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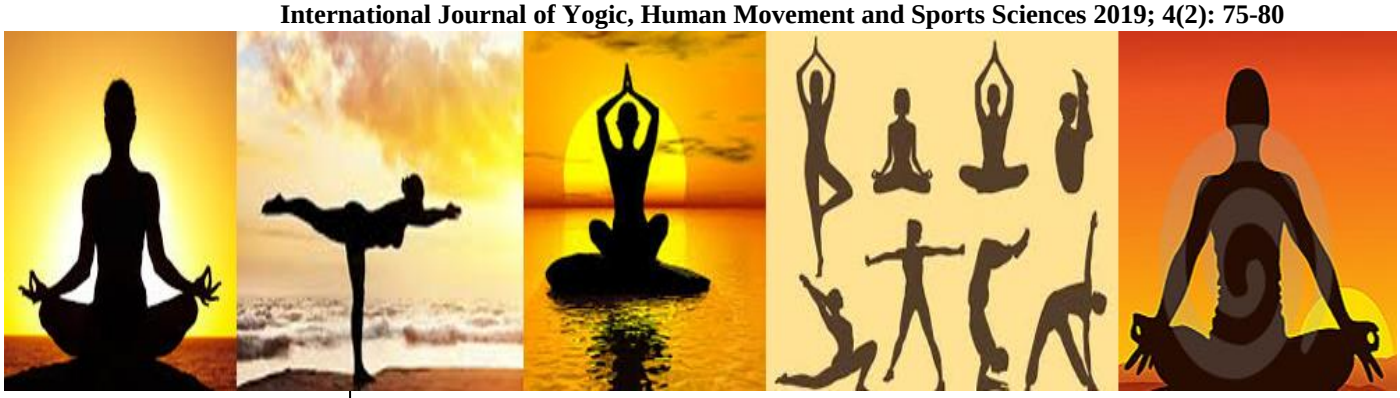

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Effect of isolated and combind strength training endurance training on selected maximum strength and speed among women

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Abstract
Aim: The objective of the present study is to identify the effects of Isolated and Combined Strength Training performances on maximum strength and speed among college level Women.
Methodology: Twelve weeks of Isolated Training was studied with constant-speed procedure and constant-time procedure. Twelve weeks of Combined Strength Training was studied maximum strength and speed. ANCOVA statistical analyses have been used to analyses the performance and outcome of the college level women and Scheffe's post hoc test was used to find out the mean difference of confidence Isolated Training and Combined Strength Training maximum strength and speed among college level Women.
Result: The submaximal-performance effects on maximum Strength F-ratio at 0.05 level of confidence (df) =3.56 (df) =2.70 Significant is better than control group. These effects have been compared for speed women F-ratio at 0.05 level of confidence for (df) =3.56, (df) =2.70. Significant is better than control group.

Keywords: Maximum strength, speed, Isolated and combined strength training

1. Introduction
The present study sought to evaluate the inconsistencies previously observed regarding the pre dominance of Isolated and Combined Strength Training for improving fitness. The experimental design initially equated and subsequently maintained the same relative exercise intensity by both groups throughout the programs. Thirty subjects were equally divided into isolated training (isolated training, exercise at 50% to 60% maximal work) or Combined Strength training (30 subject as working group and control group respectively at 100% maximal work) training groups that performed 30 min per day for 3 days in all 12 weeks. Following Isolated training and Combined Strength training, exercising work rates were parallel examined both the Combined Strength and Isolated training. Three equated groups were performed to measure the performance of maximum strength and speed; one group act as control group and another two group act as experimental group. I Combined Strength training and isolated training regimens are used to improved physical fitness. There is conflicting evidence as to which is the more effective in improving biochemical, physiological, and performance measures (Cunningham *et al*. 1979). The purpose of this study were to compare the effects of using the same relative work intensities in the two training modes and examine their effect in Isolated training and Combined Strength training tests.

2. Methodology
2.1 Sample selection
Simple random procedure was used to select the subjects for the present study. To delimit the present study only women of Kerala were selected. Totally, 90 members have been taken as sample size. The sample size was divided into three groups namely; isolated training group, combined strength training group and control group.

2.2 Collection of data
A selected package of isolated training and combined strength were administered to collect the data.

12 weeks was administered to all three groups. The performance of all groups was administered for only 30 min per day especially for continuously 3 days in all 12 weeks.

