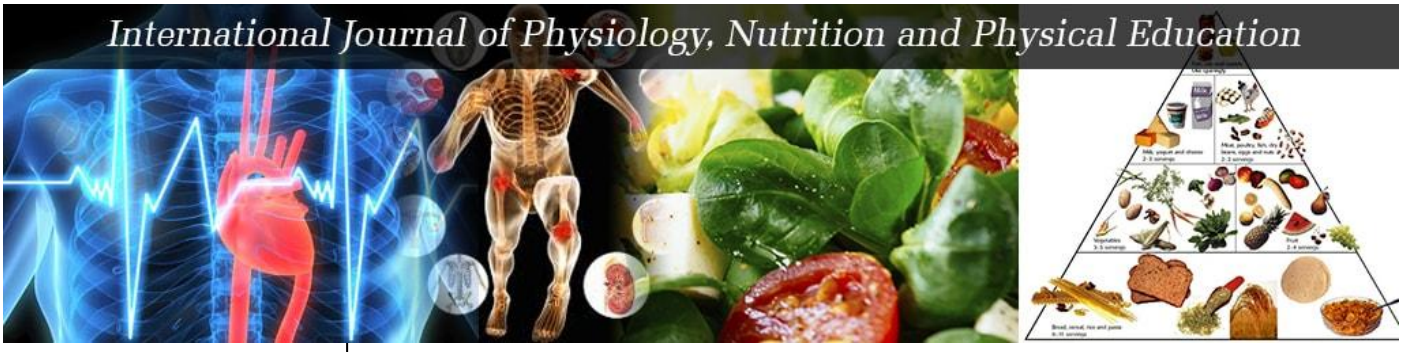

ISSN: 2456-0057
IJPNPE 2018; 3(2): 947-950

www.journalofsports.com
Received: 19-05-2018
Accepted: 24-06-2018

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

Corresponding Author:
AP Seelan
Ph.D, Research Scholar, Department of Physical Education, Annamalai University, Tamil Nadu, India

Impact of isolated and combined functional strength training and karate skill training on muscular strength of college level karate players

AP Seelan and Dr. A Subradeepan

Abstract
The purpose of this study is to examine the effect of isolated and combined functional strength training and karate skill training on muscular strength 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 dependent variable muscular strength (arm strength) was assessed by pull-ups. 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 muscular strength of college level karate players.

Keywords: Functional strength training, karate skill training, muscular strength and karate players

Introduction
Martial arts training aims to result in several benefits to trainees, such as their physical, mental, emotional and spiritual health (Bu, 2010) [1]. Through systematic practice in the martial arts a person's physical fitness may be boosted (strength, stamina, speed, flexibility, movement coordination, etc.) as the whole body is exercised and the entire muscular system is activated. Beyond contributing to physical fitness, martial arts training also have benefits for mental health, contributing to self-esteem, self-control, emotional and spiritual well-being. For this reason, a number of martial arts schools have focused purely on therapeutic aspects, de-emphasizing the historical aspect of self-defense or combat completely. According to Bruce Lee, martial arts also have the nature of an art, since there is emotional communication and complete emotional expression.

Karate is a martial art developed in the Ryukyu Kingdom. It developed from the indigenous Ryukyuan martial arts "hand"; under the influence of Chinese Kung Fu, particularly Fujian White Crane. Karate is now predominantly a striking art using punching, kicking, knee strikes, elbow strikes and open-hand techniques such as knife-hands, spear-hands and palm-heel strikes. Historically, and in some modern styles, grappling, throws, joint locks, restraints and vital-point strikes are also taught. A karate practitioner is called a karateka. Karate is very different from judo, as it emphasizes striking techniques such as punches and kicks, elbows and knees, and corresponding blocks with relatively few throws or wrestling moves. There are many, many forms of karate that are very different in emphasis and quality.

