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Influence of stamina and training for selected physical variables and lipid profiles of female college players in Karnataka

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Abstract
Endurance exercise improves the aerobic processes within skeletal muscle by increasing capillary and mitochondrial densities as well as oxidative enzyme concentration, whereas strength training improves skeletal muscle force production by increasing muscle cross-sectional area and glycolytic enzyme concentration. Both the Strength & Endurance (SE) and Endurance & Strength (ES) groups outperformed the control group in terms of lipid profile (significant reductions in TC, TG, LDL-C, VLDL-C and significantly increased HDL-C) and body composition (significant decreases in body fat, body weight, and increased body fat free mass, with no statistical significance between the two). There was also no statistically significant difference in body composition or lipid profiles between the SE and ES groups. Aerobic exercise, by keeping up a consistent, high-intensity exercise routine, particularly in middle-aged and young adults, protects against atherosclerosis. Exercise is the only component of early rehabilitation programs at the moment. With a mortality rate drop of at least 20%, exercise-based cardiac rehabilitation has gained widespread acceptance. Reason being, HDL levels rose while TC and TGL levels fell, resulting in lower systolic blood pressure.

Keywords: Concurrent training, ‘t' test, body fat, sportsmanship

Introduction
Sports to participate is to make the most of one's talents, to join a collaborative team effort, to feel the highs and lows of success and failure. Nowadays, sports throughout the globe are cutthroat. Athletes in any sport may benefit greatly from high-quality training that makes use of modern technological tools.

Whether done alone or as part of a team, the goals of participating in sports are the same: to stay or become in better shape while having fun. A level of ability may be necessary, particularly at the highest levels of competition, and there may be objective ways to determine the winner or winners in sports. Sports are often associated with physical athleticism, however certain non-physical pastimes, such card games and board games, are sometimes called sports.

Typically, a system of regulations or traditions governs sports. The outcome of a sport is often determined by physical occurrences, such the first player to cross a line or score a goal. Diving, dressage, and figure skating are just a few of the sports where well defined standards are used to evaluate performance and ability levels. This stands in stark contrast to other forms of competitive judging, including bodybuilding and beauty pageants, where demonstrable talent is not required and standards are less clear. At the most elite level, records are maintained and updated for the majority of sports, and both successes and failures are frequently publicized in the sport news. Fun and exercise are the most common motivations for participating in sports, although many also participate for health and fitness reasons. On the other hand, many people find great joy in watching professional sports. Good sportsmanship, including norms of behavior such as respecting opponents and referees and praising the winner after losing, is required of players in various sports, however practices may differ.

Important for athletes and non-athletes alike, physical fitness metrics provide the groundwork for peak performance. According to Mal (1982), in order to have great technique and tactical effectiveness, one must be physically fit. This includes having strength, speed, endurance, flexibility, and varied coordination qualities.

It amplifies the amount of energy. It lifts spirits and improves demeanor. It aids the body in adjusting to even mundane tasks that pose risks of bleeding and other consequences, particularly for muscles and joints that have been weakened due to inactivity. A healthy lifestyle, including regular exercise and a balanced diet, may have far-reaching positive effects on a person's mental, physical, and spiritual health. It also lowers the risk of acquiring diabetes type 2, cardiovascular disease, and obesity. The playing skill of game players is favorably connected with motor fitness characteristics like flexibility, explosive power, and muscular strength, and adversely correlated with factors like cardiovascular endurance and agility. Stronger and more toned muscles are another benefit of playing this game. The game's movements build strength in the upper body, shoulders, thighs, abs, and lower legs. Further benefits include enhanced reflexes, balance, and hand-eye coordination from playing games.

Concurrent training refers to a program that combines resistance training (to increase strength, hypertrophy, and power) with aerobic exercise (to improve endurance) in one cohesive effort. Athletes often do strength and endurance training regimens together to develop adaptations that are unique to each kind of exercise. Changes in strength and endurance variables after strength training, endurance training, or concurrent strength and endurance training have usually been the focus of research examining the effects of concurrent training. So far, research on the effects of concurrent training on strength and endurance performance has shown conflicting findings. Incorporating strength training into an endurance program hampered improvements in maximum oxygen uptake (VO2 max) in the second half of the twenty-week program. But other studies have shown that training at the same time does not hinder strength or endurance gains.

