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A Study on the Impact of Special Aided Training on Badminton Players' Personal Fitness

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ABSTRACT
Introduction: Strength training, which is recommended for improving endurance and controlling muscle hypertrophy, involves using loads that are larger than 75% of the individual's 1RM (one-repetition maximum test). Due to the inherent advantages of the power of muscle contraction explosion, it is thought that with this approach, badminton players' performance can be enhanced.
Objective:Determine the effects of strength training on badminton players' physical fitness.
Methods: Experimental and control groups were created by randomly selecting 24 volunteer young badminton players. Before and after the experiment, First Beat® was used to record the experimental data, and the experimental group received high-load training.
Results: The experimental group's action speed decreased, going from 216.46 km/h to 240.81 km/h, but its release speed rose, going from 293.79 km/h to 364.25 km/h. The control group exhibited no statistically significant difference, but the release velocity was greatly improved, raising the net velocity from 169.57 km/h to 200.94 km/h.
Conclusion: Special Aided strength training considerably increased the physical condition of badminton players, which had a major impact on their finishing skills.
Keywords: Resistance Training; Badminton; Athletes; Physical Fitness.

Introduction:- In the badminton competition, badminton plays a significant role as an adversarial sport. Killing the ball is a crucial part of the backcourt attack because badminton is a relatively light sport and the movements are quick.[1] It plays a significant role in the attack and has a high rate of success. Since the inception of the four-ball game until the present, when the opposing side is compelled to find opportunities to assault the backcourt, attacking has become more and more important in badminton.[2] It is vital to speed up and manage the game's rhythm in order to gradually lower the proportion of high balls used. The game will be easier to watch if the pace of play picks up and the offence is improved. Therefore, it is essential to kill the ball precisely and sensibly in order to directly produce the score and open up the opportunity for the next row's attack.[3] Increasing the opponent's defensive pressure and mastering the game's rhythm are also essential for victory. The action of killing the ball must be examined and studied in order to win the game, regardless of the type of killing procedure used. The methods of scoring have gradually changed due to the variety of badminton technology.[4] Regardless of the method of killing, the action must be examined and investigated using biomechanics. Before performing core strength training on the deep muscles to get the maximum killing speed, the nerves on the body must be triggered by the athletes' muscular movements.[5] The stability of the players and the synchronization of their movements can be used in badminton instruction to enhance the players' physical attributes and to address the game's movement-based challenges. The quality of the killing must be improved in order to improve the killing technique.[6] In this essay, we'll discuss how specific training might help badminton players become stronger and play with more force. We'll do this by looking into pertinent literature. We must do offensive training on the quality level of athletes if we hope to increase their actual battle readiness.[7]

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METHODOLOGY

Study subject

The young badminton players at the training facility are chosen as the primary research subjects in this essay. The research subjects are 24 male badminton players in total. The Ethics Committee of regional Badminton association examined and authorized the study and all of the participants. Women athletes are not chosen as research subjects because of gender variations that could impact the efficacy of the findings. Every subject needs to have a physical examination before instruction. Then, using a random number generator, all of the young badminton players were split into an experimental group and a control group. After the training, none of the subjects experienced ongoing knee, back, or ankle pain. The hitting action is not problematic. Details on the study object are provided in Table 1. The training lasted for 12 weeks throughout the duration of the investigation. Of course, each athlete needs to train for 2.5 hours prior to each course. The next step is a 40-minute high-load training session for each athlete. Each badminton player needs to unwind and recuperate during this time.

Table1. Basic information of two groups of subjects (N=12).

Test indicators	Age(years)	Height(cm)	Bodyweight(kg)
Experience group	22.10±1.568	177.07±2.832	72.45±1.760
Control group	21.61±1.228	178.36±2.918	75.48±1.947
t	0.4202	0.3460	-0.2821
P	0.7265	0.6214	0.4677