Functional training, if performed correctly, will lead to better joint mobility and stability, as well as more efficient motor patterns. Improving these factors decreases the potential for an injury sustained during an athletic endeavor. The benefits may arise from the use of training that emphasizing the body's natural ability to move in six degrees of freedom. In comparison, through a machine appears to be safer to use, they restrict movements to a single plane of motion, which is an unnatural from of movements for the body and may potentially lead to faulty movement patterns or injury.

The aim of the present study was to compare the effect of isolated and combined functional strength training and karate skill training on muscular strength 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, Tamilnadu, 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, karate skill training and combined functional strength and karate skill training were selected as independent variables and muscular strength was selected as dependent variables for this study. The muscular strength (arm strength) of the karate players was assessed by conducting pull-ups 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 muscular strength was statistically analyzed by applying 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 pre and post test data collected from the experimental and control groups on arm strength is statistically analyzed and presented in table–I.

Table 1: Analysis of Covariance on Arm Strength of Experimental and Control Groups

	Functional strength training	Karate skill training	Combined training	Control Group	S o V	Sum of Squares	df	Mean Squares	'F' ratio
Pre test Mean SD	12.87	13.00	12.60	12.93	B	1.38	3	0.46	0.46
	0.92	1.07	1.12	0.88	W	56.27	56	1.01	
Post test Mean SD	17.67	14.80	16.80	13.07	B	191.52	3	32.78	34.03*
	1.45	1.08	1.70	1.18	W	105.07	56	1.87	
Adjusted Post test Mean	17.66	14.72	16.93	13.02	B	199.56	3	66.52	40.69*
					W	89.91	55	1.64	

(Required table value for significance with df 3 & 55 and 3 &56 is 2.77)
*Significant at .05 level of confidence

Table-1 shows that the pre-test means and standard deviation on arm strength of functional strength training, karate skill training, combined training and control groups are 12.87 ± 0.92, 13.00 ± 1.07, 12.60 ± 1.12 and 12.93 ± 0.88 respectively. The obtained 'F' ratio value 0.46 of arm strength is less than the required table value of 2.77 for the degrees of freedom 3 and 56 at 0.05 level of confidence, which proved that the random assignment of the subjects were successful and their scores in arm strength before the training were equal and there was no significant differences.

The post-test means and standard deviation on arm strength of functional strength training, karate skill training, combined training and control groups are 17.67 ± 1.45, 14.80 ± 1.08, 16.80 ± 1.70 and 13.07 ± 1.18 respectively. The obtained 'F' ratio value 34.03 of arm strength is greater than the required table value of 2.77 for the degrees of freedom 3 and 56 at 0.05 level of confidence. It implies that significant differences existed between the four groups during the post test period on arm strength.

The adjusted post-test means on arm strength of functional strength training, karate skill training, combined training and control groups are 17.66, 14.72, 16.93 and 13.02 respectively. The obtained 'F' ratio value 40.69 of arm strength is greater than the required table value of 2.77 for the degrees of freedom 3 and 55 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 arm strength.

Since, the obtained 'F' ratio value in the adjusted post test means is found to be significant, the Scheffe'S test was applied as post hoc test to find out the paired mean difference, and it is presented in table-2.

Table 2: Scheffe's Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Arm Strength

Functional Strength Training Group	Karate skill Training Group	Combined Training Group	Control Group	Mean Difference	Confidence Interval
17.66	14.72			2.94*	1.35
17.66		16.93		0.73	1.35
17.66			13.02	4.64*	1.35
	14.72	16.93		2.21*	1.35
	14.72		13.02	1.70*	1.35
		16.93	13.02	3.91*	1.35

*Significant at .05 level

From table-II the Scheffe's post hoc analysis proved that significant mean differences exist between functional strength and karate skill training groups, functional strength training and control groups, karate skill training and combined training groups, karate skill training and control groups, combined training and control groups on arm strength. Since, the mean differences 2.94, 4.64, 2.21, 1.70 and 3.91 are higher than the confident interval value of 1.35 at .05 level of significance. However, no significant difference exist between functional strength training and combined training groups since, the mean differences 0.73 is lesser than the confident interval value of 1.35 at .05 level of significance.

