



ISSN: 2456-0057

IJPNPE 2023; 8(2): 419-421

© 2023 IJPNPE

[www.journalofsports.com](http://www.journalofsports.com)

Received: 16-10-2023

Accepted: 26-11-2023

**K Srihari**

Research Scholar, Department of  
Physical Education, Annamalai  
University, Chidambaram, Tamil  
Nadu, India

**Dr. G Swaminathan**

Assistant Professor, Department  
of Physical Education,  
Annamalai University,  
Chidambaram, Tamil Nadu,  
India

## Combined and isolated effect of ladder and medicine ball training on $VO_2$ max among school students

**K Srihari and Dr. G Swaminathan**

### Abstract

This study was to find out the combined and isolated effect of ladder and medicine ball training on  $VO_2$  max among school students. Since the purpose of the study one hundred and twenty (120) high school boys were selected randomly as subjects from in and around Bangalore, India. The selected subjects were randomly assigned into one of four groups of thirty ( $n=30$ ) each. The group I ( $n=30$ ) underwent combined training, group II ( $n=30$ ) underwent ladder training, group III ( $n=30$ ) underwent medicine ball training for a duration of twelve weeks with three days per week, in addition to the regular schedule and group IV ( $n=30$ ) had acted as control group which did not undergo, any special training except their leisure time pursuit. Students who have participated on the school teams and are healthy guys will make up the participants in these experimental groups. The subjects were tested on  $VO_2$  max before and after the training period. Prior after the training period  $VO_2$  max were measured by using 1 mile run. Analysis of Covariance (ANCOVA) was applied as statistical tool for the present study. The Schiff's test was used as post-hoc test at whatever point the 'F' - ratio of the adjusted post-test means were discovered to be significant at 0.05 level of significance. Both, ladder, medicine ball training and combined training group influence on  $VO_2$  max when compared with control group. Combined (medicine ball and ladder training) may have better influence on muscular endurance of school students.

**Keywords:** Medicine ball training, ladder training and  $VO_2$  max

### Introduction

An ascending and descending repetition pattern is used to do one or more exercises during a ladder workout, which is a type of strength and sports training. Exercises like ladders, which focus on muscle endurance and conditioning, can help you raise your total training volume while still using the right form and technique. Your muscular strength and endurance will determine the number of exercises in each session and the number of repetitions between sets. Beginner ladders often just have one exercise, but expert ladders typically have two or three.

A medicine ball is an excellent piece of health equipment for strength training. The medicine ball is one of a select few pieces of gym equipment that enables competitors to exert more force at the start of a muscle compression. Due to the special characteristic of medicine balls, which also enables the body to accumulate and transmit flexible energy, competitors can increase their capacity to start development even more. This improves the muscles' ability to generate force rapidly and effectively, making it the greatest power-focused pre-workout method.

The expression " $VO_2$  max" depicts how much oxygen your body can take in and use while working out. You can contemplate expanding your  $VO_2$  max to build your vigorous wellness (some of the time called your oxygen take-up). The most extreme rate at which your body can use oxygen during exercise is known as  $VO_2$  max.

**Corresponding Author:****K Srihari**

Research Scholar, Department of  
Physical Education, Annamalai  
University, Chidambaram, Tamil  
Nadu, India

### Statement of the problem

The purpose of the present study was to find out combined and isolated effect of ladder and medicine ball training on VO<sub>2</sub> max among school students.

### Methodology

The purpose of the study one hundred and twenty (120) high school boys were selected randomly as subjects from in and around Bangalore, India. The selected subjects were randomly assigned into one of four groups of thirty (n=30) each. The group I (n=30) underwent combined training, group II (n=30) underwent ladder training, group III (n=30) underwent medicine ball training for a duration of twelve weeks with three days per week, in addition to the regular schedule and

group IV (n=30) had acted as control group which did not undergo, any special training except their leisure time pursuit. Students who have participated on the school teams and are healthy guys will make up the participants in these experimental groups. The subjects were tested on VO<sub>2</sub> max before and after the training period. Prior after the training period VO<sub>2</sub> max were measured by using 1 mile run.

