


The Effect of Different Myofacial Release Exercise Times Using Foam Roller in Archers on Reaction Balance and Arrow Shooting Performance

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Abstract

The aim of this study is to examine the acute effects of different myofascial relaxation exercise times applied using foam roller on reaction balance and arrow shooting performance in archers. For this purpose, a total of 12 athletes between the ages of 18-20, who have been actively involved in archery for the last two years, took part in the study voluntarily. The mean age of the participants was 18.92±0.79 years, average height was 171.83±6.99 cm, body weight was 65.67±5.97 kg, BMI was 22.23±1.28. On different days, control application, experimental application foam roller 30 seconds, experimental application 60 seconds method with foam roller were applied to the subjects, immediately after, visual and auditory reaction test, balance and arrow shooting performance applications were made. In the control application, tests were applied to the subjects without any myofascial release protocol. The obtained data were analyzed in SPSS 22.0 program. In order to determine the difference between the applications, one-way analysis of variance and LSD tests were applied in repeated measurements. As a result of the statistical analysis, a significant difference was observed in favor of the experimental applications (30-60 seconds) compared to the control application in the visual and auditory reaction tests, balance and arrow shooting performance tests ($p<0.05$). In terms of arrow shooting performance scores, there was a significant difference in favor of experimental applications in favor of experimental applications, 30 seconds of foam roller application and 60 seconds of application in favor of 30 seconds compared to control application. As a result, we can say that different myofascial relaxation exercises applied with foam roller affect reaction balance and arrow shooting performance positively.

Keywords: Balance, Warm-up, Archery, Reaction

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Introduction

Archery, which has achieved great success today, has taken its place among the sports branches that attract attention in the world. Improved performance in archery is demonstrated by the results of arrows shot towards a target in a limited time with high accuracy (Şahinoğlu and Özusakiz, 1994). As a static sport, it is a sport that requires the upper body muscles to be intensely strong and durable (Ertan et al. 2003; Mann, 1994). Archery traction technique, which has certain phases, is based on completing the movement by dynamically pulling the beam with the traction arm by carrying the bow with the tense shooting arm together with the muscles that keep the posture of the individual's body stable throughout the shot, which includes the aiming and releasing technique actions (Leroyer et al. 1993; Nishizono et al. et al. 1987). As in many sports, there are many factors that affect performance in archery. The main factor is the physical and physiological readiness of the athlete. With the applications, it is aimed to reveal the physical and physiological development of aerobic and anaerobic developments (Öner and Yasul, 2022; Öner et al. 2021; Ay and Pancar 2022). The fact that the muscles are trained correctly and effectively for the movements that will take place directly affects the shooting performance.

In all sports, warming up is of great importance in making the physiological and psychological state effective before training or before the competition, and in preparing the body physically and physiologically. With the warm-up, it is ensured that the performance is made fluent and effective with general and special movements (Şahinoğlu and Özusakiz, 1994). Many external factors become equal in the success of athletes, and depending on the enrichment of psychological, physical and nutrition differences that bring success, various training methods should be formed (Çınar et al. 2019; Tuzcuoğulları et al. 2017; Koyunlu and Pancar, 2022). In this study, it was aimed to reveal the effects of different myofascial relaxation exercise times applied using foam roller on reaction, balance and arrow shooting performance in archers.

Method

Experiment Content and Subjects

In this study, in which the effects of different myofascial release exercise periods applied using foam rollers on the reaction, balance and arrow shooting performance of archers were examined, the study was started with the approval of the ethics

committee with the decision of the Gaziantep University Social and Human Sciences Local Ethics Committee, dated 05.05.2023 and numbered 05. In addition, voluntary participant statements were obtained from the individuals participating in the study. Individuals who regularly come to the archery center and participate in training three days a week were included in the study. A total of 12 healthy male individuals between the ages of 18-20 were included in the study. As the criteria of the study, criteria such as having been involved in archery for two years, regularly participating in training, not having a chronic disease, not taking long drug therapy in the recent past, and not taking any additional food or doping-containing substances for the last six months were met.