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

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

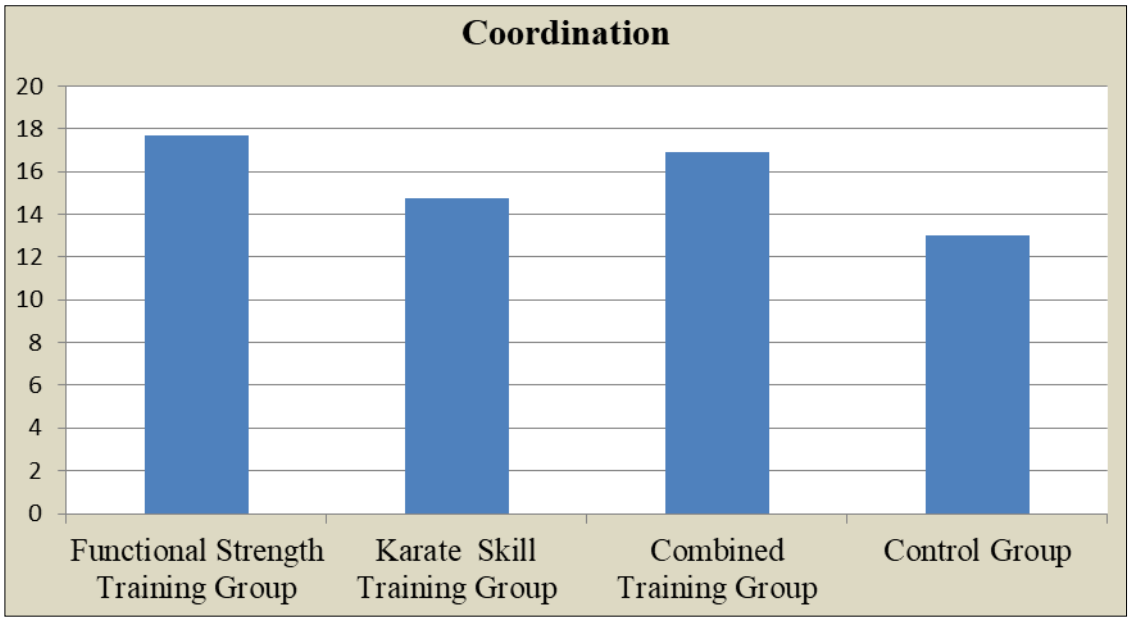

Fig 1: Diagram Showing the Adjusted Post Test Mean Values on Arm Strength of Experimental and Control Groups

Discussion

The American Council on Exercise (ACE) defines functional strength training as "performing work against resistance in such a manner that the improvements in strength directly enhance the performance of movements so that an individual's activities of daily living are easier to perform". Our muscle mass and strength will decrease 30 to 50% between the ages of 30 and 80. Despite this, only 6% of adults do resistance training two or more times per week (the 2008 Physical Activity Guidelines for Americans' recommendation).

Doing resistance exercises and movements that help us become stronger, more flexible, and more agile makes us better equipped to handle day-to-day feats of strength and athleticism that are often overlooked. And, it can help us become less injury-prone. Another secondary benefit, according to ACE, is that improving our strength and agility in one area of our body leads to better performance in other areas.

Results of the study previous studies showed very substantial gains and benefits in the functional training group over fixed training equipment. Functional users had a 58% greater increase in strength over the fixed-form group. Their improvements in balance were 196% higher over fixed and reported an overall decrease in joint pain by 30% (Simon, 2010).