Literature Review

Genc, H. (2020) [1] investigated the impact of calisthenics activities on static and dynamic balance performance during tennis training. Seventeen male tennis players (mean age = 20.82 + 4.42), average height = 1.80 + 0.03 m, and mean body mass index = 58.75 kg, willingly took part in the research. The tennis players who took part in the trial were split into two equal groups at random. Eight members of the control group (CG) engaged in just tennis training, whereas nine members of the experimental group (EG) engaged in both tennis training and calisthenics. Eight weeks overall, with three exercises per week, was the duration of the research. Researchers measured participants' stature, weight, body mass index (BMI), static balance, and dynamic balance as part of the study. The ALFA Stabilometric Platform and the dynamic balance Y test were used to determine static balance. The SPSS 22 application was used to analyze the individuals' statistical analysis results. Results showed that calisthenics exercise improved eyes with open-to-back standard deviation (34.47%), right-left standard deviation (20.82%), and static balance (28.29%). Eyes with a total swing speed of 27.16 percent, a left-to-right swing speed of 31.68%, and an open-to-back swing speed of 23.23% all showed improvement in DG (p 0.05). A 25.17% improvement was seen in the eyes-closed static balance score when EG, which employs calisthenics exercises, was used. In EG, the forward-to-back, right-to-left, and overall oscillation speeds were all significantly improved (by 20.40%, 26.23%, and 22.98%, respectively) while the eyes were closed. Therefore, it is safe to say that tennis players' static and dynamic balance features are improved by the applied calisthenics exercise.

Vinu (2018) [2] investigated the impact of aerobic dancing on agility. Thirty male Kabaddi players were chosen at random to serve as subjects for this purpose. Fifteen individuals were randomly allocated to the control group and fifteen to the experimental group. Aerobic training was administered to Group I, whereas Group II served as a control. Participants in both groups were put through agility drills. To find out if there was a statistically significant change in agility between the pre- and post-tests, we utilized analysis of covariance. Aerobic exercise increased the experimental groups' agility, according to the study's results.

Poddar *et al*., (2016) [3] found that kids in tribal schools in West Bengal improved their agility and lung capacity after participating in several exercise programs. Eighty (N=80) male students from Talturam and Thakur Panchanan Viddapith high schools in West Bengal's Alipurduar District were chosen at random among 360 tribal students for the research. The participants' ages varied from twelve to fifteen. The participants were randomly assigned to one of four groups, with 20 people drawn from each. Calisthenics in Group I, yoga in Group II, traditional and leisure pursuits in Group III, and a control group in Group IV. Each group had its own set of pre-tests on the chosen variables. The three groups subsequently followed different 12-week regimens of calisthenics, yogic exercise, leisure activities, and traditional activities. The results of the post-test for each variable were recorded after 12 weeks. The peak flow meter was used to assess lung volume, while the 10 × 4 yards shuttle run was used to test agility. We used an ANCOVA and a paired t-test to examine the data. A significance threshold of 0.05 was used. The research found that West Bengal tribal students' lung volume and agility both improved considerably after participating in one of several 12-week fitness programs.