Research Techniques

Experienced badminton coaches provided advice on badminton players' endurance speed during the trial and compared it to the training progress of each group of young badminton players. The badminton training facility was where the experiment was carried out. Each athlete participated in the test while wearing a heart rate monitor, and they were split into three groups based on the intensity of the exercise. There was an open area for training for each group. Various training methodologies are used. A period of recovery is necessary following the conclusion of the game. Each exam has a precise time limit as well as a rest period. Every regulation is followed in accordance with how the simulated game is played.Young badminton players need to be instructed to maintain their exercise posture during the simulated match. In the first four weeks, side-by-side jumps, open-close jumps, lunge jumps, etc. form the foundation of the workouts. Speed competitions must be held in the fifth through eighth weeks on the basis of preparation. Different young badminton players must retain their fluidity of movement, and all body joints must keep a healthy posture for movement. International badminton regulations state that players must warm up and stretch dynamically for the first 15 minutes of a match, adjust their rest period by 10 minutes, and wear heart rate monitors during simulation matches when playing at a professional level.

Gathering and processing of data: All the data for this study were tracked, recognized, and gathered before being recorded into Excel tables. The approach of analysis and matching is utilized for testing when separate software is used for analysis and statistics.

Control of experiment-related factors: Controlling and understanding a few environmental factors from outside the experiment is required. Of course, standard training is required for every member of the experiment's crew. The measuring professionals involved in the experiment before and after the test can only conduct the test once the test has met the unified test requirements. It is

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necessary for all test sites and test procedures to be uniform. Young players of badminton must perform a speed endurance test. Young badminton players should be guided to warm up according to their specific composite training in order to prevent sports injuries. All young badminton players must have their exercise intensity and duration strictly regulated during the trial in order to ensure the validity of the experimental findings. The badminton players in the experimental group and the control group must rigorously regulate the course arrangement and training during the training experiment; they are not required to perform any other type of training at other times.

RESULTS

Effects of heavy training on badminton players' athletic ability

The physical fitness differences between the experimental group and the control group of badminton players are shown in Table 2.By comparing the data in Table 2 before and after the experiment, it can be shown that the badminton players in the experimental group's physical fitness level was improved by the high load training, however there was no statistically significant difference in the physical fitness level of the control group. Through high-load training during everyday practice, badminton players can raise their physical level, which in turn will increase their strength and serving range. The variations in the specific markers of badminton players between the experimental group and the control group are shown in Table 3. In contrast to the control group, the high load training greatly enhanced the particular indicators of badminton players, according to a comparison of the data from before and after the trial in Table 3. To help badminton players serve and receive the ball more quickly, high load training can be added to the regular training.

Effect of heavy training on a player's ability to kill in badminton: The effects of high-load training on badminton players' killing abilities are shown in Table 4 as a consequence. The experimental group and the control group's movement speed, release speed, net speed, landing time, and other statistics are compared in Table 4 before and after the experiment. High-intensity training can raise badminton players' degree of killing ability and significantly raise their level of professionalism.

Table2. Effect of high load training on the physical fitness of badminton players (N=12).

Beforeexperiment	**30sshortropejump**	**1minsit-ups**	**1minpronefrombothends**	**Badmintonthrowdistance(m)**
Experience group	79.97±6.979	47.36±6.222	29.25±7.772	7.87±1.058
Control group	75.71±7.455	46.24±5.631	32.71±8.359	7.65±0.819
t	1.8925	-0.3757	0.9740	-1.1510
p	0.0395	0.0418	0.0568	0.0389
er experiment	**30sshortropejump**	**1minsit-ups**	**1minpronefrombothends**	**Badmintonthrowdistance(m)**
perience group	82.47±8.171	54.24±4.874	37.08±6.712	8.50±0.751
Control group	76.65±7.296	48.70±5.550	35.95±8.319	7.97±0.649
t	2.2473	-2.4519	-0.4870	-2.6585
p	0.0617	0.0537	0.0678	0.0521

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Table3. Effect of high load training on special indexes of badminton players (N=12).

Beforeexperiment	Straightturnback run(s)	Lowcenterofgravitycornerrun(s)	Leftandrightedgetouch(s)
Experience group	9.16±0.345	17.40±0.889	28.44±1.609
Control group	9.54±0.208	17.21±0.984	28.99±1.321
t	-1.8807	1.6817	-1.2205
p	0.0343	0.0472	0.0304
After experiment	**Straightturnback run(s)**	**Lowcenterofgravitycornerrun(s)**	**Leftandrightedgetouch(s)**
Experience group	8.74±0.375	16.27±1.059	28.21±1.365
Control group	9.51±0.188	17.14±1.289	28.94±1.390
t	-2.7175	-2.1583	-1.0004
p	0.0543	0.0314	0.0645

Table4. Effectofhighloadtrainingonforehandkillingtechniqueofbadmintonplayers(N=12).

