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# Investigation of Selected Biomotor Ability And Technical Skills in 10-11 Years Old Badminton Athletes

Faruk AKÇINAR [1A], Hakan EKİN[2B]

[1]İnönü University, Faculty of Sport Sciences, Malatya/TURKEY.
[2]İnönü University, Institute of Health Sciences, Malatya/TURKEY.

*Address Correspondence to H. Ekin: e-mail:eknhkn@gmail.com*

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A:Orcid ID: 0000-0003-2751-1743- B:Orcid ID: 0000-0002-7082-5169

**Abstract**

This study was conducted to investigate the selected biomotor ability and technical skills of 10-11 year old badminton athletes and to determine the relationship between biomotor characteristics and technical skills. The sample of the study consists of athletes who are actively playing badminton in the 10-11 age groups in Kayseri and Batman provinces and have a badminton history of at least 1 year. For this study, French & Stalter badminton test, Lockhart & McPherson badminton test, agility t test, reaction test, vertical jump test and hand grip strength measurement were applied. Pearson correlation, independent-samples t test ve one-way anova test were used for statistical analysis. Significance level was accepted as $\alpha = 0.05$. While there was a negative correlation between technical tests and agility t test results; there was a positive relationship between anaerobic power. No significant correlation was found between vertical jump, hand grip left hand and hand grip right hand and technical tests. While there was a negative correlation between French & Stalter technical test and reaction visual right hand; There was no significant relationship between McPherson & Lockhart technical test. French & Stalter and McPherson & Lockhart technical tests showed no significant relationship between reaction visual left hand, reaction auditory right hand and left hand. As a result of 10-11-year-old badminton athletes selected biomotor ability and the technical skills investigated in this study, while a significant relationship was found between technical tests and agility and anaerobic power, and French & Stalter technique test and reaction visual right hand; vertical jump, hand grip left hand, hand grip right hand visual reaction left hand, auditory reaction right hand and auditory reaction left hand, no significant correlation was found between technical tests.

**Key Words:** Badminton, technical skills, biomotor ability, agility, reaction.

## INTRODUCTION

Today, a lot of training methods are applied to improve the athletes' sports performance and increase the level of success of the athletes. These practices aim to achieve an increase in athlete's performance by considering and developing more than one variable rather than being uniform. Badminton training should also be in this direction and should be capable of providing multi-faceted development of athletes. Because badminton is a sporty game based on being quick, fast and resourceful, coordinating and making decisions quickly (7). In such sports, speed, coordination, strength, reaction, instinct, playing abilities and techniques are expressed as prerequisites for success (4). In the badminton match, which is an individual sports branch that does not host the opponent's contact area, there is a need for jumps, moves, serial changes and serial arm movements (3). The fact that the flight distance of the badminton ball is different and surprising suggests that the reaction time can be important in badminton sport. For this reason, badminton athletes must have a short reaction rate (1, 17). During the Badminton game, the jumps

made by the athletes, the 2-3 meter straight runs and the reactions in the strokes require the explosive power of the badminton athletes to be high (29, 22).

As it is seen, like in many other sports branches, biomotor features have an important place in increasing performance by supporting technical skill (25, 33). If these skills and features are developed in a coordinated manner, a good performance level can be obtained from athletes, otherwise training for technical skills only or for increasing the level of biomotor features may not be sufficient for athletes. For this reason, training should be qualified to ensure the multi-faceted development of athletes with long and short term goals, with plans in line with the requirements of the branch. At the same time, making training plans that will develop these qualities at the right time and amount in accordance with the development period of the athletes and their level of readiness will contribute to the physical development of the athletes as well as their contribution to the sports performance.

