance events.

References:

1. Ispirlidis I, Fatourus I. G, Jamurtas A. Z, Nikolaidis M. G, Douroudus I, (2008). Time course of changes in inflammatory and performance responses following a soccer game.Clin.J.Sport Med.18,423-431.
2. Friesenbichler B.,Stirling L.M.,Federolf P.,Nigg B.M.(2011)Tissue Vibration in prolonged running .J.Biomech.2010.08.034.
3. Brown S.R. B, Day S.H, Donnelly A.E. (1997). Exercise-induced skeletal muscle damage and adaptation following repeated bouts of eccentric muscle contractions. J. Sports Sci.
4. Goodall S., Howatson G. (2008). The effect of multiple cold water immersions on indices of muscle damage.J.Sports Sci.Med.7,235-241.
5. Mackey A.L. Bojsen -Moller J.,Qvortrup K, Langberg H, Suetta c, Kalliokoskr K.K,(2008). Evidence of skeletal muscle damage following electrically stimulated isometric muscle contractions in humans.105,1620-1627.
6. Saxton J.M, Clarkson P.M, James R, Miles M, Westerfer M, Clark S, (1995). Neuromascular dysfunction following eccentric exercise med. sci. sports Exercise. 27,1185-1193.
7. Pachalis V, Nikolaidis M. G, Giakas G, Jamurtas A.Z,Pappas A, Koutedakis Y.(2007).The effect of lower limbs muscle nerve 35,496-503.
8. Twist C, Eston R.G. (2009). The effects of exercise -induced muscle damage on perceived exertion and cycling endurance performance.Eur.J.Appl.Physiol.105,559-567.
9. Burt D. G, Twist C. (2011). The effects of exercise -induced muscle damage on cycling time-trial performance.J. Strength cond Res.25,2185-2192.
10. Cheung K, Hume P, Maxwell L. (2003). Delayed onset muscle soreness, treatment strategies and performance factors. Sports Med.33,145-164.
11. Bornett A. (2006). Using recovery modalities between training sessions in elite athletes: does it help? Sports Med.36,781-796.

12. Magnusson SP, Simonsen EB, Aagaard P.Dybre – Poulsen P, McHugh MP, Kjaer M. Mechanical and physical responses to stretching with and without preisometric contraction in human skeletal muscle . Arch Phys Med Rehabil.1996;77:373-378.
13. Sullivan KM, Silvey PB. Button DC, Behm DG. Roller- massager application to the hamstrings increases sit and reach range of motion within five to ten seconds without performance impairment. Int J Sports Phys Ther. 2013,8(3):228-36.
14. Gulick DT. Delayed onset muscle soreness: what is it and how do we treat it? J Sport Rehabil. 1996;5(3):234–243.
15. Rowlands AV, Eston RG, Tilzey C. Effect of stride length manipulation on symptoms of exercise-induced muscle damage and the repeated bout effect. J Sports Sci. 2001;19(5):333–340.
16. Nguyen D, Brown LE, Coburn JW, et al. Effect of delayed-onset muscle soreness on elbow flexion strength and rate of velocity development. J Strength Cond Res. 2009;23(4):1282–1286.
17. Foam Rolling for Delayed-Onset Muscle Soreness and Recovery of Dynamic Performance Measures. Gregory E. P. Pearcey,David J. Bradbury-Squires, Jon-Erik Kawamoto Eric J. Drinkwater,David G. Behm and Duane C. Button. Journal of athletic training 2015.

Acknowledgement: The authors are thankful to the subjects and the gymnasiums for their cooperation to this study.