Babu *et al*., (2020) [4] collected data from a group of untrained individuals to determine the impact of varying aerobic training intensities on a number of physiological variables. We chose 45 untrained guys to be our research participants so that we could accomplish our goals. The ages of the participants varied from twenty-one to twenty-three. There were three groups comprised of the chosen subjects: one that had moderate-intensity aerobic exercise, another that underwent high-intensity aerobic training, and a control group (III). Aerobic exercise of varying intensities was administered to groups I and II for a duration of twelve weeks, while group III served as a control. Before and after the study period, all three groups were evaluated for resting heart rate and breath holding time. We used the Analysis of Covariance (ANCOVA) statistical approach on each dependent variable to find out how it changed as a result of the independent factors. We used Scheffe's post hoc test to find out which of the three paired means substantially varied if the resulting 'F' ratio for adjusted posttest means was found to be significant. Aerobic exercise at high and moderate intensities significantly changed the resting heart rate and breath holding duration of the untrained males, the study found. Also, when it came to lowering the resting heart rates of the untrained men, moderate intensity aerobic training was determined to be far superior to high intensity aerobic training. On the other hand, when it came to improving breath holding time, there were no significant differences between the two groups.

Methodology

From the first problem statement to the last findings, researchers follow a systematic technique known as research methodology. To conduct the study in a legitimate and scientific way is the responsibility of this approach. The researchers wanted to see how collegiate female athletes' lipid profiles and physiological characteristics changed after engaging in strength, endurance, and concurrent training.

Selection of subjects

Sixty female athletes from Government First Grade College for Women Gadag College for Females in Karnataka participated in this research. People in the study were between the ages of 25 to 57. Each of the four groups—an experimental group, a control group, and an additional experimental group—consisted of fifteen participants.

Selection of variables

When looking for signs of a healthy lifestyle, physiological and lipid measures are the best bets. If a person meets the requirements for their physiological and lipid metrics, they will lead a healthy lifestyle. Along with the guide and other specialists in the field, the investigator had reviewed the relevant literature on the subject of strength training, endurance training, and concurrent training in all its facets. The variables were chosen after taking into account the accessibility and practicality of suitable methods and tools.

Selection of tests

As shown in Table I, the following standardized tests were chosen after a study of the relevant literature; they were used to gather data on the dependent variables that were chosen.

Table 1: Selection of tests and units of measurement

Variables		Test	Measurements
Physiological	Fat Free Mass	Bioelectrical Impedance Analyzer (Karada Scan)	In Percentage
	Body Fat	Bioelectrical Impedance Analyzer (Karada Scan)	In Percentage
	BMR	Bioelectrical Impedance Analyzer (Karada Scan)	In Calories
Lipid Profile	HDL-C	Enzymatic Calorimetric Method	In mg/dL
	LDL-C	Enzymatic Calorimetric Method	In mg/dL
	Total Cholesterol (TC)	Enzymatic Calorimetric Method	In mg/dL

Results and Discussion

This research presents the results of the data analysis. The researchers set out to examine the impact of strength, endurance, and concurrent training on a number of physiological indicators and lipid profiles in collegiate female athletes. The goal of the research was to do this by randomly selecting 60 female college athletes from Government First Grade College for Women Gadag College for Females in Karnataka who participated in intercollegiate and interuniversity level events in a variety of sports. The individuals included in the study were between the ages of 25 to 57. Each of the four groups an experimental group, a control group, and the third will consist of fifteen (n=15) participants.

Test of significance

Typically, alpha is set at 0.05 or 0.01. A significance level of alpha = 0.05 between two groups indicates that there is a 5% chance that the difference is due to chance; nevertheless, this level of significance does not indicate the size or clinical relevance of the difference. In the same vein, data that do not reach statistical significance do not establish the validity or the researchers. Statistical significance is only concerned with the probability that the outcomes observed were not a consequence of random chance.

This section of the thesis is crucial. The test was often referred to as the test of significance since it allowed one to determine whether there was a significant difference in scores between the three groups or among several groups. But in this study, if the calculated F-value was higher than the table value, that the groups' means were significantly different from one another; conversely, if the calculated F-value was lower than the table value, conclude that the groups' means were not significantly different from one another.

Level of Significance

This research set out to answer the following questions about collegiate female athletes' lipid profiles and physiological variables: how does concurrent strength and endurance training affect these variables? Using an analysis of covariance (ANCOVA) to identify significant differences between groups on specific criterion variables and a dependent t-test to determine if there was a statistically significant improvement between the pre- and post-tests, we looked at the data from the dependent variables in this study. The proper level of confidence for the test of significance in this investigation was set at 0.05 in all instances.

