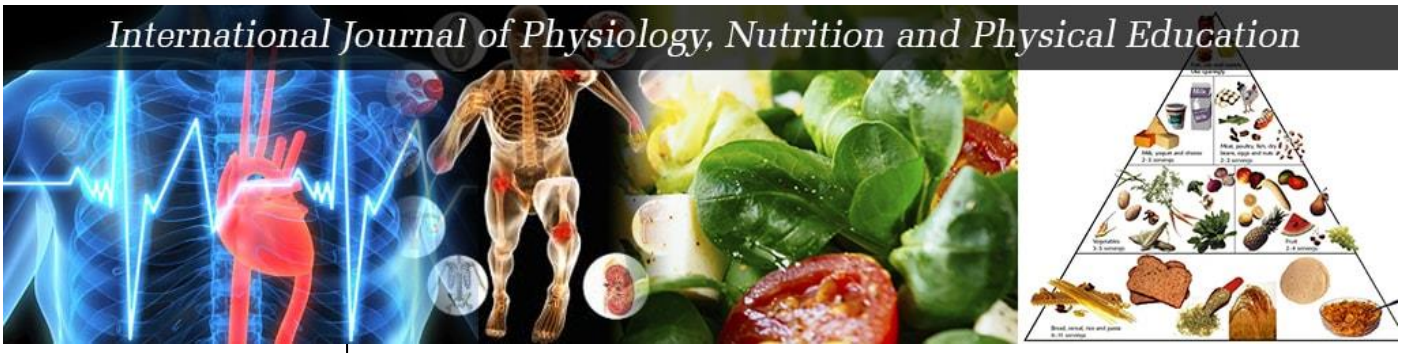

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Impact of weighted vest and weighted sled running on stride frequency of sprinters

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Abstract
The purpose of the study was to the impact of weighted vest and weighted sled running on stride frequency of sprinters. To achieve the purpose of this study, forty five male sprinters from the Delhi Public school, Bangalore. The age, height and weight of the subjects ranged from 17 to 19 years, 155 to 165 centimeters and 50 to 55 kilograms in that order. They were divided into three groups; each group consisted of fifteen subjects. Group-I underwent weighted vest sprint training, group-II underwent weight sled training and group-III acted as control. The data collected from the three groups prior to and post experimentation were statistically analyzed by analysis of covariance (ANCOVA). When the obtained 'F' ratio value in the analysis of covariance test was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases statistical significance was fixed at .05 levels. The experimental groups had significant improvement on stride frequency when comparing to the control group.

Keywords: Weighted vest, weighted sled, stride frequency and sprinters

Introduction
A weighted vest could be a tool utilized by athletes to construct workouts more difficult. Weight vests are obtainable in a assortment of styles. The capability to enlarge fitness and performance of an athlete while doing longer duration of weight vest sprint leads to burn more calories for sports people and the same time fitness presentation increase in the course of the adaptation of muscles. Vest kind of resistance working out enables more calories during the exercises and also after a exercises burn some amount of calories. The static and dynamic training with weighted vest is increase on core body muscles temperature and motivated to get good warm-up and increase a dynamic range of motion on joints of an athletes.
The sled is a stepping up tool as the nature of the exterior load requires that the athlete produce an angle of expansion that is closer to the ground. Sprinting, particularly the rate of change of velocity is one of the most insightful ingredients that are communal across a continuum of sport disciplines. Athletes from all groups may accomplish world class levels of sprint speed and their training must be individualized to their characteristics. An athlete who is accelerates to sled sprints can get better improvements than an athlete who can only accelerate without sled sprint.

Methodology
The purpose of the study was to the impact of weighted vest and weighted sled running on stride frequency of sprinters. To achieve the purpose of this study, forty five male sprinters from the Delhi Public school, Bangalore. The age, height and weight of the subjects ranged from 17 to 19 years, 155 to 165 centimeters and 50 to 55 kilograms in that order. They were divided into three groups; each group consisted of fifteen subjects. Group-I underwent weighted vest sprint training, group-II underwent weight sled training and group-III acted as control. Weighted vest running group involved three days per week for twelve weeks training programme. Intensity of load once in two weeks 2% of body weight added in the vest, and 5% of HRR increased. Eight repetitions for 3 sets for 30 meter sprint training. The recovery for the repetitions 80 seconds and for sets 4 minutes. Weighted sled running group involved three days per week for twelve weeks training programme. Intensity of load once in two weeks 2% of body weight added in the sled, and 5% of HRR increased.

Eight repetitions for 3 sets for 30meter sprint training. Stride frequency was measured by 50 meters run. The data collected from the three groups prior to and post experimentation were statistically analyzed by analysis of covariance (ANCOVA). When the obtained 'F' ratio value in the analysis of covariance test was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases statistical significance was fixed at .05 levels.

