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The Acute Effect of Foam Rolling Vs Dynamic Stretching on Physical Performance in Male Basketball Players

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Abstract

Background: Players are frequently required to repeat bouts of intense action, such as jumping, sprinting, shuffling, changing directions, and jogging, which are interspersed with walking and short periods of recovery. Hence, Foam Rolling (FR) and Dynamic Stretching (DS) are essential for basketball training regimes to increase aerobic capacity, agility, speed, strength, and power.

Purpose: The purpose of this study was to determine whether there was a difference between the Foam rolling and DS on flexibility, power, and agility in male collegiate Basketball players.

Method: 5 male Basketball players were randomly assigned to receive either FR via plain foam roller or DS. To compare the effect of interventions, subjects were assessed on measures of flexibility via sit and reach test, power through vertical jump test, agility by illinois agility test.

Results: A one-way ANOVA was used to analyze differences. To test the difference between interventions and across 3 assessments, a 3X3 split plot ANOVA with group (control, SMR, IASTM), time (0 min, 10 mins, 20 mins) and interaction effect (Group X Time) was employed. There were no significant differences between interventions for all variables.

Conclusion: The findings of this study revealed that there was no significant improvement after the intervention of Foam Rolling and Dynamic Stretching in male Basketball players. But it also did not have adverse effects on the player's performance.

Keywords: Basketball; Foam Roller; Dynamic Stretching; Flexibility; Power; Agility

Introduction

A warm-up is a common pre-exercise routine performed with the intention of improving performance and reducing risk of injury. The stretches used during DS typically mimic movement patterns performed during exercise. This would allow for a more sport specific warm-up, which would increase muscle temperature, thereby decreasing muscle stiffness [1] as well as increasing nerve conduction and enhancing metabolic rates related to phosphagen and glycolytic energy systems [2]. Foam rolling is a type of Self myofascial release (SMR) that requires the person to use a dense foam cylinder to roll back and forth over the muscle and fascia. The use of foam rolling (FR) has gained popularity in recent years within the general population. Although, its precise mechanism of action is unknown, the conventional theory states that the friction created during FR breaks apart fascia adhesion [3]. By removing these mechanical restrictions from the myofascial tissue, ROM can be restored. SMR before a workout allows an athlete to increase his or her volume of training and decrease dysfunctions resulting from micro-trauma. The acute effect of Foam rolling on physical performance is controversial as some research shows that there is improvement, and some shows no effect.

Healey and colleagues [4] examined the acute effect of foam rolling exercise on vertical jump height and power, isometric force, and agility. The results showed no significant differences between foam rolling and planking for all the athletic tests. MacDonald [5] examined the acute effect of foam rolling on quadriceps maximum voluntary contraction force and found no changes in muscle strength 2 and 10 minutes after foam rolling on the quadriceps. On the other hand, a study examined the effect of foam rolling

after an intense bout of back squats. The results revealed that foam rolling substantially improved muscle activation and vertical jump height as compared to the no-treatment control group [6]. One method of stretching that is commonly used as part of the preparatory period is dynamic stretching (DS). It has been shown to acutely improve physical performance [7-12]. In a recent extensive review, Behm and Chaouachi [13] suggested that dynamic stretching causes either no adverse effects or improves performance, and it is currently becoming more common as part of a warm-up [14].

However, there is also evidence to suggest that dynamic stretching decreases hamstring strength [15]. Considering the recent debate surrounding the efficacy of dynamic stretching for reducing the risk of injury and improving performance. To our best knowledge, previously one studied had been done that compared Foam rolling with dynamic stretching on Joint Range of Motion. And one more study was done which showed a combined effect of Foam rolling and dynamic stretching on physical performance [16]. To our best knowledge no study had been done which compared the acute effect of Foam rolling and dynamic stretching regarding their effectiveness on flexibility, power and agility in form of physical performance. Therefore, the purpose of this study is to determine whether there is a difference between the Foam rolling and DS on flexibility, power, and agility in male collegiate Basketball players.

Methodology

Subjects: 5 male basketball players ranging in ages from 18 to 25 years, without any known neuromuscular, orthopedic, or cardiovascular conditions, volunteered to participate in the study. Subjects were recruited from those who voluntarily reported. This study consisted of randomized crossover design in which subjects participated in both soft tissue release treatment and stretching treatment.