Beforeexperiment	Operatingspeed(km/h)	Releasespeed(km/h)	Networkspeed(km/h)	Landingtime(s)
Experience group	216.46±10.573	293.79±19.155	169.57±15.991	0.52±0.691
Control group	220.65±10.436	287.22±22.037	172.05±17.622	0.57±0.596
t	-7.7671	-10.9496	-7.3861	7.9601
p	0.0601	0.0438	0.0534	0.0455
After experiment	**Operatingspeed(km/h)**	**Releasespeed(km/h)**	**Networkspeed(km/h)**	**Landingtime(s)**
Experience group	240.81±11.194	364.25±20.948	200.94±6.410	0.36±0.557
Control group	232.36±8.545	340.51±19.828	186.02±15.712	0.44±0.533
t	-7.6173	-6.3216	-7.3607	10.7795
p	0.0474	0.0658	0.0727	0.0785

DISCUSSION

As a skill-based sport, badminton demands a high level of physical conditioning from competitors in terms of flexibility and speed sensitivity. It must continue to participate actively in the competition process to simultaneously increase physical fitness and specialty abilities and provide superior results. Both newcomers and experienced badminton players need to improve and make advancements in a variety of areas. All backcourt kills must be proactive, and all strong slam dunks will consider the impact of line landing, speed, and other factors when killing. Utilising blind technology to kill the ball will drain a lot of your physical energy and place you in a passive state. The role will be increasingly significant throughout the entire game the higher the tactical position.

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The entire technique begins with killing the ball, which can also serve as the crucial turning point for the entire round. In order to take the game's initiative and effectively end the current round while using the least amount of physical energy possible and laying the groundwork for future games, it is necessary to deploy ball-killing technology in all tournaments. Based on the analysis of the current situation, we can infer that the deterrent force is greater the faster the backcourt releases the ball, the quicker the opponent reacts, and the quicker the backcourt releases the ball, the faster the ability to play the flat lob, drop ball, high ball, etc. is. The more quickly a shot changes during a game, the more precisely you can assess your opponent's errors. The athlete's wrist and finger joints must be transferred in order to transmit the release speed as quickly as possible. Maximizing the effectiveness of upper limb muscles at the end of power transmission is essential to ensuring the efficiency of power and speed transmission. The results of the study demonstrate the necessity of encouraging the strength growth of the training load at the maximum load in order to guarantee the entire activity of muscle fibres to the maximum strength. Due to the high speed and intensity of movement during high-load training, several functional systems can be viewed from various angles. The energy supply system can provide the primary energy because of the movement's high speed and intensity. The amount of intermittent rest time will also have an impact on the recovery of function for various training programmes. It is required to equitably distribute the reasonable frequency of the composite group number in order to effectively increase the energy supply capacity of the energy supply system. According to several research, athletes' phosphate source concentrations may be impacted by high-load training. High-intensity resistance force will also be stimulated throughout training as muscle mass increases. During high-load training, a full-body explosive resistance exercise was performed in order to efficiently increase the overall phosphate function system's capability. Following the enhancement of the body's coordination, it can aid in energy repair and be employed to prevent competitive tiredness.

CONCLUSION

This paper can conclude that high-load special aided strength training for badminton players can significantly improve the physical fitness of the badminton players, and that the badminton players can prepare for the badminton match with better physical fitness through comparative analysis of the physical fitness, special indicators, and killing skills of the experimental group and the control group of badminton players before and after the experiment. The specific characteristics of badminton players may also be greatly enhanced by high-load training, and it has also dramatically reduced the time required for straight turn back running, low center of gravity corner running, and left and right-side touch. More importantly, high-load training can greatly enhance a player's ability to kill, including movement speed, release speed, net speed, landing time, and other factors. This serves as a resource for badminton players' daily practice. We can further develop the killing techniques of badminton players by including high-load training into their regular workouts, allowing Indian badminton players to perform better in sporting events, bring home more gold medals for India, and bring honor to their nation.

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