2.3 Analysis
ANCOVA and Scheffe's post hoc test were used for the study. The mean, sum of squares, mean square and f-ratio are identified by using the SPSS package and Microsoft version is used to all the tabular columns and figures.

2.4 Selection of Variables
The various scientific literatures have been reviewed, based on the review Strength endurance training and endurance training among college women in Kerala was selected as variables of the present study.

3. Results on maximum strength
The statistical analysis comparing the initial and final means of Maximum strength due to isolated strength training (IST), isolated endurance training (IET), combined strength and endurance (CSE) training and control groups (CG) of college level women is presented in Table 1.

Table 1: Computation of analysis of covariance due to isolated and combined strength training and endurance training on maximum strength

	IST Group	IET Group	CSE Group	Control Group	SOV	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	149.53	145.87	149.20	150.73	B	195.53	3	65.18	0.65
Std Dev	12.61	11.36	7.80	7.17	W	5606.80	56	100.12	
Post Test Mean	154.87	155.40	162.87	150.20	B	1234.87	3	411.62	4.18*
Std Dev	13.29	9.99	7.80	7.36	W	5511.47	56	98.42	
Adjusted post test mean	154.20	158.21	162.52	148.40	B	1608.49	3	536.16	61.13*
					W	482.43	55	8.77	

IST: Isolated Strength Training; IET: Isolated Endurance Training
CSE: Combined Strength and Endurance Training
SOV: Source of Variance; B: Between W: Within
Required $F_{(0.05),\,(df\ 3,56)} = 2.70$
* Significant at 0.05 level of confidence

As shown in Table 1, the pre-test mean on Maximum strength of strength trainings group was 149.53 with standard deviation ±12.61 pre-test mean of Endurance training group was 145.87 with standard deviation ±11.36, the pre-test mean of combined strength and Endurance training group was 149.20 with standard deviation ±7.80, the pre-test mean of control group was 150.73 with standard deviation ±7.17. The obtained F ratio of 0.65 on pre-test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.70 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table 1 the post-test mean on Maximum strength of strength trainings group was 154.87 with standard deviation ± 13.29 post-test mean of Endurance training group was 155.40 with standard deviation ± 9.99, the post-test mean of combined strength and Endurance training group was 162.87 with standard deviation ± 9.99, the post-test mean of control group was 150.20 with standard deviation ± 7.36. The obtained F ratio of 4.18 on post-test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.70 to be significant at 0.05 level. This shows that there was significant difference in means of the groups at post experimental stage.

Taking into consideration of the pre-test means and post-test means, adjusted post-test means were determined and analysis of covariance was done. The adjusted mean on Maximum strength on strength trainings group was 154.20, Endurance training group was 158.21, combined strength and Endurance training group was 162.52 and control group was 148.40. The obtained F value on adjusted means was 61.13. The obtained F value was greater than the required value of 2.70 and hence it was accepted that there was significant differences among the adjusted means on the Maximum strength of the subjects.

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

Table 2: Multiple paired means comparisons among isolated and combined strength training, endurance training and control groups and scheffe's post hoc analysis on maximum strength

Adjusted Means of					C.I
IST group	IET group	CSE group	Control group	Mean diff	
154.20	158.21			-4.01*	3.16
154.20		162.52		-8.32*	3.16
154.20			148.40	5.80*	3.16
	158.21	162.52		-4.31*	3.16
	158.21		148.40	9.81*	3.16
		162.52	148.40	14.12*	3.16

IST: Isolated Strength Training; IET: Isolated Endurance Training
CSE: Combined Strength and Endurance Training
***** Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 3.16. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level. Strength trainings Group Vs Endurance training Group (MD: -4.01)

StrengthtrainingsGroupVsCombinedtrainingGroup(MD-8.32)
Strength trainings Group Vs Control Group (MD: 5.80)
Endurance training Group Vs Combined training Group (MD: -4.31)
Endurance training Group Vs Control Group (MD: 9.81)
Combined training Group Vs Control Group (MD: 14.12)

The pre-test, post-test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure 1.