Variables: In our study, two independent variables and three dependent variables were taken. For Foam Roller treatment we used VPK plain foam roller, for IASTM M2T blade was taken. In dependent variables, flexibility was measured by sit and reach test, power by vertical jump test, agility by Illinois agility test.

Procedures: The potential volunteer candidates were explained to the nature and purpose of the study. Eligible candidates underwent assent taking and received familiarization trials specific to each subject. Descriptive variables of all subjects, such as age, height, weight, BMI were recorded. After familiarization trial the base line measurement of dependent variables was taken.

Interventions

On the very first day baseline data was taken, after 24 hours any one of two interventions were given that may be FR or DS. For FR, we used VPK plain foam roller and muscles were taken quadriceps, hamstring, triceps surge muscles of both lower limbs. Foam roller rolled 3 sets for 60 seconds and 60 seconds interval between two sets for each muscle group. On the other hand, for DS the same muscles were taken same as FR. After giving treatment all 3 dependent variables were measured 3 times i.e., immediately after treatment (at 0min), 10 min after treatment, 20 min after treatment. 3 trials were taken for each variable and the best of 3 was selected.

Data Analysis

Table 1: Temporal Changes in Performance following FR vs. DS vs. Control.

Variable	Group	0 mins Mean (SD)	10 mins Mean (SD)	20 mins Mean (SD)		Df	F-value	P-value	Partial eta squared
Sit and Reach	Control	35.7 (8.17)	36.5 (8.81)	36.8 (9.09)	Time	2	0.48	0.953	0.003
	FR	37.7 (8.09)	37.2 (8.77)	38.3 (9.29)	Group	2	0.114	0.893	0.006
	DS	36.2 (752)	36.2 (9.38)	37.2 (8.96)	G X T	4	0.008	1	0.001
Vertical Jump	Control	19.3 (1.56)	20.4 (1.98)	20.5 (1.9)	Time	2	1.19	0.315	0.062
	FR	21 (1.9)	21.2 (1.9)	21.7 (1.85)	Group	2	1.49	0.239	0.076
	DS	20.1 (1.38)	21 (2.42)	21.5 (2.62)	G×T	4	0.086	0.98	0.009
Illinois Test	Control	18.31 (2.68)	16.76 (0.54)	16.7 (0.57)	Time	2	1.74	0.189	0.88
	FR	16.74 (0.48)	16.58 (0.46)	16.43 (0.33)	Group	2	2.21	0.124	0.11
	DS	16.57 (0.76)	16.51 (0.73)	16.51 (0.69)	G×T	4	1.04	0.398	0.1
FR- Foam roller; DS- dynamic stretching.									

The data was SPSS 21 version software. The descriptive analysis was used to determine the mean and standard deviation of the variables. A one-way ANOVA was used to analyze differences. To test the difference between interventions and across 3 assessments, a 3X3 split plot ANOVA with group (control, SMR, IASTM), time (0 min, 10 mins, 20 mins) and interaction effect (Group X Time) was employed. There were no significant differences between interventions for all variables (Figure 1), (Table 1), (Figure 2,3,4).

