

Dynamic Warm-Up Protocol With Different Intensities Of Weighted Vest On Fitness Performance In Varsity Female Athletes

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Abstract : *Our finding may improve the understanding of Dynamic warm-up protocol with and without weighted vest on fitness performance and may help clinicians develop effective warm-up protocols for sports practice and competition. This paper aims to investigate the effect of dynamic warm-up protocol with and without weighted vest on fitness performance in varsity female athlete. A total of 40 female university athletes were recruited voluntarily. After 5 minutes of jogging, subjects performed dynamic warm-up protocols: (1) Nine moderate-intensity to high-intensity dynamic exercises without weighted vest (DY), (2) the same nine dynamic exercises performed with a vest weighted with 6% of body weight weighted vest (DY6) and (3) the same nine dynamic exercises performed with a vest weighted with 12% of body mass (DY12). The main outcome measures are vertical jump (VJ), standing broad jump (SBJ), seated medicine ball toss (SMBT), and 20 meter sprint (S). The result showed that VJ performance was significantly greater after weighted vest with DY6 and DY12 (39.93±1.06cm, 40.68±0.94cm, respectively), compared with DY (37.63±1.00cm), and SBJ performance was significantly greater after DY6 and DY12 (65.00±9.40 inch, 66.30±8.41inch) compared with DY and DY6 (62.80±8.70 inch) (P<.05). SMBT with DY12 had been increase to 2.80±0.27m from DY and DY6 (2.55±0.30m vs 2.70±0.29m, respectively) and 20m sprint with DY12 weighted vest had been reduced to 3.75±0.29sec while 20m sprint from DY with DY6 weighted vest (3.95±0.85sec vs 3.78±0.28sec, respectively). Therefore dynamic warm-up performed with a vest weighted with 6% and 12% of body mass may be the most effective warm up protocol for enhancing jump performance in varsity female athlete.*

Keywords: *female athlete, dynamic warm-up, fitness performance*

1. INTRODUCTION

In recent times, surveys have experiential a variability of techniques for enhancing training protocols, starting accumulative the strength to refining the aerobic endurance. Warm up as pre-exercise event have been introduced to acutely increase sports performance. Warm-up dynamic exercise might generate an optimum situation for power production by increasing neuromuscular function [1]. Inefficient muscle movement and overstretch the inflexible muscle are most command case that happen when performance vagarious or intense activities because of an unready muscle to contract immediately in fast tempo [2-4]. Dynamic warm-up comprises exercise and is prone toward stimulate countless cardiovascular and metabolic changes than static stretching [5]. According to Samson et al., by implementing dynamic warm up as part of pre exercise event it have been reported improvement on power, sprint

and jump performance [6]. The probability that a weighted resistance with dynamic warm-up protocol might give the better outcome in improvements power invention might ensure significant effects for capable athletic trainers and other specialists who usually inspire undeveloped athletes to participate in some type of warm-up afore practice and competition [7-8]. Various mechanisms have been proposed about the effectiveness of warm up protocol. However, the most pronounced known mechanism is probably post activation potentiation (PAP). PAP is manifested mostly in activities involving endurance, speed and power [9] while muscle activation level is history dependent, and it is believed that performing active stretching temporarily increases muscle activation through the mechanisms involved in PAP. To manipulated load for warm-up, weighted vest can be one of equipment.

The intensity of warm-up can increase by loading the weighted vest. The duration of warm-up can reduce because of the manipulation of load. Therefore, with the short duration of time athletes can warm up with optimum intensity. In order to increase the intensity of activity the weighted vest will be filled up by plate to increase the load. Therefore, it can be proposed that a pre-exercise activity with a weighted vest might temporarily affect some specific characteristics of sport performance during and shortly after the removal of the vest. Based on previous findings, we hypothesized that performance after dynamic warm-up protocols with a weighted vest would exceed performance after dynamic warm-up compare to without a weighted vest.

2. MATERIALS AND METHODS

This is a crossover repeated measure design study. First session is (DY) warm up with body weight only, followed by (DY6) wearing weighted vest 6% of body mass and lastly (DY12) wearing weighted vest 12% of body mass all of them will go for the same testing procedure and the same warm up protocols routine. Forty participants will complete all of the three dynamic warm up protocols with weighted vest and without. The respondent are required to fill in the medical history forms. The participants will be asked to avoid doing high intensity exercises one day before the test is conducted. Varsity female athletes aged 18- 26 years old were selected (Table 1).