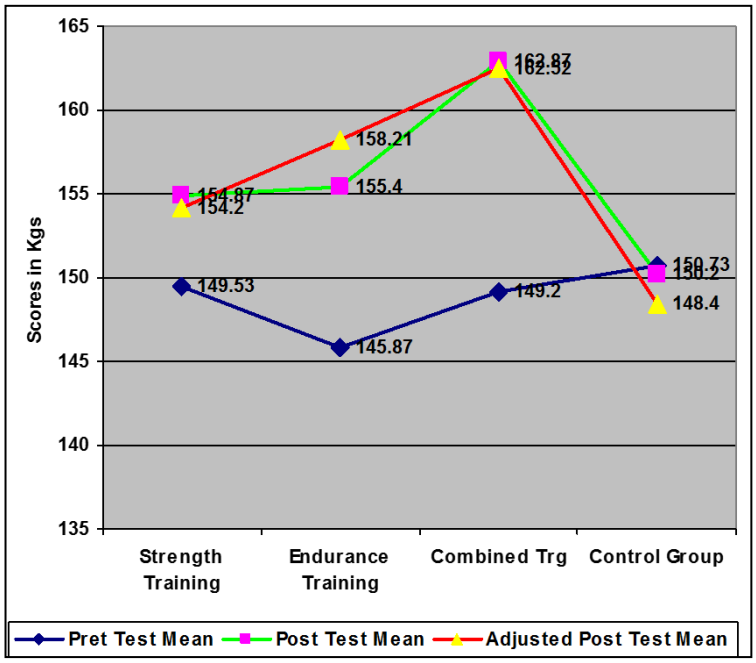

Fig 1: Line graph showing pre, post and adjusted means on maximum strength among college women

4. Results on speed

The statistical analysis comparing the initial and final means of Speed due to isolated strength training (IST), isolated endurance training (IET), combined strength and endurance (CSE) training and control groups (CG) of college women is presented in Table 3.

Table 3: Computation of analysis of covariance due to isolated and combined strength training and endurance training on speed

	IST group	IET group	CSE group	Control group	SOV	Sum of squares	df	Mean squares	Obtained F
Pre Test Mean	6.79	6.71	6.82	6.86	B	0.17	3	0.06	
Std Dev	0.16	0.15	0.17	0.18	W	1.51	56	0.03	2.06
Post Test Mean	6.57	6.57	6.67	6.84	B	0.69	3	0.23	
Std Dev	0.18	0.14	0.17	0.20	W	1.58	56	0.03	8.18*
Adjusted Post Test Mean	6.58	6.65	6.65	6.78	B	0.29	3	0.10	
					W	0.25	55	0.00	21.63*

IST: Isolated Strength Training; IET: Isolated Endurance Training
CSE: Combined Strength and Endurance Training
SOV: Source of Variance; B: Between W: Within
Required $F_{(0.05),\,(df\ 3,56)} = 2.70$
* Significant at 0.05 level of confidence

As shown in Table XIII, the pre-test mean on Speed of strength trainings group was 6.79 with standard deviation ±0.16 pre-test mean of Endurance training group was 6.71 with standard deviation ±0.15, the pre-test mean of combined strength and Endurance training group was 6.82 with standard deviation ±0.17, the pre-test mean of control group was 6.86 with standard deviation ±0.18. The obtained F ratio of 2.06 on pre-test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.70 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table 3, the post-test mean on Speed of strength trainings group was 6.57 with standard deviation ±0.18 post-test mean of Endurance training group was 6.57 with standard deviation ±0.14, the post-test mean of combined strength and Endurance training group was 6.67 with standard deviation±0.14, the post-test mean of control group was 6.84 with standard deviation ±0.20. The obtained F ratio of 8.18 on post-test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.70 to be significant at 0.05 level. This shows that there was significant difference in means of the groups at post experimental stage.

Taking into consideration of the pre-test means and post-test means, adjusted post-test means were determined and analysis of covariance was done. The adjusted mean on Speed on strength trainings group was 6.58, Endurance training group was 6.65, combined strength and Endurance training group was 6.65 and control group was 6.78. The obtained F value on adjusted means was 21.63. The obtained F value was greater than the required value of 2.70 and hence it was accepted that there was significant differences among the adjusted means on the Speed of the subjects.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table 4.

