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Effects of coordination training with circuit method on forehand drive skill ability

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Abstract

The purpose of this study was to determine eye-hand coordination training with the circuit method in improving forehand drive ability. Participants (n = 20) table tennis athletes aged 8-12 years, the research method used is experimental. The first stage of the procedure participants do a pre-test before doing the exercise, the second stage athletes are given exercise treatment, the third stage athletes do a posttest. Data collection using tests and measurements. The instrument uses a table tennis skill test. Data analysis using paired sample t-test. The results of this study indicate the comparison of pretest and posttest Sig values. 0.036, it can be said that these results have a significant difference or increase in results between the pre-test and post-test.

The conclusion of the study explains that hand-eye coordination training with the circuit method can improve forehand drive ability in table tennis for children aged 8-12 years.

Keywords: Hand-eye coordination, skill, table tennis, circuit training

1. Introduction

Table tennis is a sport that requires several combined abilities such as physical aspects, psychological aspects, and skill aspects ^[1, 2]. Skills are one of the deciding factors in winning a match ^[3] mastery of good technical skills results in athletes planning a mature tactic ^[4]. This is inseparable from achievement coaching by applying effective and efficient training methods. In the process, coaching cannot be instantaneous, the development of table tennis players is considered a sport that requires the development of young athletes to reach their peak potential ^[5]. Therefore, it is necessary to improve the basic skills of early childhood table tennis in an effort to reach the peak of achievement.

Forehand drive is a basic skill in playing table tennis ^[6, 7]. Research Anderson *et al.* (2020), explains that Skill is considered a classic constraint in early development, and the age range of 8 to 12 years is an important window of opportunity for high-potential young players to develop their technical skills as a foundation for being able to reach an elite level. It can be said that forehand drive skills are very important as a foundation for mastering playing techniques ^[6]. Some previous studies applied drill or multi-ball exercises to improve forehand drive skills ^[9, 10]. However, this training is very specific to young athletes who are just learning and therefore have difficulty in doing the training. The ball is constantly moving and hand-eye focus is prioritized. In this case, a component is needed, namely the ability to coordinate the hand-eye ^[11].

Hand-eye coordination is the ability of the visual system to coordinate information and direct the hands to the mind in completing a specific task ^[11]. Safari & Saptani ^[12] Explaining the integration of the nervous system and muscles to produce correct, graceful, and harmonious body movements is called coordination. Although not just one aspect, coordination ability and movement skills are very significant factors in mastering the game of table tennis.

Based on the explanation above, the researcher aims to determine the effect of a modified hand-eye coordination training method in improving the ability of early childhood forehand drive skills.

2. Materials and Methods

2.1 Participant

The participants of this study were table tennis athletes with an age range of 8-12 years totaling 20 children. The sampling technique uses a census / total sampling. Census or total

sampling is a sampling technique where all members of the population are sampled [13].

2.2 Training Method

Table 1: Hand-eye coordination training method

| Week | Meeting | Training Items | Training Frequency |
|------|---------|---|--|
| 1-2 | 1-6 | a. Coordination with ball b. Ladder drill with ball c. Suttle run with ball d. Ladder drill with baloon e. Throwing and catching the ball f. Coordination game | Frequency: 3 Intensity: Medium Set: 3 Time on: 30 second Rest Interval: 30 second Rest between circuits 3 minutes |
| 3-4 | 7-12 | a. Coordination with ball b. Ladder drill with ball c. Suttle run with ball d. Ladder drill with baloon e. Throwing and catching the ball Coordination game | Frequency: 3 Intensity: Medium Set: 4 Time on: 30 second Rest Interval: 30 second Rest between circuits 4 minutes |

2.3 Instrument

The data collection technique in this study used a forehand drive instrument [7]. The instrument procedure is as shown below:

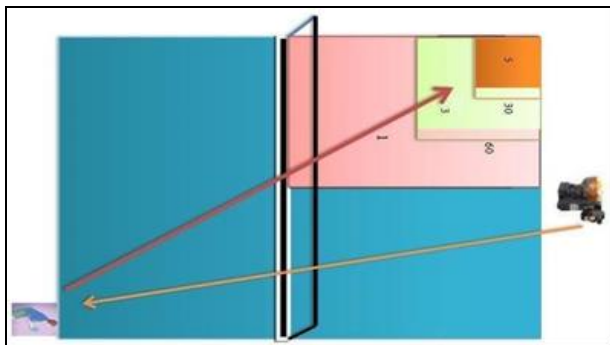


Fig 1: Instrument Forehand Drive

Table Marks: The mark for the target to the left of the testi is the first area of 30 cm x 30 cm, the second area is 60cm x 60cm, Test Instructions: a. The subject warms up and

practices (practice), b. The speed of the ball rate and ball repetition from the robot is moderate, c. Perform forehand drive for 30 strokes. Scoring Instructions: a. Scoring is carried out by one person, b. The recorder observes and records the value of the results of the ball passing under the rope and entering the left target, c. Score = total target value of 30 forehand drive balls that enter the target.

