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Effect of weight training and strength training on selected physical fitness components of badminton players

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Abstract
The Purpose of the Study was to find out the effect of weight training and strength training on selected physical fitness components of badminton players. To achieve the purpose of the study (N=30) thirty men badminton players were selected from the affiliated colleges of Bharathidasan University, Tiruchirappalli, Tamilnadu, India as subjects. The age of the subjects ranged from 19 to 23 years. The selected subjects were divided into three equal groups (N=10). Group I underwent weight training. Group II underwent strength training. Group III acted as control group who did not undergo any specialized training program other than their daily routine. The physical fitness components such as muscular strength, muscular endurance, agility, speed and flexibility were selected as dependent variables. The physical fitness components were assessed by one repetition maximum (1RM) bench press test, sit-ups test (1 minute), Illinois agility run test, 50meter dash and sit and reach test respectively. The subjects were concerned with their particular training for a period of twelve weeks, alternatively three days per week. The collected data from three groups prior to and immediately after the training programme on selected criterion factors were statistically analyzed with analysis of covariance (ANCOVA). The level of confidence was fixed at 0.05 for all the cases to test the hypothesis. The result of the study reveals that the weight training group demonstrated greater gains in muscular strength and muscular endurance, while the strength training group showed notable improvement in agility, speed and flexibility of college men badminton players.

Keywords: Weight training, strength training, muscular strength, muscular endurance, agility, speed and flexibility

Introduction

Sports training encourage discipline, collaboration and a dedication to reaching personal or professional objectives, whether for competitive athletes or fitness enthusiasts. Sports training aids in achieving peak performance while advancing general health and wellbeing by methodically advancing and adjusting to an athlete's demands. Enhancing an athlete's entire physical, technical, tactical and mental skills to succeed in a certain sport or physical activity is the goal of sports training, which is a thorough and methodical approach. Strength, speed, endurance, flexibility and agility are all improved, while sport-specific abilities like coordination, precision, and decision-making are sharpened through a variety of workouts, drills, and techniques. Scientific concepts like specificity, overload, progression, and recovery serve as the foundation for the training regimen, which guarantees that the athlete may adjust, become better, and maintain peak performance. In order to develop resilience and sustain top performance, sports training also include elements like injury prevention, healthy eating, and psychological preparedness [1].

Weight training, also known as resistance training, refers to a system of physical conditioning in which muscles are worked against load or resistance, using free weights (like barbells and dumbbells), machines, body weight, or other tools [2]. The principle of *progressive overload* gradually increasing the load or intensity over time is fundamental to eliciting adaptations such as increased muscle strength, hypertrophy (muscle size), enhanced endurance, and better neuromuscular coordination [3]**.** Historically, weight training has roots going back to ancient times (e.g. Milo of Croton in Greece), where progressive resistance (carrying a growing animal) was used to build strength [4]. In modern society, its applications have expanded far beyond athletics or bodybuilding: weight training is now widely recognized for its role in public health, rehabilitation, aging, metabolic health, and chronic disease prevention [5].

Strength trainingoften referred to as resistance training, involves exerting muscles against some form of resistance (free weights, machines, bands or body weight) to improve strength, muscular fitness and overall health [6]. It is increasingly recognized as a key component not just in athletic development but in public health, pediatric fitness and geriatric care [7]. Recent meta-analytic evidence shows that in older populations with osteosarcopenia, strength training significantly improves muscle mass, handgrip strength and physical performance, especially when combined with adequate protein or calcium intake. In children and adolescents, supervised strength training programs lasting 6-12 weeks with 2-3 sessions per week produce meaningful improvements in upper and lower body strength, aerobic capacity (VO_2max) and sprint performance [8]. Moreover, the youth-focused review "the era of resistance training as a primary form of physical activity for physical fitness and health in youth has come" emphasizes that resistance training is now considered as essential as aerobic activity for achieving health and fitness benefits in younger cohorts [9].