Table 4: Multiple paired means comparisons among isolated and combined strength training, endurance training and control groups and scheffe's post hoc analysis on speed

Adjusted Means Of					C.I
IST Group	IET Group	CSE Group	Control Group	Mean Diff	
6.58	6.65			-0.07*	0.07
6.58		6.64		-0.08*	0.07
6.58			6.78	-0.20*	0.07
	6.65	6.64		0.01	0.07
	6.65		6.78	-0.13*	0.07
		6.65	6.78	-0.12*	0.07

IST: Isolated Strength Training; IET: Isolated Endurance Training
CSE: Combined Strength and Endurance Training
***** Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 0.07. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Strength trainings Group Vs Endurance training Group (MD: -0.07)
Strength trainings Group Vs Combined training Group (MD: -0.08)
Strength trainings Group Vs Control Group (MD: -0.20)
Endurance training Group Vs Control Group (MD: -0.13
Combined training Group Vs Control Group (MD: -0.12

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Endurance training Group Vs Combined training Group (MD: 0.01)

The pre-test, post-test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure 2.

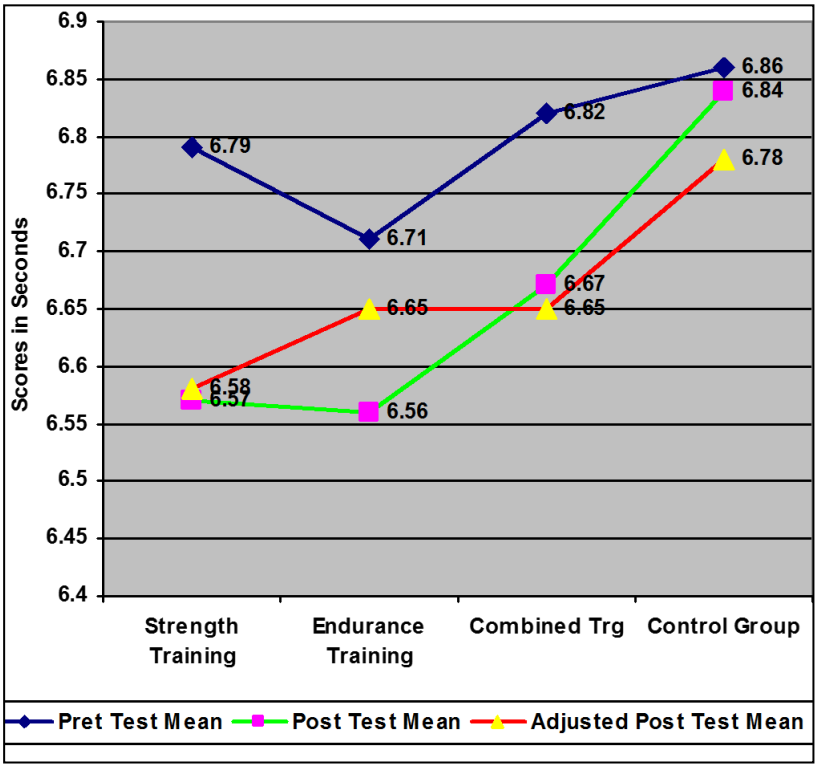

Fig 2: line graph showing pre, post and adjusted means on speed among college women

5. Results on muscular endurance

The statistical analysis comparing the initial and final means of Muscular endurance due to isolated strength training (IST), isolated endurance training (IET), combined strength and endurance (CSE) training and control groups (CG) of college women is presented in Table 5.

Table 5: Computation of analysis of covariance due to isolated and combined strength training and endurance training on muscular endurance

	IST group	IET group	CSE group	Control group	SOV	Sum of squares	df	Mean squares	Obtained F
Pre Test Mean	30.67	29.73	31.33	31.93	B	40.05	3	13.35	0.758
Std Dev	4.20	3.51	4.72	4.27	W	986.53	56	17.62	
Post Test Mean	34.40	36.53	39.87	32.27	B	473	3	157.58	10.41*
Std Dev	4.03	3.09	4.72	3.83	W	848.00	56	15.14	
Adjusted post test mean	34.59	37.43	39.55	31.49	B	546.52	3	182.17	35.88*
					W	279.24	55	5.08	

IST: Isolated Strength Training; IET: Isolated Endurance Training
CSE: Combined Strength and Endurance Training
SOV: Source of Variance; B: Between W: Within
Required $F_{(0.05),\,(df\ 3,56)} = 2.70$
* Significant at 0.05 level of confidence

As shown in Table 5, the pre-test mean on Muscular endurance of strength trainings group was 30.67 with standard deviation ±4.20 pre-test mean of Endurance training group was 29.73 with standard deviation ± 3.51, the pre-test mean of combined strength and Endurance training group was 31.33 with standard deviation ± 4.72, the pre-test mean of control group was 31.93 with standard deviation ±4.27. The obtained F ratio of 0.758 on pre-test means of the groups was not significant at 0.05 level as the obtained F value was less than the required table F value of 2.70 to be significant at 0.05 level. This shows that there was no significant difference in means of the groups at initial stage.

