

# The Application of Functional Training in Badminton Teaching: Basis for Induction Program for Beginners

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**Abstract:** This study selected 40 students randomly selected from the badminton general training class of Hanjiang Normal College as the experimental subjects, and grouped the sampled students for teaching experiments, the experimental class used the teaching mode of integrating functional training, and the control class used the conventional badminton technical teaching and course organization, and conducted a comparative analysis of the experimental group's and the control group's students' physical fitness, functional status, badminton technical level, and interest in learning the badminton course before and after the experiment to assess the impact of functional training on the learning of basic badminton techniques. After the teaching experiment, the physical quality, functional condition, badminton skill level, badminton course learning interest of the students in the experimental group and the control group were analyzed before and after the experiment, in order to assess the influence of functional training integrated into the teaching of badminton introductory skills on the learning of basic badminton skills.

**Keywords:** Functional Training, Badminton Teaching, Badminton Training, Introductory Courses.

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## 1. Introduction

As one of the competitive sports, badminton is deeply loved by the majority of students. Badminton belongs to the skills dominant class net confrontation project, the project extremely high demand for physical quality, almost every turn in constantly do speed and kick turn movement, especially in modern competitive sports, the athletes strength balance with outstanding explosive force, rapid response and moving speed is a prerequisite for playing badminton to win the game. By this token, the activation and promotion of the special body function is particularly critical. However, the traditional badminton teaching and training methods focus on the learning of technical movements and high-intensity practice, ignoring the basic physical strength, physical quality and functional movements needed to support the technical movements of badminton. So how to improve the physical quality of badminton skills more scientifically and effectively has become an important problem facing badminton teaching. Therefore, this study attempts to integrate functional training into the teaching of badminton beginners to explore whether functional training can produce good practical results in badminton teaching.

## 2. Methodology

### 2.1. Object of Study

This study focuses on the application of functional training in primary badminton teaching.

### 2.2. Research Methods

This study mainly uses teaching experiment and mathematical statistics methods.

This study primarily investigates the application of functional training in the technical learning of badminton beginners through teaching experiments. The research design mainly unfolds experimental studies in the form of teaching experiments. Before the experiment, the physical fitness and functional movement screening of 20 male and 20 female

students who have never participated in badminton learning were tested to collect data and compare the test scores of students in the experimental group with those in the control group. Statistical analysis was conducted on the pre-test scores of both groups, and subsequent experiments and data collection were carried out under the condition that there were no significant differences between the two groups. Both the experimental group and the control group used the teaching syllabus of the Badminton General Course at Hanjiang Normal University for regular teaching. The experimental group integrated functional training content into regular teaching, while the control group used traditional teaching and training content in regular teaching. After the experiment, the physical fitness, functional movement screening test, and badminton technical scores were tested again according to the pre-experimental test indicators, and data were collected for statistical comparison and analysis. The study explores the positive role of functional movement training in enhancing the technical skills of beginner badminton players and verifies the effectiveness of functional training on badminton technical practice.

## 3. Results

### 3.1. Comparison of the Results of Badminton Special Physical Test and Functional Screening Test Between Experimental Group and Control Group before Experiment

#### 3.1.1. Comparison of Special Physical Fitness Test Results of Badminton Between Experimental Group and Control Group before Experiment

Badminton technique is very demanding in terms of physical fitness and hitting skills, mainly utilizing a variety of movement paces, hitting maneuvers, random responses, and the ability to coordinate the hands and feet (M., Laffaye, G. (2015)). These technical requirements are highly dependent on the athlete's physical qualities such as speed, strength,

agility, and endurance. Therefore, the basic physical quality of athletes is crucial for learning and mastering badminton techniques. In order to ensure the scientificity and validity of the experiment, we will conduct special physical quality tests on the subjects before the experiment starts. These tests include 6-meter 20-times folding run, 1-minute rope skipping, standing long jump, badminton throw, and 1500-meter run. Through these tests, we can have a comprehensive understanding of the physical fitness of the experimental

subjects and promote the teaching experiment according to the specific planning of the experiment. These test items provide a comprehensive understanding of the physical fitness of the subject students, thus providing them with targeted training and improvement suggestions for better performance in badminton training and competition. In order to make the experimental pre-test data more reasonable and reliable, comprehensive data were analyzed and compared statistically.

