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Original article

## EFFECTS OF SELF MYOFASCIAL RELEASE USING A FOAM ROLL ON RANGE OF MOTION AND PERFORMANCE LEVEL OF INDIVIDUAL ROUTINE IN RHYTHMIC GYMNASTICS

LARION ALIN<sup>1</sup>, MANAL AZAB<sup>2</sup>

### Abstract

**Purpose.** Foam roll is a tool that comes from the world of injury rehabilitation and has made its way in recent years to become part of the training of many athletes. The Foam Roller is very easy to transport, weighs little, is economical and can be applied anywhere. It is generally used at two key moments: before the training session or the competition in order to activate the muscles and improve the range of joint movement (ROM) and then to reduce muscle pain and facilitate recovery. The purpose of this study was to investigate the effects of self-myofascial release using a foam roll on range of motion and performance level of individual routine in rhythmic gymnastics for female college students.

**Methods.** Twenty female college students were randomly allocated to receive either an 8-weeks intervention of the of Foam roll exercises (n = 10) and a control group receiving 8-weeks of normal training only (n = 10). The data collected before and after the program for the two groups.

**Results.** Statistical analyses showed that:

- Significant Difference between the pre and posttests for experimental group in Shoulder (extension), Shoulder (flexion), Shoulder (abduction), Shoulder (adduction), Back (extension), Back (flexion), Back (lateral), Knee (extension) and performance level of individual routine in rhythmic gymnastics for posttest to the experimental group.
- Significant Difference between the experimental group and control group in Shoulder (extension), Shoulder (flexion), Shoulder (abduction), Shoulder (adduction), Back (extension), Back (flexion), Back (lateral), Knee (extension) and performance level of individual routine in rhythmic gymnastics for posttest to the experimental group.

**Conclusions.** Under the conditions of our study, Foam roll training to 8-weeks resulted in an increase in flexibility and performance level of individual routine in rhythmic gymnastics for female college students. These results must be considered by coaches and teachers in order to better understand and implicated of these concepts for technical effects of training.

**Key words:** Foam roll, Flexibility, Fasci, Rhythmic Gymnastics

### Introduction.

Rhythmic gymnastics is a high leap demanding sport (Hutchinson, et al., 1998). Leaps are fundamental human movements that require power and complex motor coordination of both upper and lower body segment (Ashby & Heegaard, 2002). Rhythmic gymnastics leaps performance always followed by a requisite manipulation (ball, rope, hoop, clubs, ribbon), and that manipulation is referred to requisite throws or passing through it. Above the requisites, swing of arm plays an important role, which was reported in certain studies, at least when speaking about vertical jump (Ashby & Heegaard, 2002). According to (Horvatin-Fučkar, 2005), the rhythm is also important for the harmonious execution of various complex movements.

The Foam Roller is a rigid rubber-foam roller, which allows to execute the technique known as myofascial self-release or foam rolling, using our own weight, to “roll” through the area of our body that we intend to “massage”. Currently in the market, there are Foam Rollers of different sizes (variety of lengths but also of diameters), shapes (smooth or with protrusions) and hardness, depending on the daily use that we are going to give and the needs of each person.

It is a tool that comes from the world of injury rehabilitation and has made its way in recent years to become part of the training of many athletes. The Foam Roller is very easy to transport, weighs little, is economical and can be applied anywhere. It is generally used at two key moments: before the

<sup>1</sup>Faculty of Physical Education and Sport, Ovidius University of Constanta, Romania

<sup>2</sup>Faculty of physical education, Sadat city University, Egypt

Email: amr297@aswu.edu.eg

training session or the competition in order to activate the muscles and improve the range of joint movement (ROM) and then to reduce muscle pain and facilitate recovery. (Macdonald, et al. 2014)

We could consider foam rolling as a therapeutic pseudo-technique applied by oneself. The Foam Roller is indicated for the musculature and connective tissue that is around the joints and allows self-massage in different areas of the body and even in muscles that are difficult to access by oneself, such as the buttocks, the twins or the iliotibial belt. Its self-application allows the athlete to control the pressure exerted on the muscle and to locate and emphasize the work in said area that causes greater pain. (Amr & Naglaa, 2019).

