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Effects of 6-week combined training on badminton player of under the age group of 12 years

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Abstract
This pilot study investigated the effects of 6-week Combined training (Strength training and Agility training) on badminton players under the age group of 12 years. Twenty badminton players (Boys Only) from sports authority of India, Bangalore whose ages ranged from 11 to 12 years were included in the study. The subjects were randomly divided in to two groups of 10 subjects in each:1) Training group I (Combined training) and a controlled group. The training groups performed 4 days a week for 6 consecutive weeks. Combined training (Strength and Agility), was assessed using a 30meter sprint test, vertical jump testand 'T' shape test, Zig-zag test respectively, and skill performance were assessed using anaerobic field test and short service test, and game performance were assessed through the coach rated basis. All the subjects performed the tests before and after the training program. Data were analysed using a depended mean value and in-depended mean value. A confidence level of .05 was considered significant. The results presented that the Combined training (Strength, Agility), and game performance of the subjects were significantly improved in the training group. Significant not found in controlled group. There were also statistically significant differences identified between the 2 groups after training program. The training group had higher Strength and Agility compared to controlled group. This study provides support to the fact that 6-week combined training (Strength and Agility training) can be used as an effective training program to improve Strength, and Agility in badminton players.

Keywords: Combined training, strength, agility, male badminton players

Introduction
Badminton is a popular sport in India. It is the second most played sports in India after Cricket. The world's second fastest racket sport. Badminton's debut as an Olympic Game has manifestly boosted interest internationally. Badminton is a game in which you struggle hard to get stamina better than a football player hands stronger than a volleyball smasher, core strength more than a basketball player, wrist stronger than a squash player & agility higher than a table tennis player. It is one of the fastest game and no one can easily get into the game to higher position. Continuous back and forth bends improve spine strength, side changes of legs benefits for toes, heels and thighs. Warm and cool strength, side changes of legs is also beneficial for toes and thighs. Warm up and cool down of the game makes your body breathe from each part, sweating and breathing improves blood circulation. There is no evidence of any research being don on this game, hence this study.

The Statement of the problem
The purpose of the study is to find out the "Effects of 6week Combined training (Strength Training and Agility Training) of badminton players of different age groups" with the help of selected fitness programme or training, skill test and game performance.

The Significance of the study: The study has wide application in Physical fitness testing program. The study may help to know the ability of player. The study may help to compare the performance of different age groups during training period. The study can reveal the changes in performance in relation to the physical fitness level of the players. The study may help the coach plan for specific training models to train and obtain better performance. The study may help to make appropriate coaching programmes planned for different age groups. The study may help to find out the effects of the short term or long term trainings programmes.

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Hypothesis

1. It was hypothesised that there would be greater amount of changes in the performance after the 6 weeks of specified skill training.
2. It was hypothesised that there would be greater amount of difference in the game performance levels.
3. It further hypothesised that the Combined training (strength training and Agility training) of 12year age group after 6 weeks of Combined training have greater influence on the skills and performance of the players.

Methodology: The study will be conducted on experimental basis on the badminton player to know their level and performance and skill through 6 weeks designed training, through pre-test and post-test method.

In this chapter the procedure adopted for the selection of subjects, selection of variables, tester reliability, instrument reliability, training schedule, reliability of data, test administration and statistical technique for the analysing the data has been described.

Selection of Subjects: The purpose of the study was to find out the effects of six weeks' strength training, agility training on selected variables and parameters among the badminton players. 20 players/ children were selected as subjected who playing for ranking badminton tournaments of under the age group of 12 years who training in SIA (Sports Authority of India) training centres in Bangalore Karnataka. The selected subjects were divided in to two groups of 10 subjects in each group. Group one acted as experimental group I (Combined training) group and group two acted as controlled group. Group one underwent combined training group two underwent routine physical exercise for six weeks.

Selection of variables

The research scholar reviewed the various scientific literatures pertaining to the strength training and agility training on selected variables from books, journals, periodicals and research papers. For this study the following variables were chosen Strength, Agility, Skills, Game performance.

The experimental group underwent training for six weeks. The data was collected before and after the training period for analysis. A pilot study was carried out to assess the initial capacity of the subjects in order to fix the training load. For this purpose, 20 students were selected and divided into two groups, combined training, and controlled group. The intensity of the training was decided according to the age group of the players. The method for strength training consist of calculating the quality or state of being physically strong of the badminton

players and the method for agility training consist of calculating the ability of the badminton player to move quickly and easily. Based on the response of the subjects in the pilot study, the training for the experimental group were constructed, however the individual difference was not considered, while constructing the training programmes the basic principles of training (progression, overload and specificity) were followed.

Selection of tests: Based on the availability of the instruments feasibility and also based on the review, the selected variables were tested by using standardized test items and the following test items were selected for the study.