In the literature, there are studies examining the biomotor ability and technical skills of badminton athletes separately, but there is no study examining the biomotor ability and technical skills together. This research was conducted to investigate the selected biomotor ability and technical skills of 10-11 year old badminton athletes and to determine the relationships between biomotor ability and technical skills

## MATERIAL & METHOD

This study is a descriptive study aiming to determine the relationship between the biomotor ability and technical skill levels of 10-11 year old children playing badminton, and was conducted in the screening model. In the statistical processes of the study, pearson correlation was used for correlation analysis, independent-samples t test for binary groups comparisons, and one-way anova test for multiple group comparisons. Significance level was adopted as $\alpha$ = 0.05. The sample of the study consists of athletes in the 10-11 age group in Kayseri and Batman who are actively playing badminton and have a badminton playing history of at least 1 year. A total of 48 athletes aged 10-11 years old who participated in badminton training at least 3 days a week participated in the study regularly. All participants were informed about possible risks and details that may occur depending on the research and voluntary consent form was signed. The research was approved by the Inonu University health sciences ethics committee.

### Data Collection Tools

Height, Weight Measurements and Calculation of Body Mass Index: Body meter and body weight were measured with electronic scales (16). Body mass index was calculated as Body Weight / height² (kg / m2) with the Pollock formula adopted by the World Health Organization (16, 24).

Reaction Time Test: Visual and auditory reaction time tests were measured with Hubbard brand reaction device. Before the test, a trial test was applied. The best value was recorded by taking the 2 replicate measurements of the participants (11).

Determination of Anaerobic Power: Vertical jump test was used to determine anaerobic power. Anaerobic power values were calculated using the Lewis formula and by using vertical jump results ($P = \sqrt{4.9} \times W \times \sqrt{D^n}$, W = Body Weight (kg), P = Anaerobic Power (Kg-m / sec), $D^n$ = Vertical Leap distance). The result was recorded in kg.m / sec. (11, 34).

Hand Grip Strength Measurement: The hand grip force was measured with Takei brand hand dynamometer. The best score was recorded after the participant made 2 attempts with both hands (34).

Technical Skill Tests: The badminton test consisting of short service and clear strokes developed by French & Stalter and the badminton test developed by Lockhart & McPherson were used.

Agility T Test: To prepare the course, four cones are lowered as shown in figure 1. When the athlete is given a start command, he reaches the "B" cone straight from where the "A" cone is, and touches the "B" cone with his right hand. Then he runs to the left side with the side run in the direction of the "C" cone and touches the "C" cone with the left hand, then he contacts the right side with the "D" cone again with the right hand. Then he comes back to the "B" cone with a side run and comes back to the "A" cone after coming into contact with the left hand and comes back. As soon as it reaches the cone "A", the time is stopped. In this measurement, the athletes were fully rested and repeated 3 times and the best grades of the athletes were recorded (18, 30).

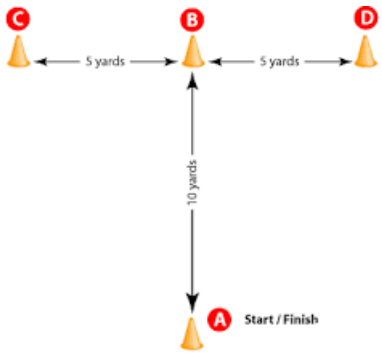


**Figure 1.** Agility T tesT

**RESULTS**

Data obtained from measurements made for some selected biomotor and technical skills of 10-11 years old badminton players are presented in tables below.

**Table 1. Descriptive Statistics of Participants.**

| Variables | n | Min. | Max. | Mean | Sd. |
|---|---|---|---|---|---|
| Gender | 48 | 1.00 | 2.00 | 1.39 | 0.49 |
| Age (year) | 48 | 10.00 | 11.00 | 10.54 | 0.50 |
| Height (cm) | 48 | 126.00 | 156.00 | 138.20 | 7.52 |
| Weight (kg) | 48 | 22.60 | 42.40 | 31.43 | 4.50 |
| Spor Age (year) | 48 | 1.00 | 4.00 | 1.66 | 0.97 |
| BMI | 48 | 12.08 | 21.63 | 16.25 | 1.92 |

The average age of the participants who participated in our study was 10.54 ± 0.50 years, the average height was 138.20 ± 7.52 cm, the average body weights were 31.43 ± 4.50 kg, the BMI was 16.25 ± 1.92, and the mean duration of badminton was 1.66 ± 0.97 years.