Computation of dependent 't' test, analysis of covariance and Scheffe's post hoc test on fat free mass

Table 1. Displays the results of the dependent t-test conducted on the fat free mass data acquired from the pre- and post-test means of ETG, STG, CTG, and CG.

Table 1: Summary of mean, standard deviation and dependent 't' test for the pre and post tests on fat free mass of experimental and control groups (Fat Free Mass scores are expressed in Percentage)

		ETG	STG	CTG	CG
Pre test	Mean	25.71	25.73	25.75	25.76
	SD	0.28	0.32	0.32	0.48
Post test	Mean	26.48	26.90	27.75	25.85
	SD	0.41	0.39	0.60	0.37
T test		6.55*	10.89*	11.36*	1.44

*Significant at .05 level. The table value required for .05 level of significance with df 14 is 1.761

Computation of dependent 't' test, analysis of covariance and Scheffe's post hoc test on body fat

Table 4 displays the results of the dependent t-test performed on the body fat data derived from the pre- and post-test means of ETG, STG, CTG, and CG.

Table 2: Summary of mean, standard deviation and dependent 't' test for the pre and post tests on body fat of experimental and control groups (Body Fat scores are expressed in Percentage)

		ETG	STG	CTG	CG
Pre test	Mean	28.70	28.72	28.76	28.73
	SD	0.28	0.30	0.31	0.40
Post test	Mean	27.45	26.89	26.30	28.69
	SD	0.40	0.43	0.77	0.36
't' test		10.81*	16.67*	14.09*	1.32

*Significant at .05 level. The table value required for .05 level of significance with df 14 is 1.761

Computation of dependent 't' test, analysis of covariance and Scheffe's post hoc test on HDL-C

Data for HDL-C were analyzed using a dependent t-test on the means of ETG, STG, CTG, and CG before and after the test. The results are shown in Table 3.

Table 3: Summary of mean, standard deviation and dependent 't' test for the pre and post tests on HDL-C of experimental and control groups (HDL-C scores are expressed in mg/dl)

		ETG	STG	CTG	CG
Pre test	Mean	51.04	50.93	51.02	51.10
	SD	0.55	0.57	0.60	0.65
Post test	Mean	52.39	52.30	54.37	51.11
	SD	0.41	0.62	0.88	0.65
't' test		7.55*	8.78*	9.90*	1.61

*Significant at .05 level. The table value required for .05 level of significance with df 14 is 1.761.

Results of Dependent 't" Test on HDL-C

According to Table 3, the average values of ETG, STG, CTG, and CG on HDL-C before the test were 51.04, 50.93, 51.02, and 51.10, respectively. After the test, the average values were 52.39, 52.30, 54.37, and 51.11, respectively. Based on the comparison of the pre- and post-test averages of ETG, STG, CTG, and CG on HDL-C, the dependent t-ratio values are 7.55, 8.78, 9.90, and 1.61, respectively. A value of 1.761 is needed to be considered statistically significant with df 14 at the.05 level. The fact that the experimental groups' 't' ratio values were higher than the table value indicates that STG, ETG, and CTG considerably enhanced HDL-C. Still, HDL-C levels in the control group weren't noticeably higher. Due to the lack of targeted instruction, the control group's derived 't' value is lower than the table value. Table 4 displays the results of the study of residual variance on HDL-C for ETG, STG, CTG, and CG.

Table 4: Analysis of covariance for the data on HDL-C among experimental and control groups

Adjusted Post Test Means				Sources of Variance	Sum of Squares	df	Mean Squares	F-Ratio
ETG	STG	CTG	CG					
52.383	52.319	54.376	51.091	Between	82.992	3	27.664	**64.868***
				Within	23.456	55	0.426	

* Significant at 0.05 level of confidence. The table value for significance at 0.05 with df 3 and 55 is 2.78.