Experiment Design

During the experiment, the researcher visited the individuals in their archery centers four times within the scope of the study. In order to eliminate possible physiological, neurophysiological and fatigue conditions that may occur during the study, the subjects completed the research protocol for three days with a 48-hour break. In the first visit, participants included in the study were given general information about the study and material use (foam roller) adaptation sessions. In the second visit, age, height and weight measurements and visual and auditory reaction test, which is accepted as a control application, stork balance test and arrow shooting performance measurement were taken from all participants. In the third visit, besides the measurements made from the control application, the 30-second session of foam roller and myofascial muscle relaxation exercise was applied to all participants and their measurements were taken. In the fourth and last visit, besides the measurements made from the control application, the 60-second session of foam roller and myofascial muscle relaxation exercise was applied to all participants and their measurements were taken. In order to reduce the effects of circadian rhythm on possible study results, all applications were applied at the same times (10.00-12.00). Attention was paid to use the same materials in the exercises.

Statistical Analysis

Statistical analysis of the obtained data was presented using the SPSS package program (SPSS for Windows, version 22.0, SPSS Inc., Chicago, Illinois, USA). The analyzes presented are shown as mean and standard deviation. The Shapiro-Wilk test was used to see if the data were normally distributed. One-way analysis of variance was performed for the difference distribution between applications for repeated

measurement data. The LSD correction test statistic was used to determine between which applications the difference analyzes between the applications were made. Statistical significance levels were accepted as $p < 0.05$.

Results

This study, examining the acute effects of myofascial relaxation exercise times applied with foam rollers, was conducted with a total of 12 volunteer athletes who participated in regular trainings interested in archery. The effects on balance, reaction and arrow shooting performance were examined by applying different relaxation times to these athletes with foam roller. The results of the obtained data are presented in tables and graphics.

Table 1. Descriptive data of individuals participating in the study

	N	Min.	Max.	Mean	Std. D.
Age	12	18.00	20.00	18.92	0.79
Height	12	162.00	183.00	171.83	6.99
Body Weight	12	60.00	80.00	65.67	5.97
BMI	12	19.75	24.69	22.23	1.28

Table 2. Analysis of the mean scores from the visual reaction test

	Mean±S.D	F	p	Dif.
T1	347.17±29.48			
T2	271.08±28.72	24.875	0.000*	T1-T2 T1-T3
T3	285.33±41.80			

* $p < 0.05$ Applications: T1. Control application T2. Experiment Application 30 seconds T3. Experiment Practice 60 seconds

Table 3. Analysis of the mean scores from the auditory reaction time test

	Mean±S.D	F	p	Dif.
T1	396.67±77.24			
T2	277.42±28.18	22.432	0.000*	T1-T2 T1-T3
T3	289.42±34.25			

* $p < 0.05$ Applications: T1. Control application T2. Experiment Application 30 seconds T3. Experiment Practice 60 seconds

Table 4. Analysis of the average scores from the Balance (Right Foot) test

	Mean±S.D	F	p	Dif.
T1	30±6.67			
T2	42.75±4.35	30.579	0.000*	T1-T2 T1-T3
T3	43.16±2.44			

* $p < 0.05$ Applications: T1. Control application T2. Experiment Application 30 seconds T3. Experiment Practice 60 seconds

Table 5. Analysis of the mean scores from the Stork Balance (left foot) test

	Mean±S.D	F	p	Dif.
T1	28.25±6.97			
T2	41.33±3.42	26.510	0.000*	T1-T2
T3	41.25±3.22			T1-T3

*p<0.05 Applications: T1. Control application T2. Experiment Application 30 seconds T3. Experiment Practice 60 seconds

Table 6. Analysis of the average scores obtained from the arrow shooting performance application