**Table 2. Descriptive Statistics of the Participants' Biomotor and Technical Test Values.**

| Variables | n | Min. | Max. | Mean | Sd. |
|---|---|---|---|---|---|
| Agility (sec.) | 48 | 11.46 | 14.90 | 12.97 | 0.76 |
| Vertical Jump (cm) | 48 | 15.00 | 35.00 | 26.20 | 4.78 |
| Anaerobik Power (kg.m/cm) | 48 | 25.51 | 48.52 | 35.41 | 5.61 |
| Handgrip Left (kg) | 48 | 10.10 | 27.10 | 16.26 | 3.91 |
| Handgrip Right (kg) | 48 | 7.60 | 31.00 | 16.93 | 4.081 |
| French & Stalter | 48 | 65.00 | 162.00 | 109.77 | 26.07 |
| McPherson & Lockhart | 48 | 77.00 | 117.00 | 91.93 | 8.90 |
| Visual React. Right Hand(sec.) | 48 | 2.00 | 4.10 | 2.83 | 0.50 |
| Visual React. Left Hand (sec.) | 48 | 1.80 | 4.00 | 2.90 | 0.41 |
| Auditory React. Right Hand (sec.) | 48 | 2.00 | 4.30 | 3.03 | 0.55 |
| Auditory React. Letf Hand (sec.) | 48 | 1.90 | 5.20 | 3.00 | 0.61 |

Agility t test average of the participants who participated in our study was 12.97 ± 0.76 sec. vertical jump average 26.20 ± 4.78 cm, anaerobic power 35.41 ± 5.53 kg.m/s handgrip strength left hand average 16.26 ± 3.90 kg. right hand average 16.93 ± 4.08 kg. French & Stalter badminton test average 109.77 ± 26.07 McPherson & Lockhart badminton test average 91.93 ± 8.90 visual reaction right hand average 2.83 ± 0.50 sec. visual reaction left hand average 2.90 ± 0.41 sec. auditory reaction right hand mean 3.03 ± 0.55 sec. auditory reaction left hand average 3.00 ± 0.61 sec. it was determined as.

**Table 3. Difference Between Technical and Biomotor Parameters According to Gender of 10-11 Age Badminton Players**

| Variables | Gender | n | Mean | Sd | t | p |
|---|---|---|---|---|---|---|
| Agility (sec.) | male | 29 | 12.86 | 0.78 | -1.263 | 0.213 |
| | female | 19 | 13.15 | 0.72 | | |
| Vertical Jump(cm) | male | 29 | 26.52 | 4.78 | 0.549 | 0.586 |
| | female | 19 | 25.73 | 4.88 | | |
| Handgrip Left (kg) | male | 29 | 16.79 | 4.55 | 1,152 | 0.255 |
| | female | 19 | 15.47 | 2.57 | | |
| Handgrip Right (kg) | male | 29 | 17.69 | 4.42 | 1.614 | 0.113 |
| | female | 19 | 15.78 | 3.27 | | |
| French & Stalter | male | 29 | 104.14 | 24.57 | -1.900 | 0.064 |
| | female | 19 | 118.37 | 26.59 | | |
| McPherson & Lockhart | male | 29 | 90.10 | 9.17 | -1.805 | 0.078 |
| | female | 19 | 94.74 | 7.91 | | |
| Visual React. Right Hand (sec.) | male | 29 | 2.84 | 0.48 | 0.124 | 0.902 |
| | female | 19 | 2.83 | 0.55 | | |
| Visual React. Right Hand (sec.) | male | 29 | 2.83 | 0.40 | -1.516 | 0.136 |
| | female | 19 | 3.01 | 0.43 | | |
| Auditory React. Right Hand (sec.) | male | 29 | 3.04 | 0.57 | 0.027 | 0.978 |
| | female | 19 | 3.04 | 0.54 | | |
| Auditory React. Left Hand (sec.) | male | 29 | 3.01 | 0.62 | 0.085 | 0.933 |
| | female | 19 | 2.99 | 0.63 | | |
| Anaerobik Power (kg.m/cm) | male | 29 | 34.58 | 5.41 | -1.269 | 0.211 |
| | female | 19 | 36.67 | 5.82 | | |

No significant relationship was found when the values between participants ' gender and the data obtained from the measurements were examined. (P> 0.05).