### Analysis of data

The data collected prior to and after the experimental periods on VO<sub>2</sub> max on, ladder, medicine ball and combined training and control group were analysed and presented in the following table -1.

**Table 1:** Analysis of covariance on VO<sub>2</sub> max of combined and isolated medicine ball and ladder training group and control group

	CT Group	LT Group	MBT Group	Control Group	SOV	SS	df	MS	'F'
Pre-test mean	11.534	11.542	11.526	11.536	B	.300	3	.300	
S.D	0.246	0.243	0.235	0.235	W	8.400	116	.657	.457
Post-test mean	11.401	11.436	11.486	11.526	B	12.033	3	12.033	29.384*
S.D	0.246	0.263	0.246	0.243	W	11.467	116	.410	
Adj. Post- test mean	11.415	11.475	11.505	11.535	B	9.418	3	9.418	89.590*
					W	2.838	115	.105	

\* Significant at 0.05 level of significance. (The table value required for significance at 0.05 level of significance with df 3 and 116 and 3 and 115 were 2.69 and 2.70 respectively).

CT – Combined training group

LT - Ladder training group

MBT – Medicine ball training group

The obtained 'F' value on pre-test scores .0457 is less than the required 'F' value of 2.69 to be significant at 0.05 level. This proves that there is no significant difference among the groups at initial stage and the randomized assignment of the subjects into four groups are successful.

The post test scores analysis proves that there is significant difference among the groups, as the obtained 'F' value 29.384 is greater than the required 'F' value of 2.69. This proves that there is significant difference among the post-test means of the subjects.

Taking into consideration of pre and post-test scores among the groups, adjusted mean scores are calculated and subjected to statistical treatment. The obtained 'F' value of 89.590 is greater than the required table 'F' value of 2.70. This proves that there are significant differences existed among the adjusted means due to twelve weeks of combined, ladder and medicine ball training on Vo<sub>2</sub> max.

Since the significant improvements are recorded, the results are subjected to post hoc analysis using Scheffe's Confidence interval test. The results are presented in Table-2.

**Table 2:** Scheffe's confidence interval test scores on Vo<sub>2</sub> max

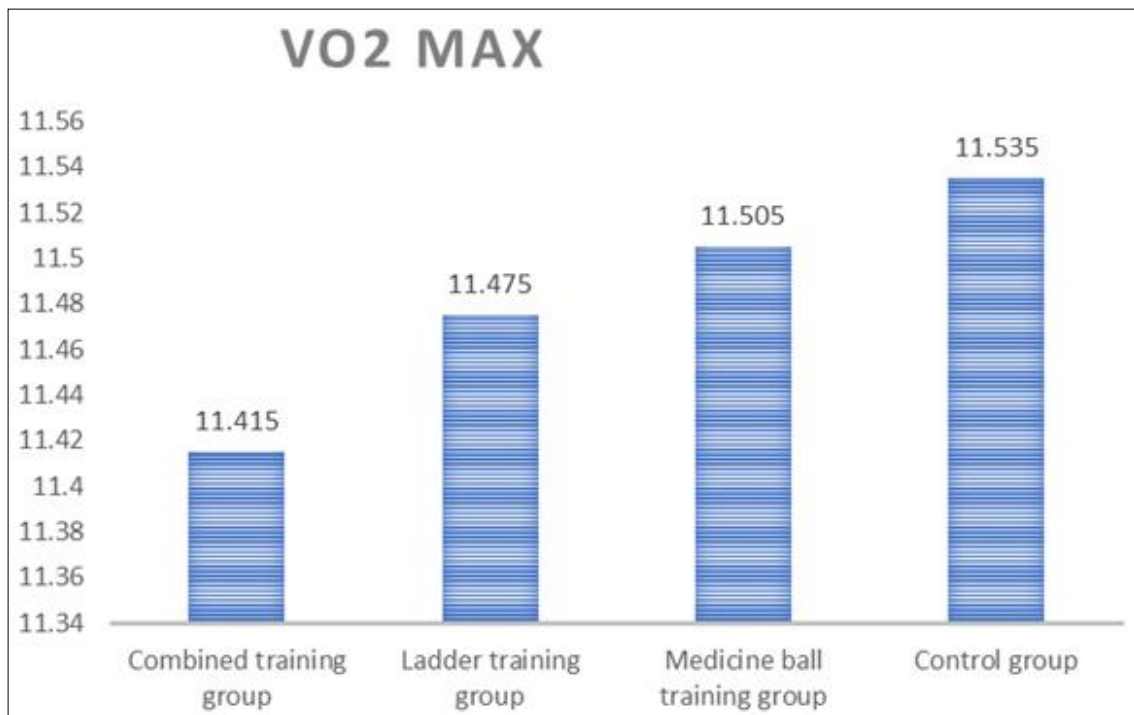
Adjusted post-test means				Mean Difference	Confidence Interval Value
CT Group	LT Group	MBT Group	Control Group		
11.415	11.475			0.06*	0.008
11.415		11.505		0.09*	
11.415			11.535	0.12*	
	11.475	11.505		0.03*	
	11.475		11.535	0.06*	
		11.505	11.535	0.03*	

