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**AP Seelan**

Ph.D. Research Scholar,  
Department of Physical  
Education, Annamalai  
University, Tamil Nadu, India

**Dr. A Subradeepan**

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

## Effect of functional strength training and karate skill training on coordination ability of college level karate players

**AP Seelan and Dr. A Subradeepan**

### Abstract

The purpose of this study is to examine the effect of functional strength training and karate skill training on coordination ability of college level karate players. To achieve the purpose of this study, the investigator selected sixty college level karate players as participants in the age group of 19 to 23 years. They were divided into four groups of fifteen subjects each. Group-I underwent functional strength training, group-II underwent karate skill training, group-III underwent combined functional strength and karate skill training and group-IV acted as control. The selected psycho-motor profile coordination ability was assessed by standard test and procedure. During the training period, the experimental groups underwent their respective training five days per week for twelve weeks. The data collected from the four groups prior to and post experimentation on selected dependent variables was statistically analyzed by applying paired 't' test and analysis of covariance (ANCOVA). It was concluded that functional strength training, karate skill training and combined training groups have significantly improved the coordination ability of college level karate players. The result of the study produced 31.89% of improvement due to functional strength training, 21.67% of improvement due to karate skill training and 39.82% of improvement due to combined training.

**Keywords:** Functional strength training, karate skill training, coordination ability and Karate players

### Introduction

Today it is believed that the eastern martial arts are an element of global culture. They are practiced all over the world for various reasons: to acquire self-defense skills, for recreational and health purposes or to get ready for an effective sports competition. The analysis of national and foreign literature points to a wide variety of tools applied to assess general physical fitness of competitors practicing combat sports, i.e. judo, wrest - ling, boxing, taekwondo, kickboxing or karate.

Karate originated in the Ryukyu Islands of Japan and was developed under the influence of Chinese martial artists. This form of martial art uses traits of punching, kicking, knee strikes, elbow strikes and a mixture of open-handed techniques such as knife-hands, spear hands, and palm-heel strikes. Karate is the most predominant form of martial arts today. Karate has made its presence felt in over 160 countries, a contributing factor towards being considered as an Olympic sport from 2020 summer Olympics.

Karate training involves basic techniques, kata and sparring. Basic techniques such as punching, kicking, blocking, and striking are practiced either in the stationary position (S-Basics) or with body movements in various formal stances (M-Basics). The S-Basics and M-Basics are very formal and systematic and combined with karate, which are set forms of pre-established sequences of defensive and offensive techniques and movements.

Functional training is more real word in terms of one's training actually mimicking a boarder spectrum of our daily movements. Functional training is useful weather a person is an athlete or recreational exercise wanting to improve general health. Functional training gives a person better balance and muscular control during everyday movements. The human body must be able to achieve and maintain balance in a variety of different position, planes angles and conditions to be totally functional. Functional balance is dynamic just like real life.

### Correspondence

**AP Seelan**

Ph.D. Research Scholar,  
Department of Physical  
Education, Annamalai  
University, Tamil Nadu, India

To achieve dynamic balance one must train dynamically. Functional training is very core oriented. All balance and movements starts in an athlete's core or midsection; therefore, functional training starts with "core training". Core is more than just front abdominals core is the whole midsection of athlete's body that goes from groin to upper back and chest including sides. Without good core development, one will not be able to move and react efficiently whether casually walking on a trail or playing professional football. Good core development from functional training will enhance all human movement for all populations and activity of daily living. The applicability of this method of training to improve the psycho-motor profiles is not yet completely known. Consequently, the aim of the present study was to compare the effect of functional strength training and karate skill training on coordination ability of college level karate players.

## Methodology

### Subjects

To achieve the purpose of this study, the investigator selected sixty college level karate players as participants in the age group of 19 to 23 years from various Colleges in Kanyakumari District, Tamil Nadu, India as subjects. They were divided into four groups of fifteen subjects each. Group-I underwent functional strength training, group-II underwent karate skill training, group-III underwent combined functional strength and karate skill training and group-IV acted as control. The selected subjects were medically examine by a qualified physician in order to check whether they are medically and physically fit enough to undergo the training programme.

### Variables

In this experimental study functional strength training and karate skill training were selected as independent variables

and the selected psycho-motor profile coordination was chosen as dependent variables for this study. The coordination of the karate players was assessed by conducting Alternate Hand Wall Toss Test.

### Training Programme

The training programme was scheduled for one session a day for the three experimental groups. Each session lasted sixty minutes approximately including warming up and warming down. During the training period, the experimental groups underwent their respective training five days per week for twelve weeks. The experimental group- I underwent functional strength training, group-II underwent karate skill training, group-III underwent combined functional strength and karate skill training. The subjects of three experimental groups performed proposed repetitions and sets, alternating with active recovery between repetition and complete rest between set based on work-rest ratio. The training intensity was progressively increased once in two weeks.