Results of Analysis of Covariance on HDL-C

The corrected post-test averages of ETG, STG, CTG, and CG on HDL-C are 52.383, 52.319, 54.376, and 51.091, respectively, A table value of 2.78 with degrees of freedom 3 and 55 is necessary for significance at the.05 level, however the obtained F-ratio value of 64.868 exceeds this. A greater F-ratio than the table value shows that the adjusted post-test means of ETG, STG, CTG, and CG are significantly different from one another. which indicated which of the matched means had a significant difference on HDL-C.

Table 5: Scheffe's test for the differences between the adjusted post test paired means of HDL-C

Adjusted Post Means				Mean Difference	Confidential Interval
ETG	STG	CTG	CG		
52.383	52.319			0.064	0.689
52.383		54.376		1.993*	
52.383			51.091	1.291*	
	52.319	54.376		2.056*	
	52.319		51.091	1.228*	
		54.376	51.091	3.284*	

*Significant at .05 level

Results of Scheffe's Test on HDL-C

At the.05 level of confidence, the adjusted posttest means differences on HDL-C between ETG and CTG, ETG and CG, STG and CTG, STG and CG, and CTG and CG are 3.284, 1.993, 1.291, 2.056, and 1.228, respectively. The confidence interval value is 0.689, so these results are also statistically significant. Having said that, at the.05 level of confidence, the adjusted posttest mean difference on HDL-C between ETG and STG is 0.064, which is less than the confidence interval value of 0.689 and considered inconsequential.

The mean values of ETG, STG, CTG, and CG on HDL-C before and after the test. It is a graphical representation of the modified posttest mean values of ETG, STG, CTG, and CG on HDL-C.