Tests selection

Table 1: Shows Tests and Test Items

S. No	Variables	Test Items
1.	30 MTR Sprint test	Stop Watch, Measurement Tape
2.	Vertical jump test	Chalk powder. measurement Tape
3.	"T" Shape test	Cones, Stopwatch, Tape
4.	Zig Zag test	Cones, Stopwatch, Measurement Tape
5.	Short service test	Chalk, 6mtr Rope, Tape
6.	4 Point anaerobic field test	Cones, Tape, stopwatch. Badminton court
7.	Game performance	Coach rated (For 10 point)

Orientation to the subjects: The researcher gave instruction to the subject about the experimental and testing methods and out the efforts required and testing methods and procedures, so that there was no confusion about the efforts required on their part. In order to get full co-operation from the subjects, they were oriented as follows. The method of performing the test items were explained and demonstrated to the subjects. The method of strength, agility, skills variables, game performance were explained to the subjects, to ensure proper understanding and effective cooperation, so as to obtain reliable data from the tests.

Experimental design: The twenty subjects were randomly assigned to two equal group of 10 badminton player in the age group of 12 years. The group were designed to as combined training and control group respectively. Pre-test data was collected for all the 20 subjects on selected variables. Combined training was given to combined training group for four days in a week for six weeks and controlled group left on their own. The post-tests were conducted on the dependent variables after a period of six weeks of combined training.

Table 2: Training Schedule for Group- I (Combined Training GroupU-12)

Day	Morning Session	Evening Session
Monday	Agility training	Badminton Skill practice and Stretching exercises
Tuesday	Strength training	Badminton Skill practice and Stretching exercises
Wednesday	Agility training	Badminton Skill practice and Stretching exercises
Thursday	Strength training	Match And Stretching exercises
Friday	Agility training	Badminton Skill practice and Stretching exercises
Saturday	Strength Training	Recreational Game (Basketball)
Sunday	Rest	

Criterion Measures: By glancing the literature and in consulting with professional experts the following measures were applied to collect data on the selected criterion and predicator variables.

Table 3: Shows Criterion

S. No	Variables	Test	Criterion
1	Strength	1. 30 MTR Sprint Test	Acceleration, Speed and Reaction
		2. Vertical Jump Test	Lower limb power, Thigh muscles, calf muscles power, explosive Strength and solder reach
2	Agility	3. 'T' Shape Test	Ability to change the direction at speed (Quick movement of Forward, lateral and backward this test requires locomotors fundamental motor skills)
		4. Zig-Zag Test	Coordination, Position of centre of gravity Running Speed and Skill
3.	Skill	5. French Short service	Directing a shuttle towards a particular area of opposite court, to determine the effects of changing the distance through, which serve must pass on scores made. Wrist power and for arm power.
		6. 4 point anaerobic field test	To find the For hand smash, back hand smash, receive the net drop, Net smash, striking ability
4	Game performance	7. The performance of badminton game was measured by coaches rated scale.	Badminton techniques ability(short service ability, long service ability, fore hand clear ability, back hand clear ability, hand movement and wrist movement ability), or Badminton game performance of the players was measured out of ten points by a panel of three qualified coaches during actual competition and the average of three scores was considered as game performance of the badminton players

Analysis of data

The statistical analysis on significance of the mean gains or losses made in the scores in the performance variables, skill performance variables and game performance of badminton players of combined training (strength training and Agility training) are presented**.**

Results of individualized treatment effects

The result of individualized effects of Combined training (Strength training and Agility training)(CTG) and Control group (CG) on performance variables of Strength, agility, upper body strength, lower body strength, endurance, leg explosive power and skill performance ability, and overall playing ability are presented below.

Hypothesis

It was hypothesized that Combined training group would significantly improve the performance variables of strength, agility, upper body strength, leg explosive power and skill performance of short service ability, fore hand clear ability, back hand clear ability, hand movement and wrist movement ability, from baseline to post-test above hypothesis the collected data were analysed by using paired sample 't' test between the pre and post-test mean on performance variables and skill performance of male badminton players. The analysed data are presented in the below table;

Table 4: Significance of mean gains / losses between pre and post-test of combined training group (CTG) on selected performance variables, skill performance and game performance of badminton players under the age group of 12 years.