**Table 4. Difference Between Technical and Biomotor Parameters of Participants According to Their Age**

| Variables | Age | n | Mean | Sd. | t | p |
|---|---|---|---|---|---|---|
| Agility (sec.) | 10.00 | 22 | 13.02 | 0.85 | -0.404 | 0.688 |
| | 11.00 | 26 | 12.93 | 0.68 | | |
| Vertical Jump (cm) | 10.00 | 22 | 23.95 | 3.99 | -3.304 | **0.002** |
| | 11.00 | 26 | 28.11 | 4.62 | | |
| Handgrip Left (kg) | 10.00 | 22 | 14.66 | 3.16 | -2.809 | **0.007** |
| | 11.00 | 26 | 17.63 | 4.02 | | |
| Handgrip Right (kg) | 10.00 | 22 | 15.88 | 3.65 | -1.676 | 0.101 |
| | 11.00 | 26 | 17.83 | 4.28 | | |
| French & Stalter | 10.00 | 22 | 97.22 | 21.15 | -3.391 | **0.001** |
| | 11.00 | 26 | 120.38 | 25.44 | | |
| McPherson & Lockhart | 10.00 | 22 | 88.23 | 7.09 | -2.849 | **0.007** |
| | 11.00 | 26 | 95.08 | 9.19 | | |
| Visual React. Right Hand (sec.) | 10.00 | 22 | 2.95 | 0.58 | 1.445 | 0.155 |
| | 11.00 | 26 | 2.74 | 0.41 | | |
| Visual React. Left Hand (sec.) | 10.00 | 22 | 2.98 | 0.37 | 1.259 | 0.214 |
| | 11.00 | 26 | 2.83 | 0.45 | | |
| Auditory React. Right Hand (sec.) | 10.00 | 22 | 3.17 | 0.57 | 1.557 | 0.126 |
| | 11.00 | 26 | 2.93 | 0.52 | | |
| Auditory React. Left Hand (sec.) | 10.00 | 22 | 2.99 | 0.68 | -0.179 | 0.856 |
| | 11.00 | 26 | 3.02 | 0.56 | | |
| Anaerobik Power (kg.m/cm) | 10.00 | 22 | 32.03 | 3.98 | -4.588 | **0.000** |
| | 11.00 | 26 | 38.27 | 5.22 | | |

While there was a significant relationship between the participants' ages and vertical jump, handgrip strength left hand, French & Stalter badminton test, McPherson & Lockhart badminton test and anaerobic power (p <0.05); There was no significant relationship between agility, handgrip strength right hand, reaction visual right, reaction visual left hand, reaction auditory right hand, reaction auditory left hand parameters (p> 0.05).