**Tab 1.** Comparison of data on the results of badminton specific physical fitness test between the experimental group and the control group before the experiment

| Analyzed items                        | Group              | Sample size | Mean value | Standard deviation | Difference of mean values | <i>t</i> | <i>df</i> | <i>p</i> |
|---------------------------------------|--------------------|-------------|------------|--------------------|---------------------------|----------|-----------|----------|
| 20 back-to-back 6-meter runs(seconds) | Experimental group | 20          | 85.77      | 9.67               | 0.27                      | 0.090    | 38.000    | 0.929    |
|                                       | Control group      | 20          | 85.50      | 9.28               |                           |          |           |          |
| 1 minute jump rope(reps)              | Experimental group | 20          | 148.90     | 26.94              | -3.15                     | -0.405   | 38.000    | 0.688    |
|                                       | Control group      | 20          | 152.05     | 22.06              |                           |          |           |          |
| standing long jump(meters)            | Experimental group | 20          | 2.23       | 0.34               | 0.00                      | 0.000    | 38.000    | 1.000    |
|                                       | Control group      | 20          | 2.23       | 0.35               |                           |          |           |          |
| shuttlecock Long throw(meters)        | Experimental group | 20          | 5.76       | 0.57               | -0.14                     | -0.693   | 38.000    | 0.492    |
|                                       | Control group      | 20          | 5.90       | 0.66               |                           |          |           |          |
| 1500m race(seconds)                   | Experimental group | 20          | 503.12     | 63.26              | -1.41                     | -0.072   | 38.000    | 0.943    |
|                                       | Control group      | 20          | 504.53     | 59.92              |                           |          |           |          |

\*  $p < 0.05$  \*\*  $p < 0.01$ , \* denotes significant difference, \*\* denotes highly significant difference.

According to the data in Table 1, the experimental group and the control group in the badminton special physical fitness test before the experiment, 20 back-to-back 6-meter runs, 1 minute jump rope, standing long jump, shuttlecock Long throw, 1500m race. There was no statistical difference in all items tested.

### 3.1.2. Comparison of Badminton Functional Movement Screening Test Results between Experimental Group and Control Group before Experiment

Before conducting the experiment, the physical condition and motor skill level of the experimental subjects in badminton can be assessed more comprehensively by conducting the screening test of their functional movements in badminton. The test items include: simulation test of badminton technical movements, sensitivity and reaction speed test, and simulation movement test of badminton game, etc. In this study, seven functional movements, namely, deep squat, hurdle racking step, straight line lunge, shoulder flexibility, active straight knee raise, trunk stability push-ups, and trunk rotational stability, were mainly used for the test. By testing and observing the quality of the experimental subjects' completion of these test items, possible problems of physical functional limitations, such as joint mobility, trunk stability, and flexibility coordination, can be analyzed. Based on these test results, individualized training programs can be developed and reasonable exercise movements can be

designed to help experimental subjects optimize the movement patterns of badminton and improve the efficiency of motor skill learning. These exercise movements may involve training content for improving badminton hitting techniques, enhancing explosive power and endurance, and improving speed and flexibility. Through systematic training, the experimental subjects can master the skills and tactics of badminton more quickly and improve the competitive level of the game. In addition, the reasonable design of exercise movements can also prevent the occurrence of sports injuries. By focusing on the training of the body's core stability, muscle balance and flexibility, it can reduce the bad posture and the risk of injury during exercise. At the same time, regular physical function assessment and training monitoring can also detect and correct potential problems in time to ensure the exercise health and safety of experimental subjects (McGuigan, M. R., & Winchester, J. B. (2008). ). In summary, it is expected that through the screening test of functional badminton movements and the design of personalized training plans, the movement patterns of experimental subjects can be effectively optimized, the learning efficiency of motor skills can be improved, and the occurrence of motor injuries can be prevented to the greatest extent possible, thus laying a good foundation for them to achieve a better performance in the field of badminton sports (Sun Guohui, Chen Guangcai, Zhang Qian.(2016)).

**Tab 2.** Comparison of data on the results of the functional movement screening test between the experimental and control groups before the experiment