Table 1: Physical characteristic of the participants

Variables	(N=40)
Age (yr)	21.10±1.48
Height (cm)	157.85±7.48
Weight (kg)	53.31±8.61
Body mass index (kg/m ²)	21.27±2.10

Data presented as mean ± standard deviation

Weight of intensity will be calculated based in their body weight. Before the test, subjects will jog for five minutes and join in one of the following 10-minute warm-up protocols (Table 2) in random order on nonconsecutive days: (1) moderate-intensity to high-intensity dynamic exercise (DY), (2) moderate-intensity to high-intensity dynamic exercise with a vest weighted with 6% of body mass (DY6), or (3) moderate-intensity to high-intensity dynamic exercise with a vest weighted with 12% of body mass (DY12). Each testing session occurred

at least 48 hours after a competition or hard practice session. The weighted vest were used to manipulate the intensity of warm-up and the dynamic warm-up are used as warm-up protocol.

Table 2. Dynamic warm up protocols

Warm-up	Exercise description
1. Speed skips	While skipping forward, subjects emphasized speed of movement and vigorous arm action with both elbows at 90 degree of flexion.
2. Heel kicks	While moving forward, subjects rapidly kicked the heels toward the buttocks while emphasizing speed of movement and quick feet.
3. Toes in, toes out	While rapidly hopping forward, subjects turned the toes inward with the heels turned outward and then turned the toes outward with the heels turned inward. Emphasis was on hip rotation and speed of movement.
4. Trunk twists	Subjects placed both hands behind the head and rapidly hopped forward as they twisted their hips to the right and left. They maintained an upright position with the chest forward as they emphasized trunk rotation.
5. Skipping straight leg toe touches	From a standing position with both arms extended in front of the body, subjects skipped forward as the left foot was raised toward the left hand and then the right foot was raised toward the right hand. Subjects skipped when switching from the left leg to the right leg. Emphasis was placed on the speed of movement and vigorous arm action with both elbows at 90 degree of flexion
6. Drop squat carioca	From a standing position with feet close together, subjects hopped and landed with feet shoulder width apart and knees slightly bent. Then subjects rapidly moved laterally while crossing the feet in front of each other. The exercise was repeated in the opposite direction.
7. Push-ups	From a modified push-up position with the knees on a mat and the hands near the chest, subjects performed 3 push-ups at a controlled speed followed by 3 explosive push-ups in which they attempted to lift their hands and body off the mat.
8. Sprint series	From a standing position with the feet close together, subjects leaned forward and sprinted to the 5-yd (4.57-m) mark and then accelerated through the 10-yd (9.14-m) mark.
9. High knee skip	While skipping forward, subjects emphasized the height of each skip, high knee lift, and vigorous arm action with both elbows at 90 degree of flexion.

Adapted by (Faigenbaum et al. 2006)

Discriptive statistics for all fitness variables are expressed as mean \pm SD. We will calculate one way ANOVA, repeated-measures analysis of variance to analyze differences among criterion measures after the 3 warm-up protocols. To evaluate if an order effect existed for the assignment of the treatment protocols, the results from the first, second and third testing sessions will also analyzed with a one way ANOVA, repeated-measures

analysis of variance. When a significant F value is obtained, post hoc comparisons are conducted via a least significant difference test to identify specific differences between criterion measures or testing sessions. Statistical significance was set at $P \leq .05$, and all analyses will carry out using the SPSS statistical package (version 20.0; SPSS Inc., Chicago, IL). Statistical significance is set at the $p < 0.05$ level of probability.

3. RESULTS AND DISCUSSION

Performance on vertical jump was greater after using protocol VJ6 than the protocol of VJ. Dynamic warm-up elicited a slight increments in VJ from without weighted vest with 6% weighted vest ($37.63 \pm 1.00\text{cm}$ vs $39.93 \pm 1.06\text{cm}$, respectively), which was statistically significant ($p = .001$). While, VJ with 12% weighted vest had been increase to $40.68 \pm 0.94\text{cm}$, which was also statistically significantly different to without vest dynamic warm-up ($p = .001$). However, VJ with 12% weighted dynamic warm-up was not significantly different with dynamic warm-up with 6% weighted vest ($p = .37$). (Figure 1).