Many studies have reported significant increases in maximum voluntary contraction in humans after resistance training (Cannon & Cafarelli 1987, Davies *et al*., 1985, Garfinkel & Cafarelli 1992, Hakkinen *et al*., 1992, Narici *et al*., 1989) [2, 3, 5, 8, 12]. Similarly, Goto (2002) [6] suggested that low intensity strength exercise improves muscular strength more than traditional strength training. LeMura *et al*., (2002) [10] observed 16 weeks of various modes of resistance training and found significant improvement in upper and lower body strength. Starkey (1996) [13] determined the effects of different volumes of high-intensity resistance training on isometric torque and muscle thickness and found that both groups improved muscular strength torque similarly at most angles.

Dorgo *et al*., (2009) [4] found significant improvements in muscular strength and muscular endurance of the manual resistance training and weight resistance training groups.
Combined training group did make gains in muscular strength (arm strength). The improvements seen in arm strength by the combined training group in this investigation are similar to or greater than those reported by earlier investigations (Gravelle & Blessing, 2000; Hunter *et al*., 1987; McCarthy *et al*., 1995) [7, 9, 11]. Functional strength and karate skill training has been proven to boost performance related fitness variables, all of which are essential to karate players.

Conclusion

It was concluded that due to the effect of functional strength, karate skill training and combined training the arm strength of the karate players was significantly improved. It was also concluded that functional strength training and combined training are significantly better than karate skill training, however, no significant differences was found between functional strength and combined training groups in improving arm strength.

References

1. Bu Bin, Haijun Han, Yong Liu, Chaohui Zhang, Xiaoyuan Yang, Singh Maria Fiatarone. Effects of martial arts on health status: A systematic review. Journal of Evidence-Based Medicine. 2010; 3(4):205-219.
2. Cannon RJ, Cafarelli E. Neuromuscular adaptations to training. J ADPI. Phvsiol. 1987; 63:2396-2402.
3. Davies CTM, Dooley P, McDonagh MJN, White MJ. Adaptation of mechanical properties of muscle to high force training in man. J Physiol. 1985; 365:277-284.
4. Dorgo S *et al*. The effects of manual resistance training on improving muscular strength and endurance. Journal of Strength and Conditioning Research. 2009; 23(1):293-303.
5. Garfinkel S, Cafarelli E. Relative changes in maximal force, EMG and muscle cross-sectional area after resistance training. Med. Sci. Sports Exerc. 1992; 24(1):220-1 227.
6. Goto K. Addition of low intensity resistance exercise to high intensity resistance exercise increases muscular strength. Medicine Science in Sports and Exercise. 2002; 34(5):1122.
7. Gravelle BL, Blessing DL. Physiological adaptation in women concurrently training for strength and endurance. J Strength and Conditioning Research. 2000; 14:5-13.
8. Hakkinen K, Pakarinen A, Kallinen M. Neuromuscular adaptations and serum hormones in women during short-term intensive strength training. Eur. J Apl. Physiol. 1992; 64:106-111.
9. Hunter G, Demment R, Miller D. Development of strength and maximum oxygen uptake during simultaneous training for strength and endurance. J Sports Med. 1987; 27:269-275.
10. LeMura LM. Lipid and lipoprotein profiles, cardiovascular fitness, body composition, and diet during and after resistance, aerobic and combination training in young women. Europian Journal of Applied Physiology. 2002; 82(5-6):451-8.
11. McCarthy JP, Agre JC, Graf BK, Pozniak MA, Vaicas AC. Compatibility of adaptive responses with combining strength and endurance training. Med. Sci. Sports Exercise. 1995; 27(3):429-436.
12. Narici MV, Roi GS, Landoni L, Minetti AE, Cerretelli P. Changes in force, cross-sectional area and neural activation during strength training and detraining of the hurnan quadriceps. Eur. J Apl. Physiol. 1989; 59:310-319.
13. Starkey DB. Effect of resistance training volume on strength and muscle thickness. Medicine Science in Sports and Exercise. 1996; 28:1311-1320.