

Effect of different durations of active warming-up on sprinting performance

■ SOMANPREET SINGH AND PARDEEP KUMAR

Received : 20.09.2012; Revised : 04.02.2013; Accepted : 03.03.2013

■ ABSTRACT

The aim of the study was to know the effect of active warm up of varied duration on the performance of sprinters. Thirty male students, 18 to 25 years of age, were randomly selected from LNUPE, Gwalior as the subjects of the study. Each subject was tested for 100 meter sprinting performance after selected durations of active warm-up. The different durations of active warm-up randomly administered were 10 and 15 minutes. The order of warm-up given for particular day was assigned at random which had been planned in advance. The time taken for 100 meter sprint was recorded to the nearest of 1/100th of a second for comparison with initial performance without warm-up. To find the difference among the means of performance for 100 meter sprinting without warm-up and with active warm-up of different durations, one way analysis of variance was used which was followed by the least significant difference test to determine the difference between the means of different duration when taken in pairs. The results of the study under the condition and limitations of the present experiment seems to permit that the different durations of warm-up improves the sprinting performance in comparison to the performance without warm-up.

■ **Key Words** : Active warm-up, Sprinting performance

■ **How to cite this paper** : Singh, Somanpreet and Kumar, Pardeep (2013). Effect of different durations of active warming-up on sprinting performance. *Internat. J. Phy. Edu.*, 6 (1) : 5-7.

See end of the article for authors' affiliations

SOMANPREET SINGH
Centre for Advanced Studies,
Lakshmbai National University of
Physical Education, GWALIOR
(M.P.) INDIA

A warm up is the act of preparing for an athletic event or workout by exercising or practicing for a short time beforehand. Warming up helps to reduce your risk of injury and the aches and pains that come with exercise. Cold muscles do not absorb shock or impact as well, and are more susceptible to injury. Experts agree that the main purpose of warm-up is to increase the blood circulation in order to raise both the general body and the deep muscle temperatures, which in turn help to heat up the muscles, ligaments and tendons in preparation for more vigorous activity. The warm-up increases muscle efficiency, reduces potential for muscle pulls, improves reaction time and improves the speed of movement of muscles and ligaments. It is difficult to recommend specific intensity and duration of warm-up for every person, but most research in this area suggest an increase in body and muscle temperature of approximately one to two degrees Fahrenheit to be adequate. The duration and intensity of warm-up should be

adjusted according to the environmental temperature and the amount of clothing worn. The higher the environmental temperature and the greater the amount of clothing, the sooner the desired body temperature is attained. In any case, no more than fifteen minutes should elapse. Competitive and recreational athletes typically perform warm-up and stretching activities to prepare for more strenuous exercise. These preliminary activities are used to enhance physical performance and to prevent sports-related injuries. On cold days the warm-up should not end more than ten minutes before the kick-off or activity, and on extremely cold days (freezing temperatures) the warm-up could be performed in the change room. Alternatively, in warm climates, the warm-up could be either shortened or finish up to twenty minutes before kick-off or activity. Most important, at all times players should avoid significant decreases in muscle temperature as the game or activity approaches. A good indicator of optimal

muscle temperature is when the player begins to sweat. The “active” component of a warm-up, designed to increase core temperature, blood flow, and prepare the body for exercise, has long been shown to benefit performance. There is no doubt that time spent on warming up and cooling down will improve an athlete’s level of performance and accelerate the recovery process needed before training or competing again. An element of the warm up programme should include event specific drills to stimulate the appropriate neuro-muscular action for the range of movement and correct posture.

■ METHODOLOGY

Procedure:

The subjects in this study were 20 male sprinters whose age ranged from 18 to 25 years from LNUPE, Gwalior. The condition of training, daily activities and pattern of living may be likely to effect the performance in the project were similar to all the subjects. The subjects were sprinters and they were motivated by their concerned coaches. These 2 main factors intrinsically motivated the subjects to give their best performance.

Administration of test:

All the subjects were made to run on the college cinder track using crouch start with spikes. Each subject was required to sprint 100 meters with and without warm-up of different durations on different days. The random choice of different duration of warm-up on each day had been planned in advance. During each session of experiment, the subjects were informed about the duration of warm-up which was assigned at random.

The time taken to the nearest 1/100th of a second for 100 meters sprint was recorded, without and with active warm-up of different durations. The average speed of the students in the 100 meters sprint was calculated with the help of given formula:

$$\text{Speed (in meters/seconds)} = \frac{\text{Distance (in meters)}}{\text{Time (in seconds)}}$$

■ OBSERVATIONS AND DISCUSSION

The data was collected and analyzed in order to draw a conclusion on the performance of the sprinters due to the various selected durations of warm-up. The descriptive statistics for the data is given in Table 1.

S.D. of the performance in speed due to selected durations of warm-up has been presented in Table 1. The mean scores of the performance in speed due to 15 minutes of warm-up was highest (8.18 m/sec.) and without warm-up was lowest (7.78 m/sec.).