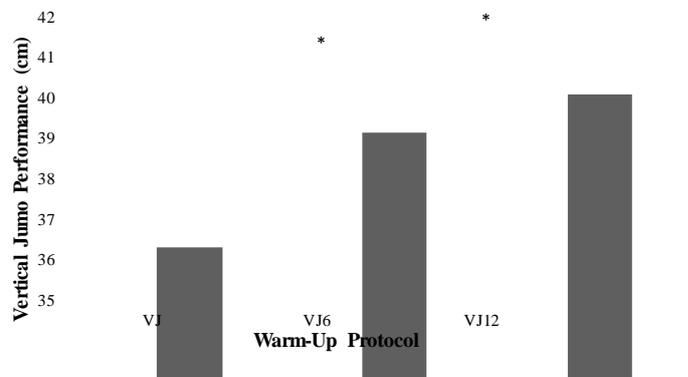


Figure 1: Vertical jump performance after warm-up protocols in 3 different intensity of weighted vest. * Significantly different from VJ, $P \leq .05$.

Dynamic warm-up elicited a slight increments in SBJ from without weighted vest with 6% weighted vest (62.80 ± 8.70 inch vs 65.00 ± 9.40 inch, respectively), which was statistically significant ($p = .001$). While, SBJ with 12% weighted vest had been increase to 66.30 ± 8.41 inch, which was also statistically significantly different to without vest dynamic warm-up ($p = .001$). Therefore, dynamic warm-up with 6% and 12% weighted vest statistically significant increase in fitness performance (Figure 2).

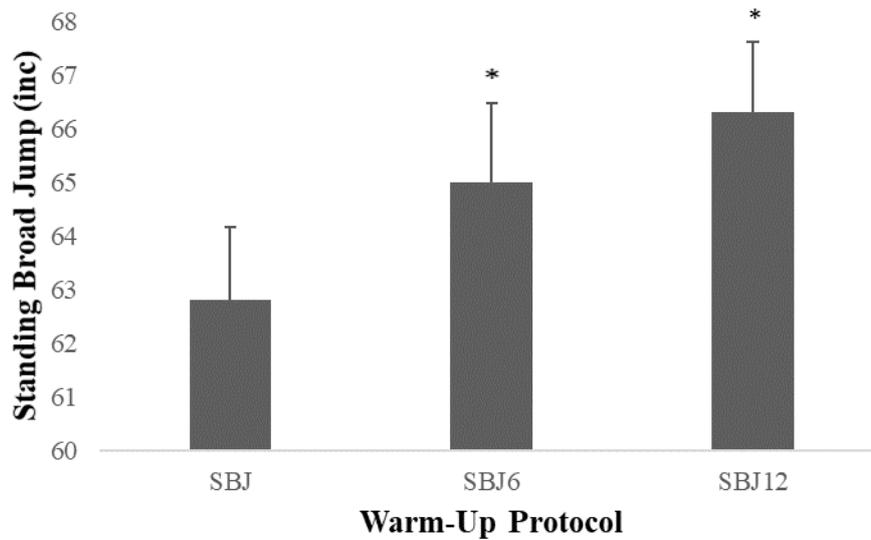


Figure 2: Standing Broad Jump performance after warm-up protocols in 3 different intensity of weighted vest. *Significantly different from SBJ, $P \leq .05$

Performance on seated medicine ball toss, there were incensement between mean are small yet the result are improve from 2.55meter without vest to 2.7meter with 6% of body weight vest and 2.8 meter for 12% of body weight vest (Figure 3). However there was no significant main effect dynamic warm-up on the number weighted vests that participants wore 6% and 12% in fitness performance for SMBT compared to without vest.

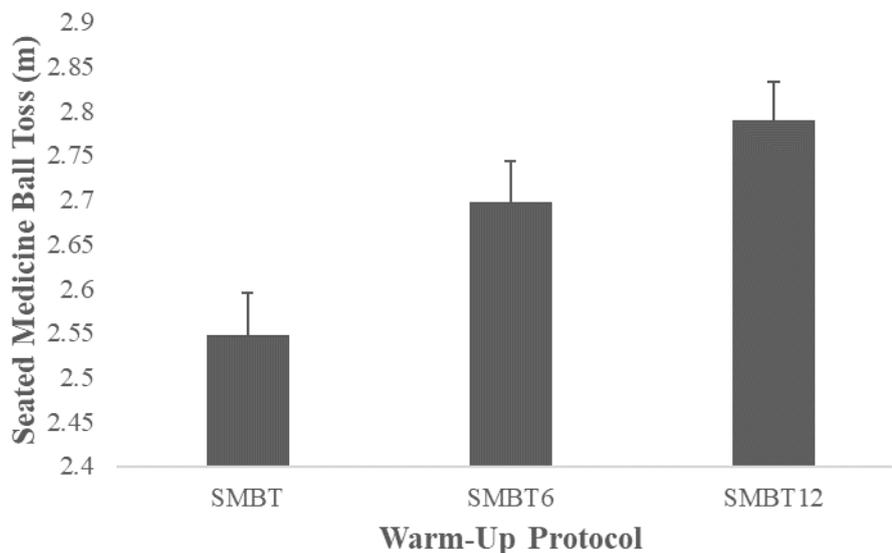


Figure 3: Seated Medicine Ball Toss after warm-up protocols in 3 different intensity of weighted vest.