**Table 5. Difference Between Technical and Biomotor Parameters of Participants According to Sports Age**

| Variables | | n | Mean | Sd | ANNOVA | p | Groups | p |
|---|---|---|---|---|---|---|---|---|
| Agility (sec.) | 1.00 | 30 | 13.13 | 0.77 | 1.941 | 0.137 | | |
| | 2.00 | 7 | 13.01 | 0.68 | | | | |
| | 3.00 | 8 | 12.64 | 0.69 | | | | |
| | 4.00 | 3 | 12.25 | 0.53 | | | | |
| | Total | 48 | 12.98 | 0.76 | | | | |
| Vertical Jump (cm) | 1.00 | 30 | 25.93 | 4.99 | 0.180 | 0.909 | | |
| | 2.00 | 7 | 26.71 | 4.19 | | | | |
| | 3.00 | 8 | 27.12 | 3.60 | | | | |
| | 4.00 | 3 | 25.33 | 8.50 | | | | |
| | Total | 48 | 26.21 | 4.78 | | | | |
| Handgrip Left Hand (kg) | 1.00 | 30 | 15.75 | 3.71 | 0.513 | 0.675 | | |
| | 2.00 | 7 | 16.94 | 5.94 | | | | |
| | 3.00 | 8 | 17.54 | 2.66 | | | | |
| | 4.00 | 3 | 16.50 | 4.07 | | | | |
| | Total | 48 | 16.27 | 3.91 | | | | |
| Handgrip Right Hand (kg) | 1.00 | 30 | 16.49 | 4.13 | 0.349 | 0.790 | | |
| | 2.00 | 7 | 17.98 | 6.04 | | | | |
| | 3.00 | 8 | 17.31 | 2.49 | | | | |
| | 4.00 | 3 | 18.00 | 1.97 | | | | |
| | Total | 48 | 16.94 | 4.08 | | | | |
| French &Stalter | 1.00 | 30 | 96.53 | 18.90 | 23.151 | **0.000*** | 1-3 | **0.000*** |
| | 2.00 | 7 | 109.86 | 12.50 | | | 1-4 | **0.000*** |
| | 3.00 | 8 | 146.50 | 10.31 | | | 2-3 | **0.000*** |
| | 4.00 | 3 | 144.00 | 13.22 | | | 2-4 | **0.005*** |
| | Total | 48 | 109.77 | 26.08 | | | | |
| McPherson & Lockhart | 1.00 | 30 | 87.07 | 5.54 | 23.756 | **0.000** | 1-2 | **0.005*** |
| | 2.00 | 7 | 94.14 | 4.18 | | | 1-3 | **0.000*** |
| | 3.00 | 8 | 103.37 | 6.21 | | | 1-4 | **0.000*** |
| | 4.00 | 3 | 105.00 | 8.89 | | | 2-3 | **0.003*** |
| | Total | 48 | 91.94 | 8.90 | | | 2-4 | **0.008*** |
| Visual React. Right Hand (sec.) | 1.00 | 30 | 2.88 | 0.56 | 0.237 | 0.870 | | |
| | 2.00 | 7 | 2.77 | 0.33 | | | | |
| | 3.00 | 8 | 2.72 | 0.49 | | | | |
| | 4.00 | 3 | 2.87 | 0.32 | | | | |
| | Total | 48 | 2.84 | 0.50 | | | | |
| Visual React. Left Hand (sec.) | 1.00 | 30 | 2.92 | 0.43 | 0.175 | 0.913 | | |
| | 2.00 | 7 | 2.89 | 0.45 | | | | |
| | 3.00 | 8 | 2.95 | 0.42 | | | | |
| | 4.00 | 3 | 2.80 | 0.30 | | | | |
| | Total | 48 | 2.90 | 0.42 | | | | |
| Auditory React. Right Hand (sec.) | 1.00 | 30 | 3.14 | 0.48 | 1.439 | 0.244 | | |
| | 2.00 | 7 | 2.80 | 0.58 | | | | |
| | 3.00 | 8 | 3.04 | 0.75 | | | | |
| | 4.00 | 3 | 2.60 | 0.52 | | | | |
| | Total | 48 | 3.04 | 0.55 | | | | |
| Auditory React. Left Hand (sec.) | 1.00 | 30 | 3.08 | 0.67 | 0.534 | 0.661 | | |
| | 2.00 | 7 | 2.98 | 0.64 | | | | |
| | 3.00 | 8 | 2.77 | 0.46 | | | | |
| | 4.00 | 3 | 2.90 | 0.26 | | | | |
| | Total | 48 | 3.00 | 0.62 | | | | |
| Anaerobik Power (kg.m/cm) | 1.00 | 30 | 33.90 | 5.84 | 2.697 | 0.057 | | |
| | 2.00 | 7 | 36.32 | 3.260 | | | | |
| | 3.00 | 8 | 39.72 | 4.78 | | | | |
| | 4.00 | 3 | 36.93 | 4.32 | | | | |
| | Total | 48 | 35.41 | 5.611 | | | | |

While there was a significant relationship between the sports age of the participants and the French & Stalter badminton test, McPherson & Lockhart badminton test ($p < 0.05$); No significant relation was found with vertical jump, agility, handgrip strength left hand and right hand, reaction visual right hand, reaction visual left hand, reaction auditory right hand, reaction auditory left hand and anaerobic power parameters ($p > 0.05$).