Badminton is a fast-paced racquet sport that requires a blend of agility, speed, power, endurance, and tactical intelligence. It is played either in singles (one player per side) or doubles (two players per side), where players use rackets to hit a shuttlecock over a net into the opponent's court. The objective is to land the shuttle within the boundaries of

the opponent's court in such a way that it cannot be returned. Originating from the ancient game of "Poona" played in India during the 19th century; badminton was formalized in England and took its modern name from Badminton House in Gloucestershire. The Badminton World Federation (BWF), established in 1934, is the global governing body that standardizes the rules, organizes world championships, and promotes the sport internationally. Badminton demands a combination of aerobic and anaerobic fitness, as rallies can involve intense bursts of movement interspersed with brief recovery periods. It enhances various components of physical fitness such as agility, coordination, reaction time, flexibility, and muscular endurance. The sport also requires a deep understanding of tactical play, including shot placement, deception, and anticipation of the opponent's movements. The modern game emphasizes scientific approaches to training, nutrition, biomechanics, and psychological preparation to optimize performance. Technological advancements in racket design, shuttle materials, and video analysis have further revolutionized how the game is played and taught. In educational and professional settings, badminton is recognized not only as a competitive sport but also as an excellent medium for physical education, promoting teamwork, concentration, and lifelong fitness habits [10].

Objectives

This study was designed to investigate the effect of weight training and strength training on selected physical fitness components of badminton players.

Methodology

To achieve the purpose of the study (N=30) thirty men football players were selected from affiliated colleges of Bharathidasan University, Tiruchirappalli, Tamilnadu, India as subjects. The age of the subjects ranged from 19 to 23 years. The selected subjects were divided into three equal groups (N=10). Group I underwent weight training. Group II underwent strength training. Group III acted as control group who did not undergo any specialized training program other than their daily routine. The physical fitness components such as muscular strength, muscular endurance, agility, speed and flexibility were selected as dependent variables. The physical fitness components were assessed by one repetition maximum (1RM) bench press test, sit – ups test (1 minute), Illinois agility run test, 50meter dash and sit and reach test. The subjects were concerned with their particular training for a period of twelve weeks, alternatively three days per week. The collected data from three groups prior to and immediately after the training programme on selected criterion factors were statistically analyzed with analysis of covariance (ANCOVA). The level of confidence was fixed at 0.05 for all the cases to test the hypothesis. The result of the study reveals that the weight training group demonstrated greater gains in muscular strength and muscular endurance, while the strength training group showed notable improvement in agility, speed and flexibility of college men badminton players.

Results

Table 1: Computation of Analysis of Covariance of Means of Weight Training, Strength Training and Control Group on Muscular Strength, Muscular Endurance, Agility, Speed and Flexibility (In Kg, Counts, Seconds and Centimetres)

Variables	Test	Weight Training (WTG)	Strength Training (STG)	Control Group (CG)	SoV	SS	df	MS	'F' Ratio
Muscular Strength	Pre-Test Mean	45.30	44.90	45.10	BW	2.81	2	1.405	0.08
					WI	463.00	27	17.148	
	Post Test Mean	55.70	52.10	45.80	BW	312.48	2	156.24	18.56*
					WI	226.90	27	8.40	
	Adjusted Post Test Mean	55.45	52.25	45.90	BW	286.25	2	143.12	27.68*
					WI	139.70	26	5.37	
Muscular Endurance	Pre-Test Mean	35.20	34.80	35.00	BW	4.22	2	2.11	0.26
					WI	215.30	27	7.97	
	Post Test Mean	43.60	41.90	35.50	BW	280.76	2	140.38	20.85*
					WI	181.80	27	6.73	
	Adjusted Post Test Mean	43.35	42.05	35.45	BW	224.85	2	112.43	23.90*
					WI	122.33	26	4.70	
Agility	Pre-Test Mean	17.82	17.79	17.76	BW	0.012	2	0.006	0.01
					WI	14.88	27	0.551	
	Post Test Mean	16.55	16.20	17.65	BW	7.42	2	3.71	14.22*
					WI	7.05	27	0.26	
	Adjusted Post Test Mean	16.60	16.25	17.63	BW	6.24	2	3.12	18.75*
					WI	4.32	26	0.17	
Speed	Pre – Test Mean	7.35	7.33	7.32	BW	0.008	2	0.004	0.02
					WI	13.29	27	0.492	
	Post Test Mean	6.82	6.70	7.28	BW	2.61	2	1.305	11.90*
					WI	2.98	27	0.11	
	Adjusted Post Test Mean	6.85	6.75	7.27	BW	2.21	2	1.105	12.85*
					WI	2.22	26	0.085	
Flexibility	Pre – Test Mean	19.90	19.70	19.80	BW	0.37	2	0.185	0.05
					WI	204.30	27	7.567	
	Post Test Mean	22.80	23.50	19.95	BW	62.10	2	31.05	15.74*
					WI	53.25	27	1.974	
	Adjusted Post Test Mean	22.85	23.45	19.98	BW	55.18	2	27.59	19.22*
					WI	37.32	26	1.435	