Results

Table 1: Analysis of Covariance on Stride Frequency of Weighted Vest, Sled Training and Control Groups

	Weighted Vest Group	Weighted Sled Group	Control Group	SoV	Sum of Squares	df	Mean squares	'F' ratio
Pre-test Mean	3.83	3.75	3.72	B	0.097	2	0.048	0.72
SD	0.17	0.14	0.38	W	2.84	42	0.067	
Post-test Mean	4.11	3.98	3.76	B	1.01	2	0.50	10.03*
SD	0.15	0.11	0.34	W	2.11	42	0.05	
Adjusted Post-test Mean	4.09	3.98	3.77	B	0.89	2	0.44	8.95*
				W	2.03	41	0.05	

(The required table value for significance at 0.05 level of confidence with degrees of freedom 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively)
*Significant at .05 level of confidence

The adjusted post test means on stride frequency of weighted vest, weighted sled training and control groups are 4.09, 3.98 and 3.77 respectively. The obtained 'F' ratio value of 8.95 for adjusted post test means on stride frequency of weighted vest, weighted sled and control groups were higher than the required table value of 3.23 for the degrees of freedom 2 and 41 at 0.05 level of confidence. It is observed from this finding that significant differences exist among the adjusted post test means of experimental and control groups on stride frequency. Due to the weighted vest, weighted sled training the stride frequency of the subject's is significantly improved. Since, the adjusted post test 'F' ratio value is found to be significant the Scheffe's test is applied as post hoc test to determine the paired mean differences, and it is presented in table-2.

Table 2: Scheffe's Test for the Difference between the Adjusted Post Test Paired Means of Stride Frequency

Adjusted Post Test Means			DM	CI
Weighted Vest	Weighted Sled	Control Group		
4.09	3.98		0.11	0.13
4.09		3.77	0.32*	0.13
	3.98	3.77	0.21*	0.13

*significant

Table - 2 shows the Scheffe's test results that there are significant differences between the adjusted post tests means of weighted vest and control groups; weighted sled and control groups on stride frequency. Moreover there are no significant differences between the adjusted post tests means of weighted vest and weighted sled groups, but weighted vest have slight increase than weighted sled training group on stride frequency of the sprinters.

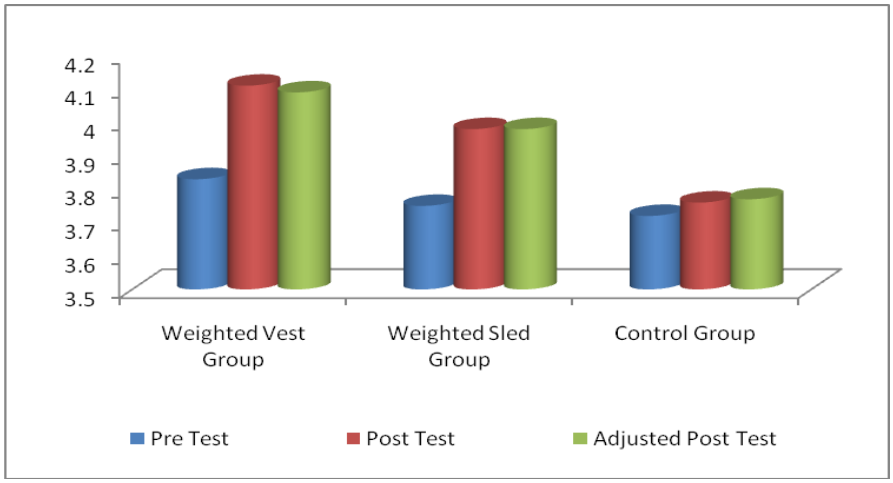

Fig 1: Cylinder Diagram on Stride Frequency of Weighted Vest Weighted Sled Training and Control Groups

Discussion and Findings

The result of this study stated that there is a significant difference between the weighted vest, weighted sled training group and control group on stride frequency. The weighted vest and weighted sled training groups had improved stride frequency. The following studies are supporting our finding of the results. Carlos and others (2018) [2] described the load-velocity relationship and the effects of increasing loads on spatio-temporal and derived kinetics variables of sprinting using weighted vest (WV) in soccer players and determining the load that maximized power output. The greatest changes occurred with loads heavier than 20% BM, especially in reaction force.

Cross, *et al*., (2014) [3] examined effects of vest loading on sprint kinetics and kinematics during the acceleration and maximum velocity phases of sprinting are relatively unknown. It seems that heavier loads than that are traditionally recommended are needed to promote increases in the GRF-z output during maximum velocity sprinting.

Bean and others (2002) [1] evaluated weighted stair climbing exercise (SCE) as a means of increasing lower extremity muscle power in mobility-limited older people. The findings suggest that SCE maybe a useful component of a home exercise program designed to enhance lower extremity muscle power, aerobic capacity, and functional performance.

Conclusion

The conclusion of the study showed that the twelve weeks of weighted vest, weighted sled training induced to increase the stride frequency of school male sprinters.

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