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## Isolated and combined effect of ladder and medicine ball training on agility among handball players

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### Abstract

This study was to find out the isolated and combined effect of ladder and medicine ball training on agility among handball players. To achieve the purpose of the study Visvesvaraya Technological University inter collegiate 120 male handball players except goalkeepers were randomly selected from different colleges in and around Karnataka state, India. During the academic year 2021-22. The age of the subjects will be ranged between 17 to 25 years. The subjects will be selected in handball and only those who represented their respective college team are taken as subjects and divided into four equal groups of 30 subjects each. Group - I will perform Ladder training, Group - II will undergo Medicine ball training, Group - III will undergo Ladder & Medicine ball training and Group - IV act as controlled. All the subjects are informed about the nature of the study and their consent is obtained in order to get their co-operation on till the end of the experimental and training period. The subjects were tested on agility before and after the training period. Prior after the training period agility were measured by using shuttle run test. Analysis of Covariance (ANCOVA) was applied as statistical tool for the present study. The Scheffé 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 agility when compared with control group. Combined (ladder and medicine ball training) may have better influence on agility of hand ball players.

**Keywords:** Medicine ball training, ladder training and agility

### Introduction

Ladder workouts are a sort of strength and sports training where one or more exercises are performed using an ascending and descending repetition pattern. Ladder exercises, which put an emphasis on conditioning and muscular endurance, will help you increase your overall training volume while still employing proper form and technique. The number of exercises in each session and the number of repetitions in between sets will depend on your muscle strength and endurance. Expert ladders often feature two or three exercises, but beginner ladders frequently just have one.

An amazing piece of health equipment for power training is a medicine ball. The medicine ball is one of just a few pieces of gym equipment that allows competitors to exert more force at the start of a muscle compression. Due to the special ability of medicine balls - which also enables the body to accumulate and transmit flexible energy-competitors can increase their starting development capacity even more. It is the ideal power-focused pre-workout approach since it improves the muscles' ability to produce force rapidly and effectively.

Agility may be explained as an individual ability to quickly vary the body momentum to different directions. Change in body momentum may be explained as accelerating or decelerating the speed from the existing speed towards new direction. As per Newton's II law, acceleration/deceleration is proportional to the ratio of force to mass.

### Statement of the problem

The purpose of the present study was to find out Isolated and combined effect of ladder and medicine ball training on agility among handball players.

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## Methodology

To achieve the purpose of the study Visvesvaraya Technological University inter collegiate 120 male handball players except goalkeepers were randomly selected from different colleges in and around Karnataka state, India. During the academic year 2021-22. The age of the subjects will be ranged between 17 to 25 years. The subjects will be selected in handball and only those who represented their respective college team are taken as subjects and divided into four equal groups of 30 subjects each. Group - I will perform Ladder training, Group - II will undergo Medicine ball

training, Group - III will undergo Ladder & Medicine ball training and Group - IV act as controlled. The subjects were tested on agility before and after the training period. Prior after the training period agility were measured by using shuttle run test.

## Analysis of data

The data collected prior to and after the experimental periods on agility 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 agility of isolated and combined ladder and medicine ball training group and control group

	LT Group	MBT Group	CT Group	Control Group	S O V	Sum Squares	DF	Mean Square	'F' - ratio
Pre- test	10.252	10.253	10.255	10.252	B:	0.711	3	0.356	0.024
Mean S.D.	0.019	0.012	0.018	0.021	W:	21.600	116	14.800	
Post- test	9.876	10.201	9.325	10.253	B:	14.711	3	7.356	10.074*
Mean S.D.	0.019	0.018	0.012	0.021	W:	47.600	116	10.657	
Adjusted Post- test Mean	9.902	10.201	9.405	10.254	B:	11.983	3	5.991	10.436*
					W:	16.398	115	10.156	

\* 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).

**LT:** Ladder training group, **MBT:** Medicine ball training group, **CT:** Combined training group

The obtained 'F' value on pre-test scores 0.024 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 10.074 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 10.436 is greater than the required table 'F' value of 2.70. This proves that there is significant differences existed among the adjusted means due to twelve weeks of medicine ball, ladder and combined training on agility.

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

**Table 2:** Scheffe's confidence interval test scores on agility

Adjusted post-test means				Mean Difference	Confidence Interval Value
LT Group	MBT Group	CT Group	Control Group		
9.902	10.201			0.29*	0.055
9.902		9.405		0.49*	
9.902			10.254	0.35*	
	10.201	9.405		0.79*	
	10.201		10.254	0.05*	
		9.405	10.254	0.84*	

\*Significant at 0.05 level.

As the confidence interval required to be significant at 0.05 level is 0.055 and the obtained values are greater than the required value, it is observed that the significant difference is found to be existed.

The ordered adjusted means on agility are illustrated through bar diagram for better understanding of the results of this study in Fig 1.



**Fig 1:** Adjusted post-test mean values on agility for ladder, medicine ball, combined training and control groups

### Conclusion

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

The research study also shows that isolated and combined ladder and medicine ball training have improved agility when compared with the control group. In addition, the results of the tests shows that there was a significant difference between experimental groups on flexibility. Combined (ladder and medicine ball training) may have better influence on agility of handball players.

### 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 handball players and in future studies, the subjects may be chosen hockey, volleyball and basketball, etc.

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