*****Table value required for significant at 0.05 (Table with df 2 and 27 and 2 and 26 are 3.36and 3.37 respectively)

The pretest, post-test and adjusted post-test mean values of Muscular Strength on Weight Training Group (WTG), Strength Training Group (STG) and Control Group (CG) were 45.30, 55.70, 55.45; 44.90, 52.10, 52.25; 45.10, 45.80, 45.90, respectively.

The pretest, post-test and adjusted post-test mean values of Muscular Endurance on Weight Training Group (WTG), Strength Training Group (STG) and Control Group (CG) were 35.20, 43.60, 43.35; 34.80, 41.90, 42.05; 35.00, 35.50, 35.45, respectively.

The pretest, post-test and adjusted post-test mean values of Agility on Weight Training Group (WTG), Strength Training Group (STG) and Control Group (CG) were 17.82, 16.55, 16.60; 17.79, 16.20, 16.25; 17.76, 17.65, 17.63, respectively.

The pretest, post-test and adjusted post-test mean values of Speed on Weight Training Group (WTG), Strength Training Group (STG) and Control Group (CG) were 7.35, 6.82, 6.85; 7.33, 6.70, 6.75; 7.32, 7.28, 7.27, respectively.

The pretest, post-test and adjusted post-test mean values of Flexibility on Weight Training Group (WTG), Strength Training Group (STG) and Control Group (CG) were 19.90, 22.80, 22.85; 19.70, 23.50, 23.45; 19.80, 19.95, 19.98, respectively.

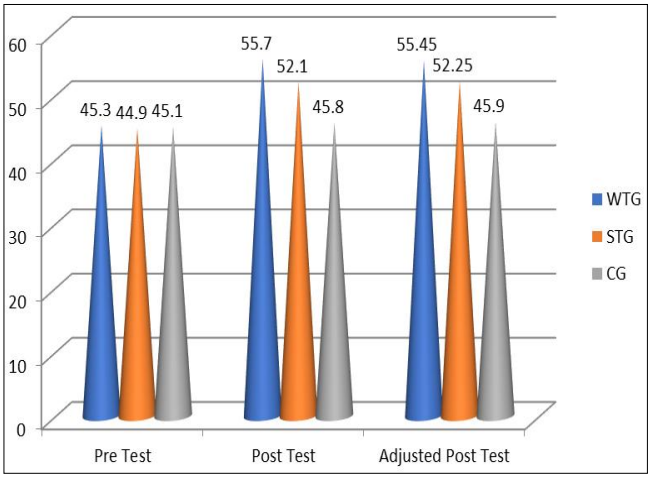

Fig 1: Pre-Test, Post Test and Adjusted Post Test Means of Weight Training, Strength Training and Control Group on Muscular Strength