Foam rolling or myofascial self-release has become one of the most popular muscle recovery techniques for its benefits (if done well) and for being very economical, since a foam roller, a foam roller, is enough to apply it This self-massage is performed to release the so-called trigger points in different muscle groups.

Thus, with a simple foam roller, a ball, your own hands and even a PVC tube covered with foam or "bareback", just apply pressure on specific points so that the foam roller helps muscle recovery, improve Its breadth and movement.

The foam roller helps myofascial self-release with the goal of muscle recovery. Trigger points (trigger points in English) are a kind of specific "knots" that occur at different points of the muscle, although when applying pressure on them the pain can spread to other areas away from that point.

For example, when applying foam roller on the iliotibial band, pain due to pressure can be felt throughout the leg, from the hip to the ankle. Thus, rolling on the foam accessory, the compression helps to break those trigger points and relax the muscle tissues and their structure (the fascia), making it possible to recover flexibility and give a feeling of greater freedom. (Amr & Naglaa, 2019).

Of course, it is body weight who commands when deciding what pressure, apply with the foam roller, but in no case should it become painful. The application must be slow and progressive on the trigger points, which can be found through self-exploration.

The player can perform many exercises in different muscle areas to achieve a great recovery and release.

Foam roller exercises for soles, twins, quadriceps, buttocks and more. Indeed, the famous rollers are used to increase mobility, prevent injuries, recover

before exercise, improve performance and even reduce stiffness. (Mohr, et al. 2014).

The way to use the roller is to place on it the part of the body that you want to treat and apply pressure by unloading the weight on it, while we roll back and forth. It is as if someone gave us a massage with the roller, but inverted, with the advantage that we can do it ourselves. (Macdonald, et al. 2013)

Many athletes understand the concept of "stretching" and there are even classes dedicated to it, which by legal imperative gyms should call stretching. Stretching, especially after exercise, improves flexibility, but too much stretching, or doing it before training, can be harmful because it weakens the muscles. With the roller we get the advantages of stretching, but without affecting performance or strength. (Healey, et al. 2011)

Quite the contrary, in an experiment at Stirling University it was observed that those who used the roller for two minutes as warm-up before a leg exercise could exert more force and had less fatigue. After three days of rolling, the improvements were evident. Be careful with the duration, since other experiments have proven that more than five minutes are counterproductive. (Healey, et al. 2014)

The theory on which the use of the roller is based is something called "myofascial release." This requires explaining before what fascia is.

Fascia is a very thin but very resistant connective tissue that envelops most organs and muscles and serves as both protection and support. It's that white and very hard layer that you find around chicken breasts and other pieces of meat. Without fascia, we would have a much more flaccid and vulnerable body, and the liver or stomach would dislodge us to the slightest fall. (Bradbury, Squires et al. 2015).

Osteopathy argues that the movement of the fascia may be limited by stress, injuries, infections or inactivity, and the result is pain, muscle tension and less blood flow. The manipulations on the fascia "release" improving the symptoms. However, it has not been found to help with chronic muscle and bone pain nor is there solid evidence, since the available studies are not too rigorous. (Halperin I Aboodarda et al. 2014).

The good news is that the roller works. The bad news is that it is not yet known why it works. The researchers seem to agree that more than in the fascia, roller pressure can act on the nervous system itself. This explains why the roller also works against the laces and the feeling of fatigue. While they agree on the causes, you can use the roller in the gym or at

home (they are very cheap) but remember that a few minutes are enough.

(Amr & Naglaa, 2019) indicated that the benefits of foam roller training are:

- Improves circulation by increasing the supply of nutrients in the worked area
- Well worked, it can generate more degrees of movement and flexibility
- Maximize the work of the stabilizing musculature
- It helps us in our postural correction, both back and cervical

These exercises can be done with foam roller:

- In the lower back
- Also, the neck part
- On the back of the leg
- Anterior leg

Current literature that measures the effects of Self-myofascial Release (SMR) is still emerging.