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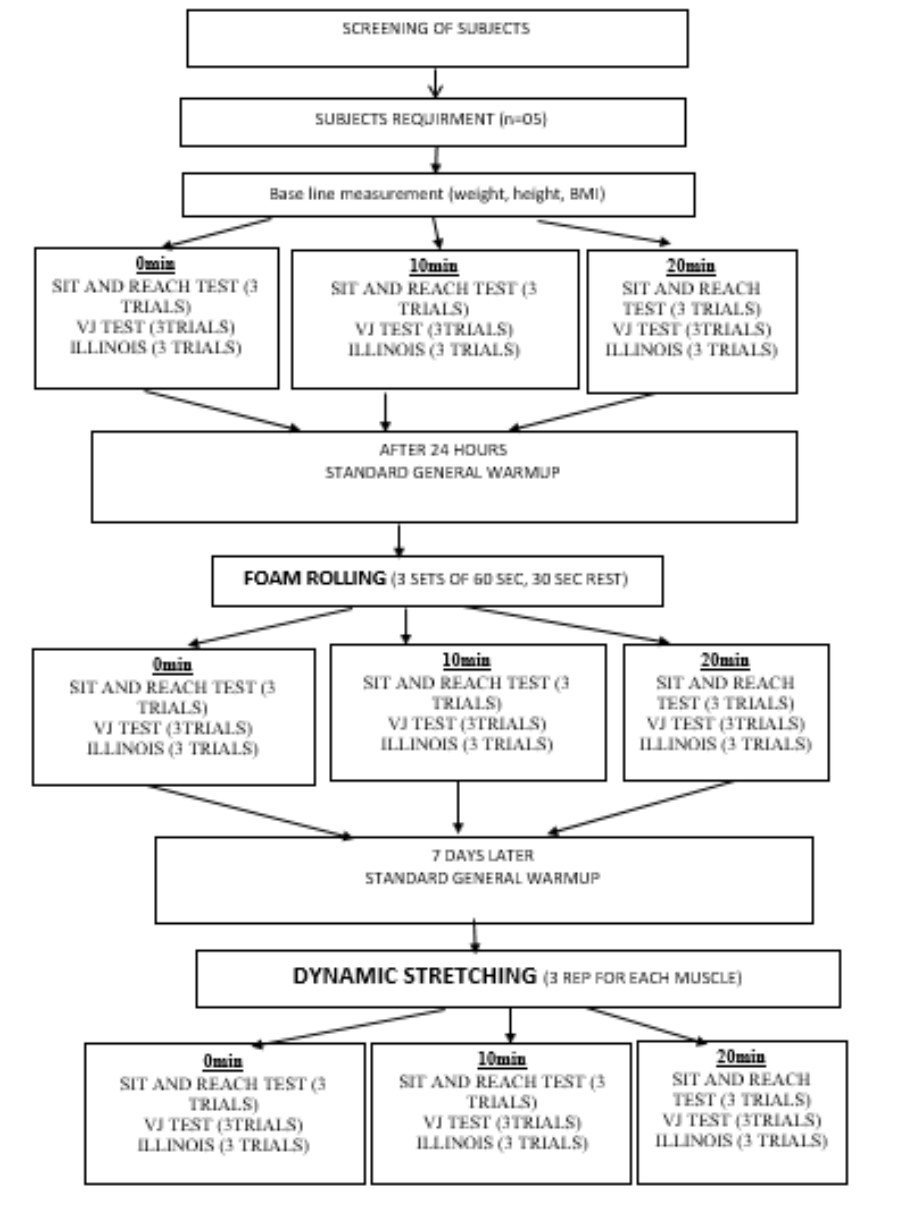

Figure 1: Screening of Subjects.

Discussion

The purpose of the study was to compare the acute effect of Foam rolling Vs Dynamic Stretching on Flexibility, Power, and agility in male Basketball players. The total number of samples taken randomly was 5.

Flexibility

Flexibility performance in the present study showed non-significantly improvement after interventions as well as without intervention. Both groups had a non-significant time effect (p=0.953) as well as a group effect (p= 0.893). Previously so much research has shown that immediately increase flexibility after foam roller. reported a 10.3% increase in knee joint ROM at 10 minutes after FR using a custom- made foam roller using 2 sets of 60 seconds of FR. Previous studies have documented acute increases in ROM with DS showing a 21.6 and a 18.2% increase in ankle ROM immediately after and 10 minutes after 4 sets of 30 seconds of DS, respectively. Changes in ankle ROM compared with the control session were not significantly different at 5, 15, and 30 minutes after treatment showed a 6.3% increase in hip flexion ROM 10 minutes after highly trained rowers performed 8 repetitions of 30 seconds of DS showed 9.3 and 7.6% increase in

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sit-and-reach scores after 6 and 12 minutes of DS, respectively, in recreationally active men. Documented a 10.6% increase in sit-and-reach scores for recreationally active men after completing 13.8 6 1.7 minutes of DS. Because there was no pretest measure, this percent increase is compared with the no stretching condition.