### Statistical Technique

The data collected from the four groups prior to and post experimentation on coordination was statistically analyzed by applying paired 't' test and Analysis of Covariance (ANCOVA). Since four groups were involved, whenever the obtained 'F' ratio for adjusted post-test means was found to be significant, the Scheffe's test was applied as post hoc test to determine the paired mean differences. In all the cases level of confidence was fixed at 0.05 for significance.

### Result

The descriptive analysis of the data showing mean and standard deviation, mean differences, 't' ratio and percentage of improvement on coordination of experimental and control groups are presented in table-1.

**Table 1:** Descriptive Analysis of the Pre and Post Test Data and 'T' Ratio on Coordination of Experimental and Control Groups

Group	Test	Mean	Standard Deviation	Mean Differences	't' ratio	Percentage of Changes
Functional Strength Training	Pre test	22.80	2.34	7.27	9.66	31.89 %
	Post test	30.07	2.12			
Karate Skill Training	Pre test	23.07	3.13	5.00	17.08	21.67 %
	Post test	28.07	3.49			
Combined Training	Pre test	22.93	1.49	9.13	20.01	39.82 %
	Post test	32.07	1.94			
Control Group	Pre test	23.20	2.24	0.13	0.29	0.56 %
	Post test	23.07	2.15			

Table t-ratio at 0.05 level of confidence for 14 (df) =2.15

\*Significant

Table-1 shows that the mean, standard deviation and mean difference values of the pre and post test data collected from the experimental and control groups on coordination. Further, the collected data was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post data. The obtained 't' values of functional strength training, karate skill training and combined training groups are 9.66, 17.08 and 20.01 respectively which are greater than the required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that significant differences existed between the pre and post-test means of experimental groups on coordination. However, the obtained 't' values of control groups is 0.29 which is lesser than the

required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that no significant differences existed between the pre and post test means of control group on coordination.

The result of the study also produced 31.89% of improvement due to functional strength training, 21.67% of improvement due to karate skill training and 39.82% of improvement due to combined training.

The pre and post test data collected from the experimental and control groups on coordination was statistically analyzed by using analysis of covariance and the results are presented in table-2.

**Table 2:** Analysis of Covariance on Coordination of Experimental and Control Groups

	Functional Strength Training Group	Karate Skill Training Group	Combined Training Group	Control Group	S oV	Sum of Squares	df	Mean squares	'F' ratio
Adjusted Post-test Mean	30.21	28.02	32.11	22.93	B	704.73	3	234.91	65.28*
					W	197.92	55	3.60	

(The required table value for significance at 0.05 level of confidence with degrees of freedom 3 and 55 is 2.77 and degree of freedom 3 and 56 is 2.77)

\*Significant at .05 level of confidence

Table-2 shows that adjusted post-test means on coordination of functional strength training, karate skill training, combined training and control groups are 30.21, 28.02, 32.11 and 22.93 respectively. The obtained 'F' value of 65.28 on coordination is greater than the required table value of 2.77 of 3, 55 df at 0.05 level of confidence. Hence, it is concluded that significant differences exist between the adjusted post-test

means of functional strength training, karate skill training, combined training and control groups on coordination. Since, the obtained 'F' value in the adjusted post-test means is found to be significant, the Scheffe's test is applied as post hoc test to find out the paired mean difference, and it is presented in table-3.