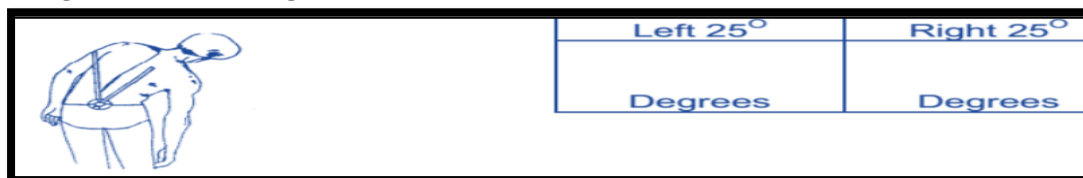
The purpose of this study was to investigate the effects of self- myofascial release using a foam roll on range of motion and performance level of individual routine in rhythmic gymnastics.

### Material and Methods

#### Experimental Approach to the Problem

Experimental and control groups performed a pre and post - training designed intervention in Shoulder

**Figure 1: Motion Range of Back**



**Figure 2: Motion Range of Shoulder**



(extension), Shoulder (flexion), Shoulder (abduction), Shoulder (adduction), Back (extension), Back (flexion), Back (lateral), Knee (extension) and performance level of individual routine in rhythmic gymnastics. The experimental group (EG) (10 female college students) trained 1 hour per day 3 times a week on Foam roll exercises for eight weeks. The control group (10 female college students) continued their normal training, while the experimental group completed foam roll exercises program to see whether this type of training modality would have a positive or negative or no effect on physical variables and performance level of individual routine in rhythmic gymnastics among female college students.

#### Samples

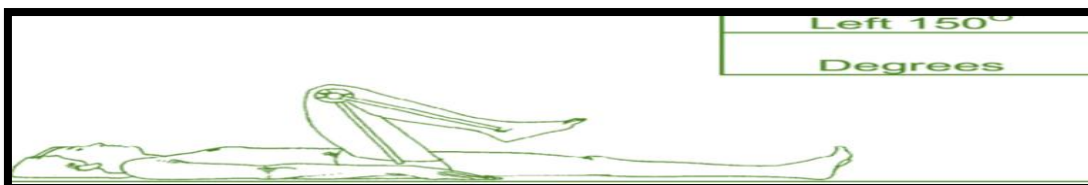
Twenty female college students were randomly allocated to receive either an 8-weeks intervention of the of Foam roll exercises (n = 10) and a control group receiving 8-weeks of normal training only (n = 10). The data collected before and after the program for the two groups.

#### Testing Procedures

Subjects were assessed before and after eight weeks of foam roll training program all measurements were taken one week before and after training at the same time of day. Tests followed a general warm-up that consisted of running, calisthenics, and stretching.



Figure 3: Motion Range of Knee



### Statistical analysis

All statistical analyses calculated by the SPSS statistical package. The results reported as means and standard deviations (SD). Differences between two groups reported as mean difference. Confidence intervals (meandiff  $\pm$  95% CI). Student's t-test for independent samples used to determine the differences in fitness parameters between the two groups. The  $p < 0.05$  was considered as statistically significant.

### Results.

Table 1. Anthropometric Characteristics and age of the groups (Mean  $\pm$  SD)

Group	N	Age [years]	Weight [kg]	Height [cm]
Experimental	10	20.55 $\pm$ 0.3	66 $\pm$ 3.9	169 $\pm$ 5.63
Control	10	20.36 $\pm$ 0.4	67 $\pm$ 4.1	171 $\pm$ 5.78

Table 1 shows the Anthropometric Characteristics and age of the subjects. There were no significant differences observed in the different groups.