**Table 6. Relationship Between French & Stalter and McPherson & Lockhart Technical Tests and Agility, Vertical Jumping, Anaerobic Power, Handgrip**

| Tests | Agility | Vertical Jump | Anaerobic Power | Handgrip Left Hand | Handgrip Right Hand |
|---|---|---|---|---|---|
| French & Stalter | **-0.454**** | 0.280 | **0.474**** | 0.204 | 0.143 |
| McPherson & Lockhart | **-0.500**** | 0.261 | **0.463**** | 0.236 | 0.224 |
| pearson correlation *p<0.05 **p<0.01 | | | | | |

While there was a negative relationship between the French & Stalter and McPherson & Lockhart technical tests of the participants and the agility t-test; a positive relationship was found with anaerobic power. No significant correlation was found between vertical jump, handgrip strength left hand and right hand and technical tests.

**Table 7. Relationship Between French & Stalter and McPherson & Lockhart Technical Tests and Visual Reaction Right and Left Hand, Auditory Reaction Right and Left Hand**

| Tests | Visual React. Right Hand | Visual React. Left Hand | Auditory React. Right | Auditory React. Left |
|---|---|---|---|---|
| French & Stalter | **-0.316*** | -0.090 | -0.244 | -0.237 |
| McPherson & Lockhart | -0.156 | -0.012 | -0.075 | -0.181 |
| pearson correlation *p<0.05 **p<0.01 | | | | |

While there was a significant negative relationship between the French & Stalter technical test and the reaction visual right hand of the participants; No significant relation was found between French & Stalter McPherson & Lockhart technical tests and reaction visual left hand, reaction audio right hand and reaction audio left hand.

**Table 8. Relationship Between French & Stalter and McPherson & Lockhart Technical Tests and Gender, Age, Height, Weight, Sport Age and BMI**

| Tests | Gender | Age | Height | Weight | Sports Year | BMI |
|---|---|---|---|---|---|---|
| French & Stalter | **-0.454**** | 0.280 | **0.474**** | 0.204 | 0.143 | 0.003 |
| McPherson & Lockhart | **-0.500**** | 0.261 | **0.463**** | 0.236 | 0.224 | 0.040 |
| pearson correlation *p<0.05 **p<0.01 | | | | | | |

While the participants had a negative relationship between French & Stalter and McPherson & Lockhart technical tests and gender; There was a positive relationship with height. No significant relation was found between age, weight, sports year and BMI and technical tests.

**Table 9. Relationship Between Agility, Vertical Jumping, Anaerobic Power, Handgrip, Visual Reaction Right and Left Hand, Auditory Reaction Right and Left Hand and Gender, Age, Height, Weight, Sports Year BMI**

| Variables | Gender | Age | Height | Weight | Sports Year | BMI |
|---|---|---|---|---|---|---|
| Agility (sec.) | 0.183 | -0.060 | -0.128 | -0.075 | **-0.332*** | 0.044 |
| Vertical Jump (cm) | -0.081 | **0.438**** | 0.281 | -0.137 | 0.047 | **-0.370**** |
| Anaerobik Power (kg.m/cm) | 0.184 | **0.560**** | **0.676**** | **0.799**** | **0.346*** | **0.345*** |
| Handgrip Left (kg) | -0.167 | **0.383**** | **0.571**** | **0.377**** | 0.151 | -0.066 |
| Handgrip Right (kg) | -0.232 | 0.240 | **0.490**** | **0.292*** | 0.122 | -0.057 |
| Visual React. Right Hand (sec.) | -0.018 | -0.208 | -0.129 | -0.049 | -0.087 | 0.103 |
| Visual React. Left Hand (sec.) | 0.218 | -0.182 | -0.049 | 0.128 | -0.038 | **0.293*** |
| Auditory React. Right Hand (sec.) | -0.004 | -0.224 | -0.040 | -0.091 | -0.224 | 0.057 |
| Auditory React. Left Hand (sec.) | -0.013 | 0.027 | 0.081 | 0.159 | -0.168 | 0.163 |