The means of the performance in seconds due to selected durations of warm-up has been represented graphically in Fig. 1.

Fig. 1 shows that the performance in terms of speed due to 15 minutes of active warm-up is higher (8.18 m/sec.) than others and the performance due to without prior warm-up is lowest (7.78 m/sec.).

Table 2 reveals that there was a significant difference among the performance in speed of the athletes due to the

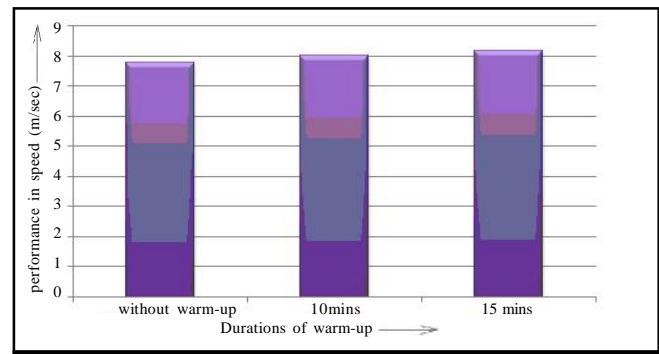


Fig. 1 : Comparison of mean results in breath holding, vital capacity, forced ventilator capacity between female

| Table 1: Mean and standard deviation of the performance in speed due to the selected durations of warm-up | | | | | | |
|---|----|------|----------------|------------|---------|---------|
| | N | Mean | Std. deviation | Std. error | Minimum | Maximum |
| Without warm-up | 20 | 7.78 | .23 | .053 | 7.41 | 8.25 |
| 10 mins | 20 | 8.02 | .28 | .062 | 7.45 | 8.50 |
| 15 mins | 20 | 8.18 | .35 | .078 | 7.57 | 8.86 |
| Total | 60 | 7.99 | .33 | .042 | 7.41 | 8.86 |

| Table 2: ANOVA for the performance in speed due to the selected durations of warm-up | | | | | |
|--|----------------|------|-------------|-------|------|
| | Sum of squares | D.f. | Mean square | F | Sig. |
| Between groups | 1.585 | 2 | .793 | 9.189 | .000 |
| Within groups | 4.917 | 57 | .086 | | |
| Total | 6.502 | 59 | | | |

*significant at F=0.05 (2, 57) = 3.15

| Table 3: ANOVA for the performance in speed due to the selected durations of warm-up | | | | | |
|--|------------|-----------------------|------------|--------|--|
| (I) warmup | (J) warmup | Mean difference (I-J) | Std. error | Sig. | |
| Without | 10 mins | -.23 | .092 | 0.013* | |
| | 15 mins | -.39 | .092 | 0.000* | |
| 10 mins | Without | .23 | .092 | 0.013* | |
| | 15 mins | -.15 | .092 | 0.099 | |
| 15 mins | Without | .39 | .092 | 0.000* | |
| | 10 mins | .15 | .092 | 0.099 | |

various selected durations of warm-up (p value <0.05). For the further comparison among the means, multiple comparison test (*i.e.* Least significant difference test) was employed.

Table 3 reveals that there was a significant difference in the performance in speed due to without warm-up and other two durations of warm-up (*i.e.* 10 minutes and 15 minutes warm-up).

To attain the best performance in sprinting events, especially in the 100 meters sprint, warm up is essential. The One way analysis of variance has shown significant difference between performance in 100 meters sprint without warm up and with active warm up of 10 minutes and 15 minutes. But there was no significant difference in 100 meters sprinting performance, which lies due to warm-up of 10 and 15 minutes duration. This lack of difference shows that warm-up is a must in sprinting activities to attain a better performance. Active warm up tends to result in improvements in short-term performance (Bishop, 2003). The study done by Burnley *et al.* (2005) has also shown the same type of results. Many of the studies done in this particular area have shown that the performance in sprinting events significantly increases with the warm-up (Mathew *et al.*, 2007). There are two types of warm-up, active and passive. Many researchers have compared the effect of these two types of warm-up on sprinting performance and found that the performance increases more due to active warm-up as compared to passive warm-up. In this study, active warm-up (*i.e.* jogging) was done by the sprinters before the 100 meter run. Most of the studies done in this area are supporting the results of this study that warm-up plays an important role in 100 meter sprint performance. This effect of active warm-up may be attributed to the increase in core temperature, better joint mobility and

increase energy production in muscles. The study concludes that the 100 meters sprint performance should be preceded by an active warm-up for either 10 or 15 minutes for attaining better performance as compared to performing without warm-up.

Recommendations:

The same type of study can be done with warming up protocols of different durations and types.

Similar studies can also be done to check the effects of various warming up protocols on various other events.

Similar studies can be done by taking a large sample and various age groups.

Authors' affiliations:

PARDEEP KUMAR, Lakshmbai National University of Physical Education, GWALIOR (M.P.) INDIA

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