**Table 3:** Scheffe's Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Coordination

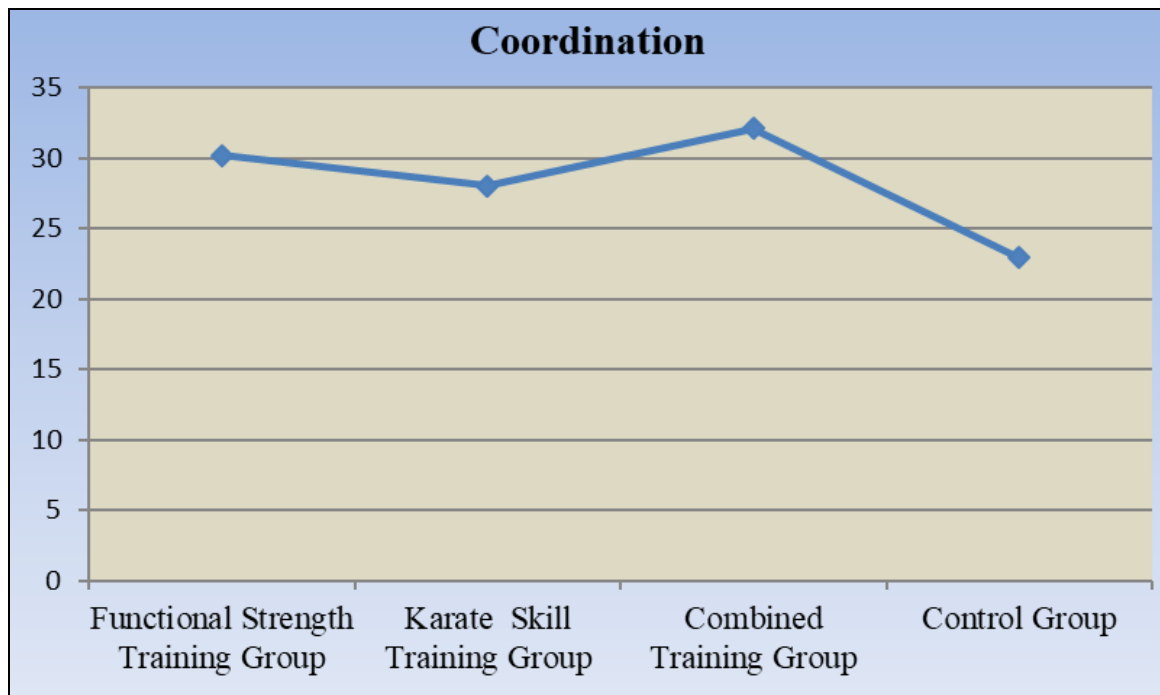
Functional Strength Training Group	Karate Training Group	Combined Training Group	Control Group	Mean Difference	Confidence Interval
30.21	28.02			2.19*	2.00
30.21		32.11		1.90	2.00
30.21			22.93	7.28*	2.00
	28.02	32.11		4.09*	2.00
	28.02		22.93	5.09*	2.00
		32.11	22.93	9.18*	2.00

\*Significant at .05 level

As shown in table-3 the Scheffe's post hoc analysis proved that significant mean differences existed between functional strength and karate skill training groups; functional strength training and control groups, karate skill and combined training groups, karate skill training and control groups, combined training and control groups on coordination since, the mean differences 2.19, 7.28, 4.09, 5.09 and 9.18 are higher than the confident interval value of 2.00 at 0.05 level of significance. However, there was no significant differences exist between functional strength and combined training groups, since, the mean differences 1.90 is lesser than the confident interval value of 2.00 at 0.05 level of significance.

Hence, it is concluded that due to the effect of isolated and combined functional strength and karate skill training the coordination ability of the subjects was significantly improved. It was also concluded that combined training and functional strength training are significantly better than karate skill training in improving coordination however, there is no significant differences found between combined training and functional strength training, in improving the coordination of the karate players.

The adjusted post-test mean values of functional strength training, karate skill training, combined training and control groups on coordination is graphically represented in figure-1.



**Fig 2:** Diagram Showing the Adjusted Post Test Mean Values on Coordination of Experimental and Control Groups

## Discussion

In recent years, there has been a growing acceptance that perceptual skills precedes and determines skilful actions in sport and other contexts (Harris & Jenkin, 1998; Williams & Davids, 1998) <sup>[5, 11]</sup>. In particular, the visual system plays a crucial role in guiding the player's search for essential information underlying skilful behavior. It is a perceptual-motor skill that involves the integration and processing of visual information in the central nervous system so that purposeful motor movements can be made (Abernethy, 1987) <sup>[11]</sup>. The enhancement of motor skills, regulations and psychomotor processes are the special requirements for all the success in various group and individual sports. Accuracy, balance, concentration and co-ordination, are a few of the visually related abilities a player uses during sports event. According to Planer (1994) <sup>[9]</sup> "if play encourages normal gross motor development and improves eye-hand and eye-body co-ordination and peripheral vision helps develop these basic motor skills, it is then clear that vision and motor skills are linked to sports performance". Coordinative abilities are important for all the activities and are optimally developed in childhood (Bos, 2001) <sup>[3]</sup>. Coordination can be defined as the ability of fast and exact control and regulation of movements, it denotes body mind relationship. Participation in physical activity is very important to increase the coordinative abilities. Coordination is often used as an indicator of objective motor behaviour, since it contributes strongly to the explanation of total motor performance (Mechling, 1999) <sup>[8]</sup>. Hence, in order to maintain optimal training levels and take advantage of the potential benefits, it is suggested that functional strength and karate skill training sessions not be missed by the karate players. Functional strength and karate skill training has been proven to boost psychomotor variables, all of which are essential to karate players.

## Conclusion

Due to the effect of isolated and combined functional strength and karate skill training the coordination ability of the subjects was significantly improved. It was also concluded that combined training and functional strength training are significantly better than karate skill training in improving coordination however, there was no significant differences found between combined training and functional strength training, in improving the coordination of the karate players.

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