Variables	Pre Test Mean± SD	Post Test Mean± SD	M.D	Std. Error Mean	'T'-Value	df	Sig
Performance Variables							
30M sprint speed in seconds	7.72+.48	5.03+.38	2.69	.08	30.58*	9	.000
Vertical Jump explosive strength in Centimetre	23.8±3.58	39.8±4.44	16.00	.80	19.93*	9	.000
Agility 'T' shape test (in seconds)	12.74±1.07	10.1150±.69	2.633	.19	13.234*	9	.000
Agility Zig-Zag test (in centimetres)	9.89±.50	7.75±.60	2.139	.11	18.78*	9	.000
Skill Performance Variables							
Anaerobic Field Test (in seconds)	11.61±1.22	9.66±.75	1.94	.195	10.00*	9	.000
Short service test (in points)	5.40±1.34	11.80±.1.39	6.4	.26	24.00*	9	.000
Game Performance Test							
Game performance	3.60±.69	8.00±.66	4.4	.16	26.944*	9	.000

* Significant at 0.05 level, Table value-2.262

Table-3 shows the mean value from pre to post-test in the performance and skill performance variables were: 2.693sec and 16.00 Centimetre's (Strength), 2.633sec and 2.139sec (Agility), 1.947sec and 6.4 points (Skill performance), 4.4 (Game performance) Overall playing ability test. Badminton game performance of the players was measured out of ten points by a panel of three qualified coaches during actual competition and the average of three scores was considered as game performance of the badminton players.

Table also shows the obtained 't' values of pre to post-test mean differences on performance, skill performance and game performance variables were: 30.588sec 19.931 Centimetres (strength), 13.234sec, 18.748sec (Agility), 10.00 sec, 24.000 in points (Skill performance), 26.944 coach rated points (Game performance) Overall playing ability test.

The obtained 't' values were tested at 0.05 level of significance. Since the calculated 't' values were greater than the table 't' value at 0.05 level for degrees of freedom 9. null hypothesis was rejected at 0.05 levels of significance and formulated research hypothesis was accepted. Thus it was concluded that six weeks of combined training program showed significant improvement in strength, agility, skills and overall playing ability (Game performance), as the study the above remark can be given at 95% confidence.

Table 5: Significance of mean gains / losses between pre and post-test of agility control group (cg) on selected performance variables, skill performance and game performance of badminton players under the age group of 12 years.

Variables	Pre Test Mean± SD	Post test Mean± SD	M.D	Std. Error Mean	't'-value	df	Sig
Performance Variables							
30M sprint test	8.19+0.643	8.10+0.66	.09	.05	1.76	9	.111
Vertical Jump test	24.2+4.8	24.3+3.8	-.01	.41	-.24	9	.841
Agility 'T' shape test (in seconds)	14.46+1.12	14.44+1.09	0.02	.043	.526	9	.612
Agility Zig-Zag test (in centimetres)	13.33+1.01	13.41+.912	0.08	.137	-0.577	9	.578
Skill Performance Variables							
Anaerobic Field Test(in seconds)	11.17+0.75	11.39+0.663	-0.22	.1611	-1.321	9	.219
Short service test(in points)	4.6+1.34	4.6+0.96609	0.00	.47140	0.0	9	1.00
Game Performance Test							
Game performance	1.7+0.67495	1.6+0.5164	0.10	.23333	.429	9	.678

* Significant at 0.05 level, Table value-2.262

Table-4 shows the mean value from pre to post-test in the performance and skill performance variables were: 0.09sec and -.01 Centimetre's (Strength), 0.02sec and 0.8sec (Agility), -.0.22sec and 0.0 points (Skill performance), 0.10 (Game performance) Overall playing ability test. Badminton game performance of the players was measured out of ten points by a panel of three qualified coaches during actual competition and the average of three scores was considered as game performance of the badminton players.

Table also shows the obtained 't' values of pre to post-test mean differences on performance, skill performance and game performance variables were: 1.76sec-0.24 Centimetres (strength), 0.526sec, -0.57sec (Agility), -1.32 sec, 0.50 in points (Skill performance), 0.00 coach rated points (Game performance) Overall playing ability test.

The obtained 't' values were tested at 0.05 level of significance. Since the calculated 't' values were lesser than the table 't' value at 0.05 level for degrees of freedom 9. Null hypothesis was rejected at 0.05 levels of significance and formulated research hypothesis was accepted. Thus it was concluded that six weeks of controlled group program showed no significant improvement in strength, agility, skills and overall playing ability (Game performance), as the study the above remark can be given at 95% confidence.

Result

After 6 weeks of training the training group showed significance improvement in all the variables while those in the controlled group unchanged. When comparing post-test result between the training group and the controlled group, it was found that combined training group (Strength and Agility) and game performance in the training group were significantly greater than those in the controlled group.

Discussion

The purpose of this study was to demonstrate the efforts of short term combined training (strength training, agility) on badminton player of age group of under-12 years of badminton players who is playing for state ranking tournaments. The result in this study showed that 6 weeks of combined training (Strength and Agility) could significantly improve the game performance in the badminton players. These findings support several previous studies which have suggested that combined training (Strength and Agility) can enhance badminton ability.

Suggestions

1. The proposed Combined training (strength training and agility training) program should be a part of the physical preparation for badminton players because of its significant effectiveness in improving the skill of the Badminton players.

2. The present study was a pilot study so significant differences in leg muscle power were found and quick movement of Forward, lateral and backward movement were found. A research should include more volunteers which may result in a better sample and possibly a significant difference in game performance between the training groups and controlled group.

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