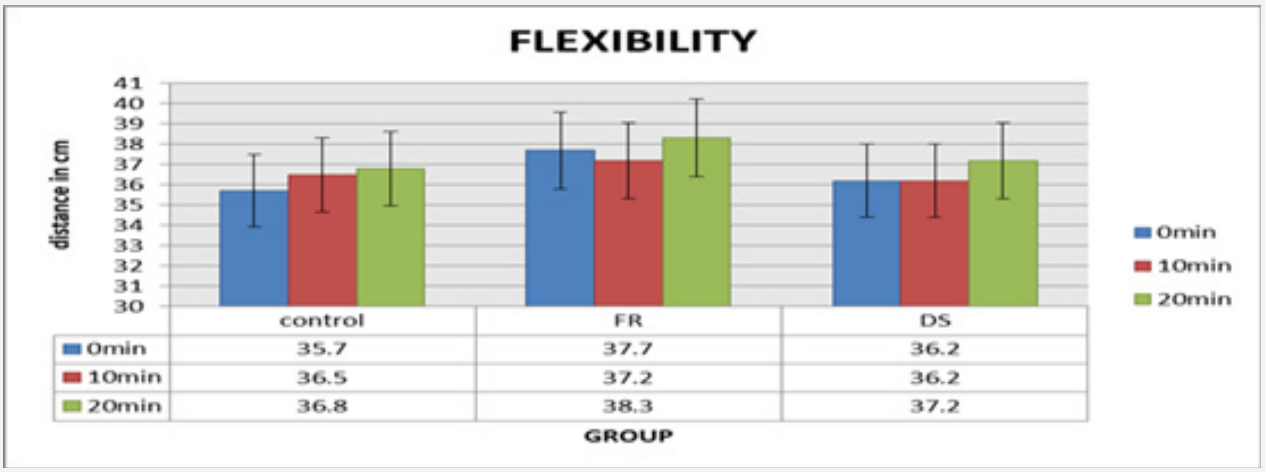

Figure 2: Comparison of change in flexibility performance.

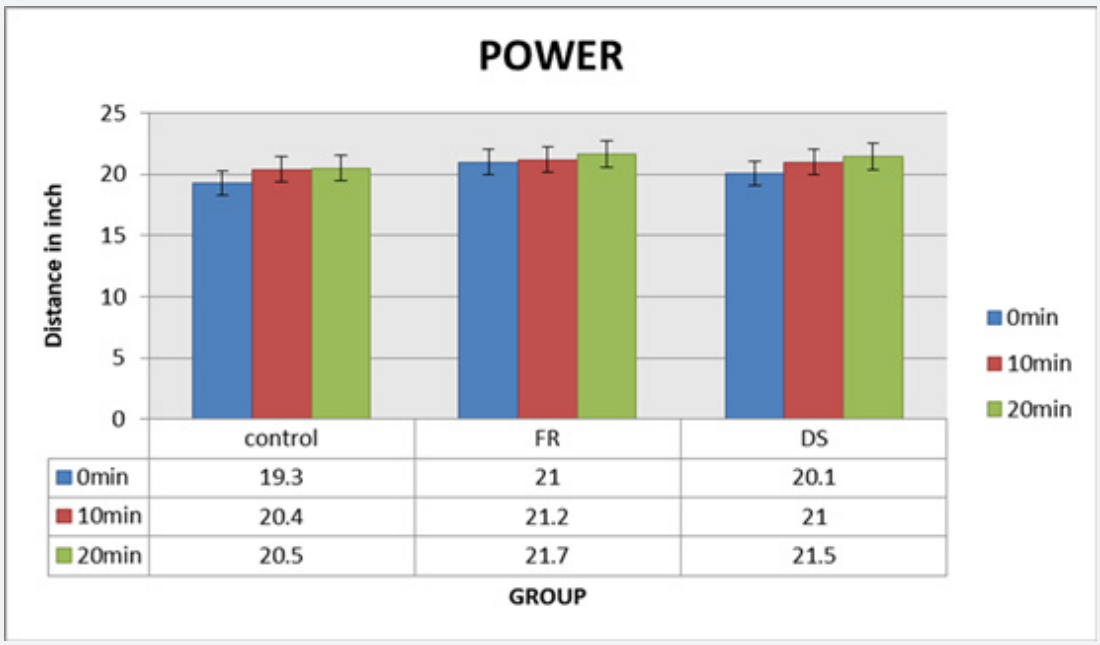

Figure 3: Comparison of change in power performance.