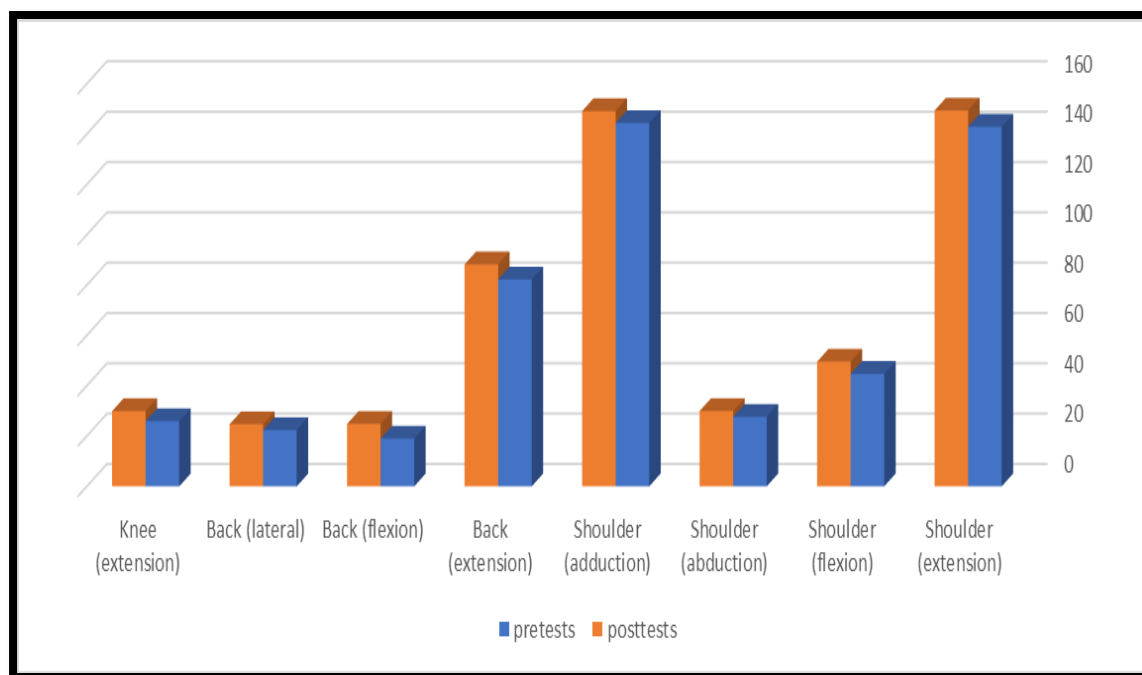


Figure4 shows that:

- Difference between the experimental group and control group in Shoulder (extension), Shoulder (flexion), Shoulder (abduction), Shoulder (adduction), Back (extension), Back (flexion), Back (lateral), and Knee (extension) for posttest to the experimental group.