2.4 Statistical Analysis

After obtaining the research data, data analysis techniques were then carried out with the help of SPSS 25 software to calculate the average value and standard deviation, namely by descriptive data analysis. Followed by a normality test, homogeneity test, and hypothesis testing using paired sample t test and calculating how much the percentage increase of the group in conducting the pretest and posttest.

3. Results & Discussion

Results

Statistical Description Results

Table 2: Statistical description

| Variable | Participant (n=20) | | |
|--------------------------|--------------------|-----|------------|
| | Min | Max | Mean & S.D |
| Pre-test Forehand Drive | 29 | 84 | 15.27 |
| Post-test Forehand Drive | 36 | 96 | 18.69 |

Table 3: Normality Result

| | Tests of Normality | | | | | |
|--------------------------|---------------------------------|----|-------|--------------|----|------|
| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Pre-test Forehand Drive | .130 | 20 | .200* | .949 | 20 | .354 |
| Post-test Forehand Drive | .123 | 20 | .200* | .915 | 20 | .078 |

Table 4: Homogeneity Result

| Test of Homogeneity of Variances | | | | | |
|----------------------------------|--------------------------------------|------------------|-----|--------|------|
| | | Levene Statistic | df1 | df2 | Sig. |
| Forehand Drive Skill Results | Based on Mean | .668 | 1 | 38 | .419 |
| | Based on Median | .483 | 1 | 38 | .491 |
| | Based on Median and with adjusted df | .483 | 1 | 36.006 | .492 |
| | Based on trimmed mean | .642 | 1 | 38 | .428 |

Based on the table above, the results of the normality test of pretest forehand drive data Sig value. 0.354 and the results of the posttest forehand drive Sig value. 0.78. The normality test results show the value of Sig. >0.05, it can be said that the data test results have a normal distribution^[14], so that the next test can be carried out, namely the homogeneity test.

Based on the table above, the results of the pretest before being given treatment in the form of hand-eye coordination training with the circuit method and after being given treatment, the children conducted a posttest and showed results with a Sig value. 0.036. This result shows the value of Sig. <0.05, it can be said that the pretest and posttest results have a significant difference.

4. Discussion

Forehand drive skills are the initial foundation in educating children to master the technique^[15]. In addition, basic skills are a determining factor in supporting athletes to reach peak achievement^[6]. The early age stage is an important initial stage in preparing an achievement development planning program. An accurate training program for early age group children can be a tool to find potential athletes^[16].

Based on the results of the research that has been conducted, hand-eye coordination training for four weeks with a frequency of three times a week can significantly improve the forehand drive skills of children 8-12 years old. The results of this study are in line with the research of Akbari *et al.*,^[17] which explains that coordination training can improve athlete skills. Hand-eye coordination training can be applied for 4, 6, and 8 weeks to improve skills and also the physical condition of athletes^[18-20]. Further research also states that training that is systematically built with the age of the child in mind can improve the initial foundation for developing the child's potential so as to improve the performance of the child being trained^[21].

Coordination training with the circuit method can be a guideline for trainers in developing training programs without reducing the principles of training. Exercise variations are a special skill for trainers in making training programs, because with the creation of exercise variations, children will not easily get bored in participating in training^[22]. Siswantoyo *et al.*,^[23] explained that training to improve basic sports skills, especially children, needs to apply fun and practical types of training.

The results of this study indicate that hand-eye coordination training with the circuit method can improve the ability of children aged 8-12 years by applying a variety of exercises so that children are not easily bored. Future research is expected to apply exercises to improve other table tennis skills, as well as the physical abilities of table tennis athletes aged 8-12 years.

5. Conclusions

The conclusion of this study is that hand-eye coordination training with the circuit method can significantly improve the ability of table tennis forehand drive for children aged 8-12 years. The results of this study are expected to be a guide for coaches in making training programs, especially table tennis athletes when training or improving the basic abilities of athletes.

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