Sprint performance shows that decrease mean on time in 20m sprint but not give a significant different. The mean time for 20 meter sprint without vest is 3.95sec and gradually decrease by 3.78sec and 3.75sec respectively for weighted vest 6% of body weight and 12% of body weight which is the smaller the number the better the result.

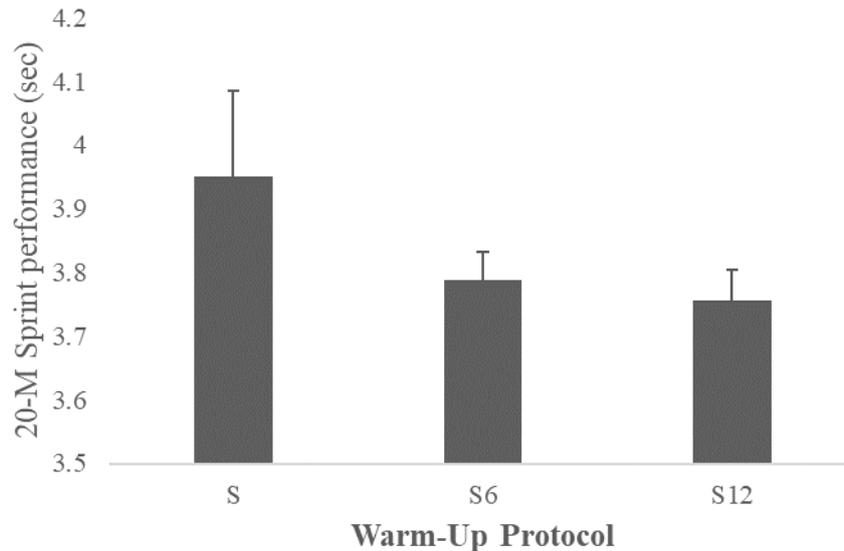


Figure 4: 20-M Sprint after warm-up protocols in 3 different intensity of weighted vest.

Intensity of dynamic warm-up is an important part of having a greater sport performance whereby adding some load in pre-exercise event may improve the understanding of the suitable intensity of warm-up and in long run improve the sport performance [10]. Dynamic warm-up with weighted vest can be broken down into an affective component where it can be viewed as how the athletes improve the performance in term of winning the game. The general purpose of a weighted vest is to add extra weight for body-weight exercises, walking, distance running or speed, agility and quickness drills. Therefore, adding extra weight can increase the performance for this exercise. When it comes to performance, research has shown that using this type of extra load in weighted vest during sprinting or speedy foot work requires your lower-body muscles to generate more force against the ground, and can lead to improvements in strength, power, and acceleration during running, as well as increased strength and efficiency during speed, power, and agility drills.

This result clearly shows that with the help of dynamic warm-up with increase of intensity the performance of these four tests can be improved [11]. Thus, it has been shown that dynamic warm-up wearing weighted vest with 6% of body mass weighted vest and 12% of body mass weighted vest can enhance height jump and long jump of the varsity female athlete. Because those intensity significant different with without extra intensity so athlete can choose either using 6% or 12% of body weight because both intensity improve the performance [12-13]. While for sprint, it is clear that using 12% of body mass weighted vest improve performance more than other intensity. Last but not list, those intensity can also improve the upper body strength and can improve the ability to accelerate over a short distances.

In conclusion, the use of weighted vest when performing dynamic warm-up which consists 9 different movements from low to high intensity is very appropriate and can improve the performance of vertical jump, standing broad jump, seated medicine ball toss and 20 meter sprint among the female athlete. The outcome of this study will provide useful guides and inputs in furthering the quality of female athlete. Performing dynamic exercises (with and without a weighted vest) during the warm-up period may be necessary for young strength and power athletes. In our research, may be the most effective warm up protocol for enhancing jump performance improve greater using DY12 and DY6, as compared with DY.

The outcomes from this research will benefit qualified athletic trainers also other professionals to enhance warm-up procedures for athletes.

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