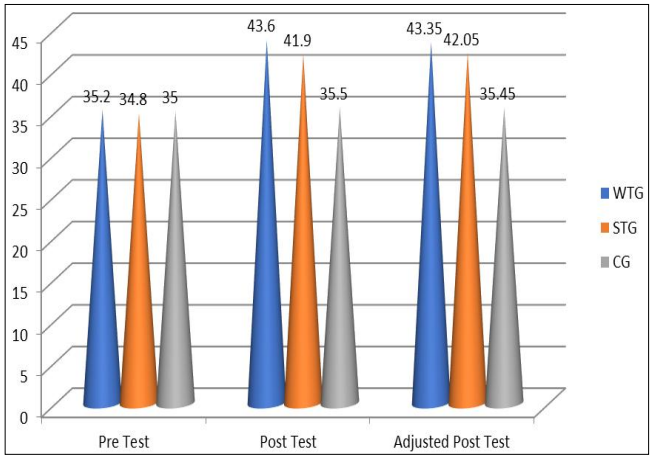

Fig 2: Pre-Test, Post Test and Adjusted Post Test Means of Weight Training, Strength Training and Control Group on Muscular Endurance

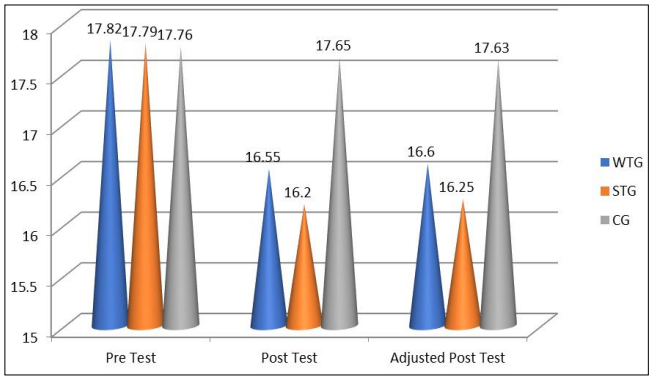

Fig 3: Pre-Test, Post Test and Adjusted Post Test Means of Weight Training, Strength Training and Control Group on Agility

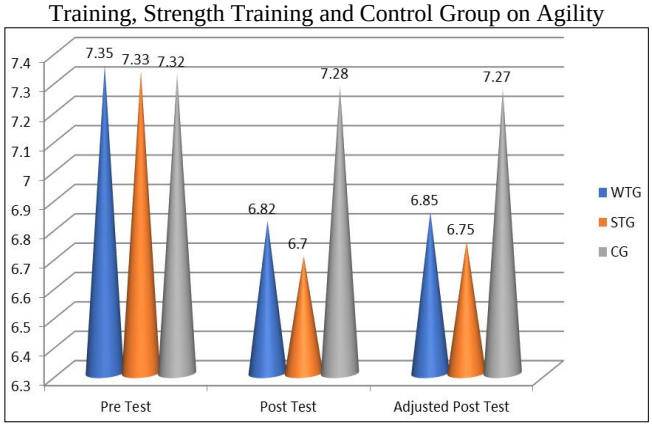

Fig 4: Pre-Test, Post Test and Adjusted Post Test Means of Weight Training, Strength Training and Control Group on Speed

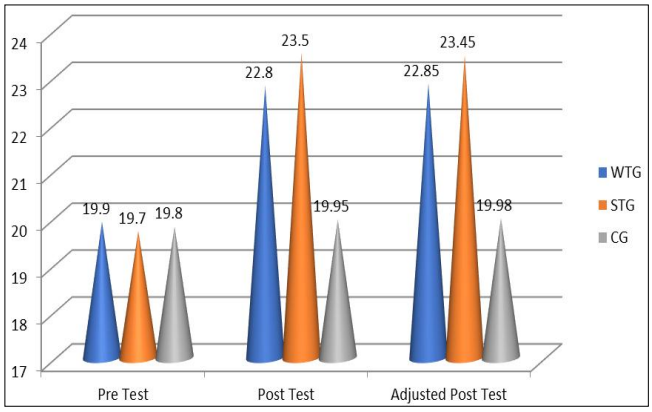

Fig 5: Pre-Test, Post Test and Adjusted Post Test Means of Weight Training, Strength Training and Control Group on Flexibility