	Mean±S.D	F	p	Dif.
T1	79.17±13.35			
T2	134.50±10.33	76.722	0.000*	T1-T2
T3	117±7.80			T1-T3

*p<0.05 Applications: T1. Control application T2. Experiment Application 30 seconds T3. Experiment Practice 60 seconds

Discussion

This study was carried out to examine the effects of different myofascial relaxation exercise times applied using foam roller on reaction balance and arrow shooting performance in archers. The study was designed according to the controlled cross-experiment design. The study was carried out with a total of 12 healthy male individuals between the ages of 18-20, who have been actively involved in archery for the last two years and met the study criteria. Control application, experimental application foam roller exercises for 30 seconds, and finally, experimental application foam roller exercises for 60 seconds were applied to the subjects. Then, reaction, balance and arrow shooting performance measurements were made and reported.

According to the results of the data we obtained from our study; visual and auditory reaction times between control and experimental applications in favor of experimental applications (T2-T3); Stork balance test results were found to be statistically significant in favor of control and experimental applications (T2-T3) (p<0.05). According to the arrow shooting performance scores, in favor of the control application and the foam roller 30 second application; It was determined that there was a statistically significant difference between T2 and T3 in favor of the 30-second experiment (p<0.05).

When the literature is examined, we can say that myofascial relaxation exercises are applied in many different branches, especially in team athletes. It was aimed to examine the effects of foam roller applications on 20 female athletes in the 11-17 age group, volleyball athletes, on jump performance in the acute period. In order to make this evaluation, dynamic and foam roller applications were applied to the athletes and it was hypothesized that which technique would affect the acute vertical jump in volleyball players. According to the results of the study, they determined that self-myofascial release applications using foam roller would have positive effects on the lower extremity and vertical jump force requiring explosive power (Çakmak, 2021). In a study examining different durations, they examined the acute effects of the self-made foam roller technique applied for different durations on the hands-up overhead squat test. They found that the long-lasting application changed the hands-up squat score statistically significantly in the applications of the foam roller technique for 90 seconds or more. Short-term technical studies also stated that foam roller applications such as 30 and 60 seconds did not reveal a statistically significant difference (Monteiro et al. 2017).

When the literature is examined, studies on balance performance have revealed the effects of different application protocols. It is seen that the results of the measurements made with the flamingo balance test, stork balance test and static balance device applied in the studies performed on different groups. There are very few studies with myofascial release exercises. There are study results that show that the warm-up protocols do not affect the balance performance of the athletes positively, and that the data obtained in the studies examining the effects of static and dynamic warming and the PNF warm-up method on the balance performance of the 15-18 age group do not affect the balance performance positively (Özer et al.,2017; Köse and Atan, 2015; Gündüz, 1995; Costta et al. 2009; Player, 2011).

In our study results, it has been determined as a result of statistical analyzes that when the application is made using foam roller, the thirty-second repeated measurement of the experimental application is more effective on the arrow shooting performance than the sixty-second foam roller. Stretching and warming exercises using many materials can be easier for archers to adapt to internal and external factors

and can increase performance. Such exercises play an active role in maintaining posture and improving stability and developing deep cervical muscles. Athletes in archery have to ensure the control of fine movements, the strength of deep muscle groups and the development of balance in order to increase their shooting performance. Successful performance requires quick strength and quick response for athletes. Before the competition, where success can be affected by very small performance differences, athletes must perform their warm-up processes very well. Myofascial release technique means that this pressure continues for a certain period of time by creating pressure on myofascial tissues in athletes. The continued pressure on the tissue reduces pain after a while, increases blood circulation, and causes involuntary stretching of the connective tissue and muscles, leading to an increase in the range of motion (Bell, 2008). It has been emphasized that the increase of blood flow in these tissues is important for warming and healing, and it has been supported by the results of the study that foam roller applications increase intra-tissue blood circulation (Hotfiel et al. 2017).

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