The results presented in Table 5, the post-test mean on Muscular endurance of strength trainings group was 34.40 with standard deviation ± 4.03 post-test mean of Endurance training group was 36.53 with standard deviation ± 3.09, the post- test mean of combined strength and Endurance training group was 39.87 with standard deviation ± 3.09, the post-test mean of control group was 32.27 with standard deviation ± 3.83. The obtained F ratio of 10.41 on post-test means of the groups was significant at 0.05 level as the obtained F value was greater than the required table F value of 2.70 to be significant at 0.05 level. This shows that there was significant difference in means of the groups at post experimental stage.

Taking into consideration of the pre-test means and post-test means, adjusted post-test means were determined and analysis of covariance was done. The adjusted mean on Muscular endurance on strength trainings group was 34.59, Endurance training group was 37.43, combined strength and Endurance training group was 39.55 and control group was 31.49. The obtained F value on adjusted means was 35.88. The obtained F value was greater than the required value of 2.70 and hence it was accepted that there was significant differences among the adjusted means on the Muscular endurance of the subjects. Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table 6.

Table 6: Multiple paired means comparisons among isolated and combined strength training, endurance training and control groups and scheffe's post hoc analysis on muscular endurance

Adjusted means of					C.I
IST Group	IET Group	CSE Group	Control Group	Mean Diff	
34.59	37.43			-2.84*	2.41
34.59		39.55		-4.96*	2.41
34.59			31.49	3.10*	2.41
	37.43	39.55		-2.12	2.41
	37.43		31.49	5.94*	2.41
		39.55	31.49	8.06*	2.41

IST: Isolated Strength Training; IET: Isolated Endurance Training
CSE: Combined Strength and Endurance Training
***** Significant at 0.05 level.

The post hoc analysis of obtained ordered adjusted means proved that to be significant at 0.05 level confidence the required confidence interval was 2.41. The following paired mean comparisons were greater than the required confidence interval and were significant at 0.05 level.

Strength trainings Group Vs Endurance training Group (MD: -2.84)
Strength trainings Group Vs Combined training Group (MD: -4.96)
Strength trainings Group Vs Control Group (MD: 3.10)
Endurance training Group Vs Control Group (MD: 5.94
Combined training Group Vs Control Group (MD: 8.06

The following paired mean comparisons were less than the required confidence interval and were not significant at 0.05 level.

Endurance training Group Vs Combined training Group (MD: -2.12)

The pre-test, post-test and ordered adjusted means were presented through line graph for better understanding of the results of this study in Figure 3.

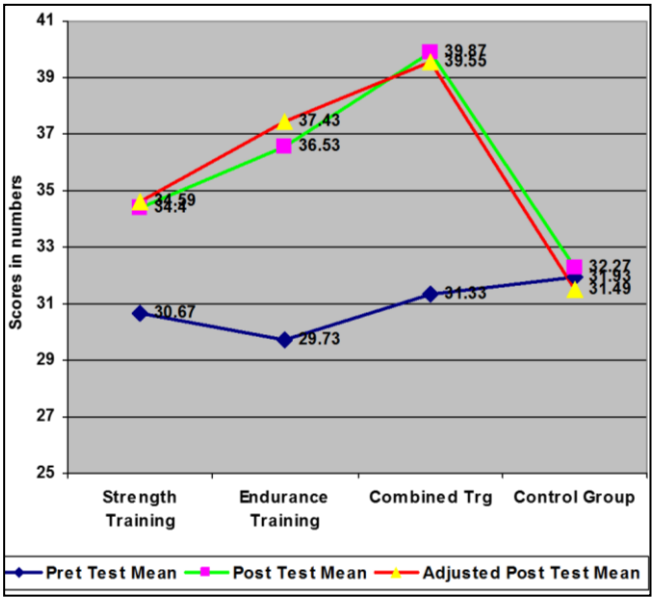

Fig 3: Line graph showing pre, post and adjusted means on muscular endurance among college women

6. Conclusion

In the present study, the effects of 12 week of exercise (Isolated strength training and isolated endurance training, combined strength endurance training), were studied in college level women. The data shows thatthere is a significant deference in thedue to body weight and lean body mass among college level women.

7. References

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