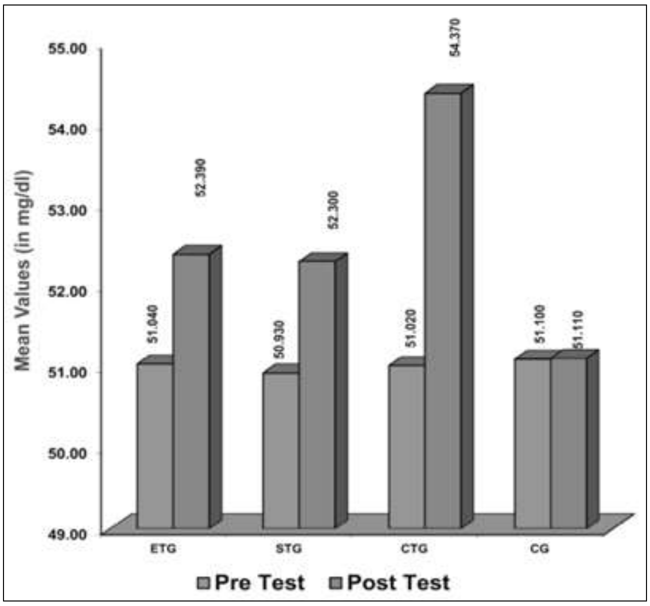

Fig 1: Pre-Test and Post Test Mean Values of Etg, Stg, Ctg and Cg on Hdl-C

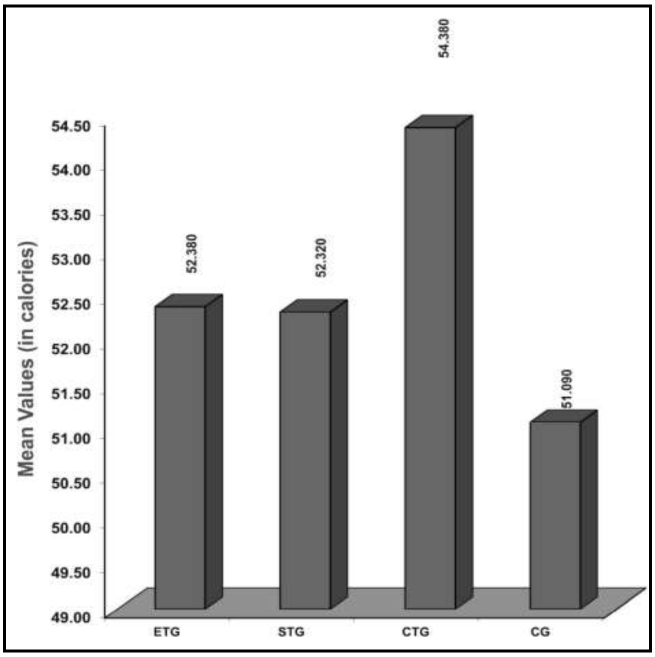

Fig 2: Adjusted Post Test Mean Values of Etg, Stg, Ctg and Cg on Hdl-C

Conclusions

The effects of strength, endurance, and concurrent training on certain physiological and lipid profiles in college-aged women are the subject of the present investigation. College female athletes who competed in intercollegiate and interuniversity level tournaments (across all sports) were the only ones who's training the researcher took into account.

1. College female athletes saw a rise in their basal metabolic rate and fat free mass after eight weeks of strength, endurance, and concurrent training.
2. Similarly, collegiate female athletes saw a reduction in their body fat percentage after including endurance, strength, and concurrent training into their training regimens.

This meta-analysis and systematic review looked at how CT affected kid fitness and performance on sporting fields. In both sporty and non-athletic youths ranging in age from 10 to 13 years old, we observed that CT had no interfering effects and, at most, a potentially amplifying one when compared to ST or ET alone. Adolescent endurance athletes showed the most obvious signs of CT's amplifying impact. This goes against what is known from studies conducted on adults and suggests that the interfering impact of CT on measurements of muscular strength varies with age. Researchers should think about things like biological age, sequencing effects, and training level while creating CT programs.

References

1. Genc H. Effect Of the Calisthenics Exercises on Static and Dynamic Balance in Tennis Players. Int J Appl Exerc Physiol. 2020;(9):3.
2. Vinu W. Effect of aerobic dance on agility of men kabaddi players. Int J Physiol Nutr Phys Educ. 2018;3(1):1360-1361.
3. Poddar H, Subhramaniam PK. Effect of different packages of physical activities programme on agility and lung volume of West Bengal tribal students. Int J Phys Educ Sports Health. 2016;3(5):508-512.
4. Babu KRR, Prasad ID. Effect of high and moderate intensities of aerobic training on selected physiological parameters of untrained men. Mukt Shabd J. 2020;198.
5. Watanabe N, Sawada SS, Shimada K, Lee IM, Gando Y, Momma H, Kawakami R, Miyachi M, Hagi Y, Kinugawa C, *et al*. Relationship between Cardiorespiratory Fitness and Non-High-Density Lipoprotein Cholesterol: A Cohort Study. J Ather Thromb. 2018;25:1196–1205. doi: 10.5551/jat.43851.
6. Haxhi J, Scotto di Palumbo A, Sacchetti M. Exercising for Metabolic Control: Is Timing Important. Ann Nutr Metab. 2013;62:14–25. doi: 10.1159/000343788.
7. Sénéchal M, Bouchard DR, Dionne IJ, Brochu M. The effects of lifestyle interventions in dynapenic-obese postmenopausal women. Menopause. 2012;19:1015–1021. doi: 10.1097/gme.0b013e318248f50f.
8. Dominguez-Amorós M, Aoaricio-Chueca P. Lack of Association between the Reasons for and Time spent Doing Physical Activity. Int J Environ Res Public Health. 2020;17:6777. doi: 10.3390/ijerph17186777.
9. Nowak M, Ambroży T. Współczesny Trening Obwodowy w Teorii i Praktyce. Kraków, Poland: 2015.
10. Ambroży T. W poszukiwaniu związków treningu obwodowego z prozdrowotną aktywnością fizyczną Annales Medicina. 2007;62:55–60.
11. U.S. Department of Education Office of Educational Research and Improvement Research Digest Definitions: Health, Fitness and Physical Activity. [accessed on 10 July 2022]