| Analyzed items             | Group              | Sample size | Mean value | Standard deviation | Difference of mean values | t      | df     | p     |
|----------------------------|--------------------|-------------|------------|--------------------|---------------------------|--------|--------|-------|
| Deep Squat                 | Experimental group | 20          | 1.85       | 0.49               | 0.10                      | 0.607  | 38.000 | 0.547 |
|                            | Control group      | 20          | 1.75       | 0.55               |                           |        |        |       |
| Hurdle Step                | Experimental group | 20          | 1.85       | 0.49               | -0.05                     | -0.337 | 38.000 | 0.738 |
|                            | Control group      | 20          | 1.90       | 0.45               |                           |        |        |       |
| In-Line Lunge              | Experimental group | 20          | 2.00       | 0.32               | 0.15                      | 1.143  | 32.999 | 0.261 |
|                            | Control group      | 20          | 1.85       | 0.49               |                           |        |        |       |
| Shoulder Mobility          | Experimental group | 20          | 1.80       | 0.41               | -0.10                     | -0.872 | 38.000 | 0.389 |
|                            | Control group      | 20          | 1.90       | 0.31               |                           |        |        |       |
| Active Straight Leg Raise  | Experimental group | 20          | 1.45       | 0.60               | -0.25                     | -1.344 | 38.000 | 0.187 |
|                            | Control group      | 20          | 1.70       | 0.57               |                           |        |        |       |
| Trunk Stability-Push Up    | Experimental group | 20          | 1.85       | 0.37               | 0.10                      | 0.777  | 38.000 | 0.442 |
|                            | Control group      | 20          | 1.75       | 0.44               |                           |        |        |       |
| Rotary Stability-Quadruped | Experimental group | 20          | 1.30       | 0.47               | -0.10                     | -0.650 | 38.000 | 0.520 |
|                            | Control group      | 20          | 1.40       | 0.50               |                           |        |        |       |
| FMS total points           | Experimental group | 20          | 12.10      | 1.59               | -0.15                     | -0.255 | 38.000 | 0.800 |
|                            | Control group      | 20          | 12.25      | 2.10               |                           |        |        |       |

\* p<0.05 \*\* p<0.01, \* denotes significant difference, \*\* denotes highly significant difference.

According to the data in Table 2, in the functional screening test before the experiment, the experimental group and the control group Hurdle Step, In-Line Lunge, Shoulder Mobility, Active Straight Leg Raise, Trunk Stability-Push Up, Rotary There were no statistical differences in the Stability-Quadruped and FMS total points.

### 3.2. Comparative Analysis of Badminton Specialized Physical Fitness, Functional Movement Screening Test Results, and Badminton Technical Achievements of Students in the Experimental Group and the Control Group After the Experiment

#### 3.2.1. Comparative Analysis of Badminton Special Physical Ability between Experimental Group and Control Group after Experiment

**Tab 3.** Post-experimental Comparative analysis of the results of the badminton specific physical fitness test between students in the experimental group and the control group

| Test content                      | Group (mean ± standard deviation) |                      | t      | p       |
|-----------------------------------|-----------------------------------|----------------------|--------|---------|
|                                   | Experimental group (n=20)         | Control group (n=20) |        |         |
| 20 back-to-back 6-meter runs(sec) | 74.89±6.27                        | 85.30±9.29           | -4.153 | 0.000** |
| 1 minute jump rope(reps)          | 197.65±16.65                      | 152.05±23.24         | 7.134  | 0.000** |
| standing long jump(m)             | 2.37±0.34                         | 2.22±0.34            | 1.333  | 0.191   |
| shuttlecock Long throw(m)         | 7.16±0.98                         | 5.89±0.73            | 4.662  | 0.000** |
| 1500m race(sec)                   | 479.33±64.64                      | 504.38±60.58         | -1.265 | 0.214   |

\* p<0.05 \*\* p<0.01, \* denotes significant difference, \*\* denotes highly significant difference.

Compare the results according to the data shown in Table 3, comprehensive analysis clearly shows that the experimental group's overall performance was superior to that of the control group. In conclusion, the badminton training received by the experimental group significantly enhanced physical fitness aspects such as speed, explosive power, and coordination. These results provide strong support for the design and implementation of badminton training programs and offer valuable experience and reference for the physical fitness training of badminton athletes.

#### 3.2.2. Comparative Analysis of the Results of Badminton Functional Exercise Screening Test between Experimental Group and Control Group

Compare the results according to the data shown in Tab 4, the experimental group showed a significant improvement in the badminton functional movement screening test results compared to the control group, with the differences being statistically significant. The generally higher average scores of the experimental group suggest that the post-experiment training had a noticeable effect on physical fitness and

functional movement screening outcomes. The experimental group's overall better performance in the badminton functional movement screening test results indicates that the teaching organization form of the experimental group is superior to that of the control group.