\*Significant at 0.05 level.

As the confidence interval required to be significant at 0.05 level is 0.008 and the obtained values are greater than the required value except between medicine ball training group and ladder training group, it is observed that the significant

difference is found to be existed.

The ordered adjusted means on Vo<sub>2</sub> max are illustrated through bar diagram for better understanding of the results of this study in Figure-1.



**Fig 1:** Adjusted post-test mean values on Vo<sub>2</sub> max of combined, ladder, medicine ball training group and control group

### Conclusion

From the analysis of the data, the following conclusion were drawn.

The research study also shows that combined and isolated medicine ball training and ladder training have improved VO<sub>2</sub> max when compared with the control group. In addition, the results of the tests shows that there was a significant difference between experimental groups on VO<sub>2</sub> max. Combined (Medicine ball and ladder training) may have better influence on muscular endurance of school students.

### Recommendations

The following recommendations were drawn, from the results of the present study:

1. Further studies may be made to investigate the effect of medicine ball training and ladder training on anthropometric measures, bio-chemical variables.
2. The effect of combined and isolated medicine ball training and ladder training programmes can be assessed on physical factors.
3. In the current study, the subjects chosen was male students and in future studies, the subjects may be chosen obese female students and middle aged obese men and women., etc.

### References

1. Alves AR, Marta CC, Neiva HP, Izquierdo M, Marques MC. Concurrent training in prepubescent children: The effects of 8 weeks of strength and aerobic training on explosive strength and Vo<sub>2</sub> max. *Journal of Strength and Conditioning Research*, 2016, 30(7). <https://doi.org/10.1519/JSC.0000000000001294>
2. Festiawan R, Suharjana S, Priyambada G, Febrianta Y. High intensity interval training dan fartlek training: Pengaruhnya terhadap tingkat VO<sub>2</sub> Max. *Jurnal Keolahragaan*, 2020, 8(1). <https://doi.org/10.21831/jk.v8i1.31076>
3. Jabbal AS, Baxter-Jones A. Does High Intensity Interval Training Improve Aerobic Power Development More Than Endurance Training? *USURJ: University of*

*Saskatchewan Undergraduate Research Journal*, 2017, 3(1). <https://doi.org/10.32396/usurj.v3i1.211>

4. The effect of 1-month and 2 month upper and lower limb training to maximal oxygen uptake (vo<sub>2</sub> max) in copd patients; c2019. *Respirology*, 24(S2). [https://doi.org/10.1111/resp.13700\\_204](https://doi.org/10.1111/resp.13700_204)
5. Ojeda ÁH, Barahona-Fuentes G, Maliqueo SG. Effects of a period without mandatory physical training on maximum oxygen uptake and anthropometric parameters in naval cadets. *PLoS ONE*, 2021, 16(6 June). <https://doi.org/10.1371/journal.pone.0251516>