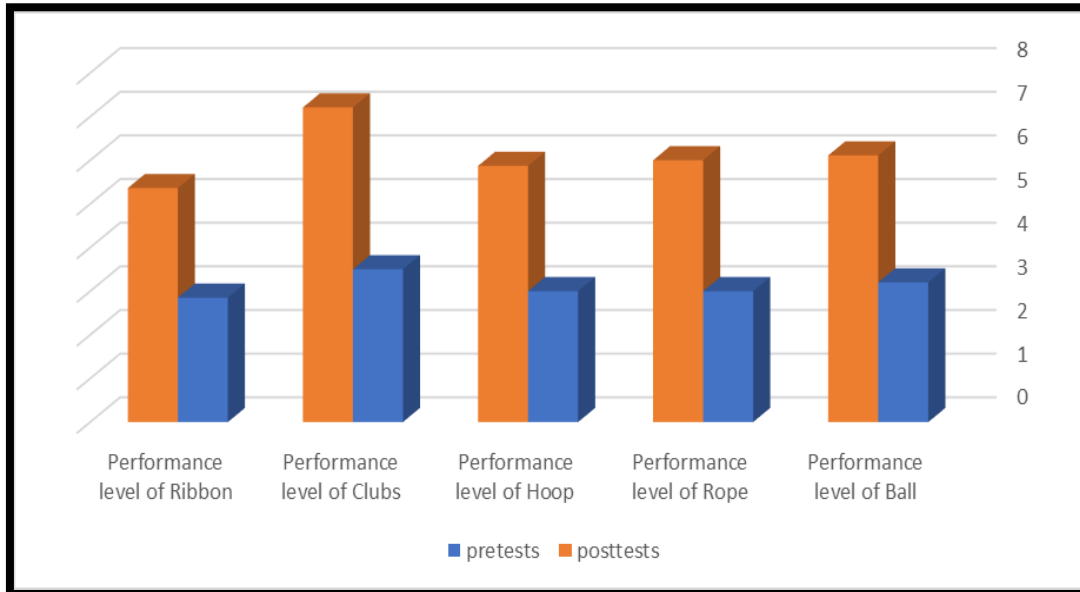


Figure 5 shows that:

- Difference between the experimental group and control group in performance level of individual routine in rhythmic gymnastics for posttest to the experimental group.

#### Discussion.

This study assessed the effects of eight weeks Foam roll training program on range of motion and performance level of individual routine in rhythmic gymnastics for female college students. Experimental results indicated that all variables significantly increased in the experimental group only after the Foam roll training program.

The maximum voluntary contractions were reduced in the following days in the resting condition compared to the use of the foam roller. The range of motion was not different over time or condition. The stiffness characteristics of the vast lateral were different on the third day of use of the foam roller.

The data suggests that prolonged periods of Self-myofascial Release (SMR) may be recommended, in case improvements in the joint range of motion are required. If the output power is a critical requirement of subsequent exercise / performance tasks, prolonged treatment with SMR (i.e. 5 minutes) should be avoided. Professionals should be cautious when implementing SMR treatments in warm-ups.

(S. Amr & E. Naglaa, 2019) pointed that Current literature that measures the effects of SMR is still emerging. The results of this analysis suggest that the foam roller and roller massage can be effective interventions to improve the range of joint movement

and muscle performance before and after exercise. However, due to the heterogeneity of the methods between the studies, there is currently no consensus on the optimal myofascial self-release program.

Kathy, (2001) notes that stretching exercises that aim to increase flexibility can help to correct many of the errors and defects of technical performance, such as motor defects that in turn affect the delay and decline of the level in general, and this is sufficient reason to pay attention to stretching programs based on Practical foundations.

(A. Abd El-Rahman, 2011) noted that muscle stretching is a prerequisite in many sports, as it provides the element of the musculature with a high degree of safety and protection from muscle ruptures and other injuries that may be caused by the sudden performance of skills in response to certain situations. Or motor performance requirements for specialized sports activity.

(M. Nariman, et al. 1997) believe that stretching exercises make use of physiological processes to achieve muscle relaxation so that muscles can be stretched under the best possible conditions. This method is one of the best methods of stretching because it increases positive flexibility and helps to build a method of harmonic movement.

In this regard, (H. Mufti, 2010) explains that the high degree of elasticity and length of the muscles positively affects the strength of muscle contraction, as well as the muscle is characterized by length and ability to elongate the more it helps to produce the best degree of muscle strength.

(R. Ibrahim Rahma and I. Mourad, 2009) show that stretching exercises for different body muscles, especially the working group before the training or competition, reduces the risk of tensile and tearing muscles or joint sprains as well as improving the perception of the body.

These results constant with (K.C. Healey, et al. 2011; K.C. Healey, et al. 2014; G. Z. Macdonald, et al. 2014; G. Z. Macdonald, et al. 2013; AR. Mohr, et al. 2014).

#### Conclusion

- The Foam roll is an extremely effective training tool for female handball players.
- Safety is key when training with the Foam roll.
- Manipulating the variables in programming is the ultimate key to success in creating programs that are within your client's ability range and challenging enough to elicit the desired training effect you are looking for.

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