**Tab 4.** Comparison of Badminton Functional Movement Screening Test Results between the Experimental and Control Groups after the Experiment

| Test content               | Group (mean ± standard deviation) |                      | t     | p       |
|----------------------------|-----------------------------------|----------------------|-------|---------|
|                            | Experimental group (n=20)         | Control group (n=20) |       |         |
| Deep Squat                 | 2.55±0.51                         | 1.70±0.73            | 4.257 | 0.000** |
| Hurdle Step                | 2.65±0.49                         | 2.05±0.51            | 3.795 | 0.001** |
| In-Line Lunge              | 2.70±0.47                         | 2.15±0.59            | 3.270 | 0.002** |
| Shoulder Mobility          | 2.60±0.50                         | 1.95±0.51            | 4.058 | 0.000** |
| Active Straight Leg Raise  | 2.50±0.51                         | 1.95±0.51            | 3.399 | 0.002** |
| Trunk Stability-Push Up    | 2.50±0.51                         | 1.85±0.37            | 4.611 | 0.000** |
| Rotary Stability-Quadruped | 2.45±0.51                         | 1.50±0.61            | 5.357 | 0.000** |
| FMS-Total score            | 17.95±1.67                        | 13.15±2.54           | 7.063 | 0.000** |

\* p<0.05 \*\* p<0.01,\* denotes significant difference, \*\* denotes highly significant difference.

### 3.2.3. Post-experiment Comparison and Analysis of Badminton Technical Scores between the Experimental Group and the Control Group Students.

**Tab 5.** Post-experiment comparison and analysis of badminton technical scores between the experimental

| Test content  | Group (mean ± standard deviation) |                      | t     | p       |
|---|-----------------------------------|----------------------|-------|---------|
|   | Experimental group (n=20)         | Control group (n=20) |       |         |
| forehand serve high backcourt shot (full score of 30)           | 23.75±3.45                        | 20.00±3.58           | 3.373 | 0.002** |
| Net forehand, backhand play, pick (full score of 40)            | 26.80±4.47                        | 18.50±4.15           | 6.088 | 0.000** |
| Forehand overhand position straight line lob (full score of 30) | 19.70±3.10                        | 17.50±3.28           | 2.179 | 0.036*  |
| Total Score   | 70.25±6.78                        | 56.00±7.73           | 6.196 | 0.000** |

\* p<0.05 \*\* p<0.01,\* denotes significant difference, \*\* denotes highly significant difference.

Compare the results according to the data shown in Table 5, the experimental group showed a significant advantage in all badminton technical score tests, especially in net forehand,

backhand play, pick, and overall technical scores. Although the difference in the Forehand overhand position straight line lob test was slightly lower, it still demonstrated that the experimental group's technical level was significantly better than the control group's. This leads to the conclusion that the teaching methods of the experimental group are effective in enhancing the mastery of badminton techniques for beginners.

## 4. Conclusion

(1) In terms of specialized physical quality, the test scores of 20 back-to-back 6-meter runs, 1 minute jump rope, shuttlecock long throw of the experimental group compared with the control group are very significant, but the enhancement of standing long jump and 1500m race is not particularly significant, thus indicating that functional training has a good effect on improving the students' badminton special needs, body coordination ability, arm swing coordination and so on. This shows that functional training has a very good effect on improving the students' badminton special needs such as the ability to run back and forth, the ability of body coordination, and the coordination of swinging arm power, etc., but it is not very obvious for the improvement of the endurance and comprehensive explosive ability, and the functional program for the endurance and comprehensive explosive power needs to be further optimized.

(2) In terms of functional movement scores, there is no significant difference between the experimental group and the control group in the Deep Squat and Active Straight Leg Raise items. According to the number ratio analysis, it is due to the fact that the two groups have improved to a certain extent in these two items, but the scores of the experimental group are significantly better than those of the control group in the comprehensive comparison of all the items, indicating that the functional training has a very positive impact on the improvement of functional ability. This shows that functional training has a very positive effect on the improvement of functional ability.

(3) In terms of basic badminton skills, the difference between the experimental group and the control group was statistically significant, and the difference was significant. It can be seen that the integration of functional training into the badminton teaching can effectively improve the learning efficiency of the badminton entry technology and improve the efficiency of students' mastering of the basic badminton entry technology.

(4) Badminton teaching effect, functional training into the badminton elementary basic technology teaching from the teaching atmosphere plays an effective role in regulating, in the classroom teaching is not only conducive to enriching the content structure of the course, but also help to stimulate the interest of students to practice, and then improve the enthusiasm of the students to practice in the classroom, and promote the students in the special functional enhancement to improve physical fitness and special technology.

(5) Through the teaching experiment of integrating functional training into the teaching of badminton elementary introductory course, it was found that the integration of functional training boards enriched the content of teaching, stimulated the students' interest in practicing in the class, and also proved that the functional training could not only improve the students' functional short boards in the short term, but also improve the special physical quality, effectively assist in improving the learning ability of technical movements, and improve the learning efficiency of badminton technical

movements. Learning efficiency.

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