The F value of adjusted post-test on Muscular Strength, Muscular Endurance, Agility, Speed and Flexibility were 27.68; 23.90; 18.75; 12.85; and 19.22 respectively. The obtained F values of adjusted post-test were greater than the table value of 3.37. Hence it was proved that there were significant improvements on weight training group demonstrated greater gains in muscular strength and muscular endurance, while the strength training group showed notable improvement in agility, speed and flexibility of college men badminton players.

Discussion on Findings

The result of the study indicated that the experimental group namely as weight training and strength training had

significantly improved in the selected physical fitness components namely muscular strength, muscular endurance, agility, speed and flexibility. It is also found that the improvement caused by weight training group demonstrated greater gains in muscular strength and muscular endurance, while the strength training group showed notable improvement in agility, speed and flexibility. The results of the studies are in line with the studies of (Wang, et.al., 2025) and (Krueger, 2025) [11, 12]

Conclusions

The experimental groups namely as weight training group and strength training group had achieved significant improvement on selected physical fitness components such as muscular strength, muscular endurance, agility, speed and flexibility when compared to the control group.

It was concluded that the weight training group demonstrated greater gains in muscular strength and muscular endurancewhen compared to the strength training group.

It was concluded that the strength training group showed notable improvement in agility, speed and flexibility when compared to the weight training group.

It was concluded that college level badminton players should practice weight training and strength training for the positive development of physical fitness and enhancement of playing performance.

References

1. Bompa TO, Buzzichelli C. Periodization: Theory and Methodology of Training. Human Kinetics, 2019.
2. Kirk A, Steele J, Fisher JP. Machine-Based Resistance Training Improves Functional Capacity in Older Adults: A Systematic Review and Meta-Analysis. Journal of Functional Morphology and Kinesiology,2024:9(4):239.
3. Choudhary R, Kumar S. Effect of Weight Training on Selected Physical Fitness Components among Badminton Players. International Journal of Physical Education, Sports and Health,2020:7(2):45–49.
4. Faigenbaum AD, Myer GD. Resistance Training among Young Athletes: Safety, Efficacy and Injury Prevention Effects. British Journal of Sports Medicine,2010:44(1):56–63.
5. Kraemer WJ, Ratamess NA. Fundamentals of Resistance Training: Progression and Exercise Prescription. Medicine Science in Sports Exercise,2004:36(4):674–688.
6. Hernandez-Martinez J, Branco BHM, Vasquez-Carrasco E, Cid-Calfucura I, Herrera-Valenzuela T, Guzmán-Muñoz E, Valdés-Badilla P. Effects of Strength Training on Body Composition, Physical Performance, and Protein or Calcium Intake in Older People with Osteosarcopenia: Meta-Analysis. Nutrients,2025:17(17):2852.
7. Baechle TR, Earle RW. Essentials of Strength Training and Conditioning. Human Kinetics, 2019.
8. Kumar P, Singh A. The Influence of Strength Training on Performance and Endurance of Badminton Players. Journal of Sports Science and Physical Education,2021:8(2):55–60.
9. Jayachandran N, Arumugam S. Comparative Study on Effect of Strength Training and Circuit Training on Muscular Strength and Endurance among Badminton Players. International Journal of Physiology, Nutrition and Physical Education,2018:3(1):120–123.
10. Ramesh K. Badminton: The Complete Guide to Tactics, Training, and Technique. KhelSahitya Kendra, 2015.
11. Wang T, Yee Guan N, Amri S, Kamalden TF, Gao Z. Effects of Resistance Training on Performance in Competitive Badminton Players: A Systematic Review. Frontiers in Physiology, 2025, 16.
12. Krueger JE. Strength over Specificity: Building the Athlete, not the Skill in Strength and Conditioning. Strength and Conditioning Journal,2025:47(2):15–22.