Vertical Jump Performance

The vertical jump performance in this study showed a non-significant increase after intervention as well as before intervention. The time effect (p=0.189) and group effect (=0.124). Demonstrated a 6.2 and 5.6% increase in VJ height after 6 and 12 minutes of DS, respectively, in healthy, recreationally active men. It is possible that varying the dosage of DS may vary the duration of this acute performance effect. Evaluated the acute effect of 6 and 12 minutes of DS on flexibility, jump performance, and muscular endurance in recreationally active men. They concluded that both DS durations immediately improved flexibility and

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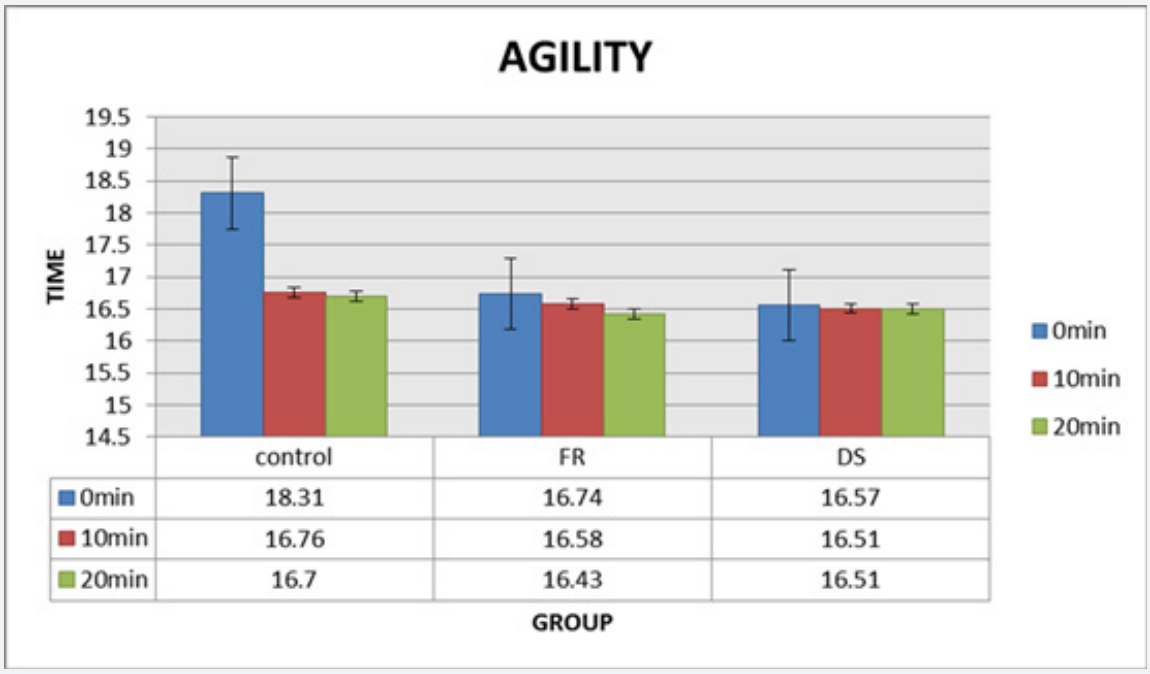
jump performance, but the 12 minutes of DS impaired muscular endurance.

Agility Performance

The Illinois agility test in this study showed no significant improvement with time effect (p=0.189) and group effect (p=0.124). There was an immediate increase in Illinois agility performance in the control group. However, a similar trend of changes was seen in both interventional groups. The early increase in control group could be because of the warmup effects. Previously a study was conducted by amiri et al 2010 showed that has elucidated that the level of agility skills as reflected by the years of experience in playing soccer improves the time in completing the IAT. Following the no-stretching warm-up and dynamic stretching, the more experienced showed faster agility times. (13.77 6 0.74 seconds and 13.71 6 0.50 s) compared with the less experienced group (14.74 6 0.54 seconds and 14.26 6 0.51 seconds). This is shown in the more experienced players where the time to complete the dynamic stretching method is faster than the less experienced players (13.71 6 0.50 seconds, 14.26 6 0.51 seconds, respectively). The more experienced players seem to show better adaptation. in performing new tasks.



	control	FR	DS
0min	18.31	16.74	16.57
10min	16.76	16.58	16.51
20min	16.7	16.43	16.51

Figure 4: Comparison of change in agility performance.

Conclusion

The findings of this study revealed that there was no significant improvement after the intervention of Foam Rolling and Dynamic Stretching in male Basketball players. But it also did not have adverse effects on the player's performance.

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