pearson correlation *p<0.05 **p<0.01

While there was a significant negative relationship between the agility t test and sports age of the participants; No significant relationship was found with gender, age, height, weight and BMI values. While a positive correlation was found between vertical jump and age, and a negative relationship with BMI; No significant relationship was found with gender, height, weight, and sports age. While there is a significant relationship between anaerobic power and age, height, weight, sports age and BMI; There is no relationship with gender. While the grip strength was found to be significant with the left hand with age, height, weight; No significant relationship was found with gender, sports age and BMI values. While grip strength is found to be significant with right hand, height and weight; No significant relation was found with gender, age, sports age and BMI values. No significant relation was found between the reaction visual right hand and gender, age, height, weight, sports age and BMI. While there was a significant relationship between the reaction visual left hand and BMI; There was no significant relationship between gender, age, height, weight and sports age. No significant relationship was found between the reaction auditory right hand and gender, age, height, weight, sports age and BMI. No significant relationship was found between the reaction auditory left hand and gender, age, height, weight, sports age and BMI.

## DISCUSSION

The vertical jump average of the participants in our study was 26.20 ± 4.78 (male 26.52 ± 4.78 female 25.7 ± 44.88) cm. it was measured as in Badminton players, lower extreme strength must be in good condition. Because it allows the players to move quickly and explosively in various directions and jump high to strike (21). In the study conducted by Güven et al, lower values were determined compared to the study we did. It is thought that the low values are due to the low sports year of the participants included in the study. The values determined in the study conducted by Yüksel et al.(35) and Kızılet and Kızılet Bozdoğan (14) are similar to our study. While the values of amateur participants are similar to the work we have done in the study conducted by Kafkas et al.(15) the values of national players differ. This difference is thought to be due to the ability and performance required to be a national players.

Anaerobic power value of the participants who participated in our study was measured as 35.41 ± 5.53 (male 34.58 ± 5.41 female 36.67 ± 5.82) kg.m / sec. The values found by Revan et al. (29), Kafkas et al.(15) and Arabacı (3) are higher than our study. The reason for this difference is thought to be both due to high average age and high body weights.

The grip force left hand average of the participants participating in our study was 16.26 ± 3.90 (male 16.79 ± 4.55 female 15.47 ± 2.57) kg. gripping force right hand average 16.93 ± 4.08 (male17.70 ± 4.42 female 15.78 ± 3.27) kg. It was measured as. Handgrip force is important for all

sports that include catching or lifting. Also, as a general rule, people with strong hands tend to be strong in general. For this reason, this test is used as a general force test (12). The values found by Güven et al. (12), Kürkçü et al. (19), Cinthuja et al.(5), Kafkas et al.(15) are similar to the work we have done.

Agility T test average of the participants in our study was 12.97 ± 0.76 (male 12.86 ± 0.78 female13.15 ± 0.72) sec. it was determined as. Paradis (23) stated in his study that T test is a good measurement tool in measuring leg strength, speed and agility. In a study conducted by Singh et al. (31) it was found that there was a significant relationship between agility and badminton performance. Agility is a key factor in high-level badminton performance due to the various movement needs of the badminton game (14). While the values found by Ağaoğlu and Ergin (1), Kızılet and Kızılet Bozdoğan (14) are similar to the values of the female participants in the study, the values of the male participants were lower (better). This difference is thought to be due to the average age. In the study conducted by Cinthuja et al. it is thought that the low values are due to the low sports year of the participants.

Visual reaction right hand average of participants participating in our study was 2.85 ± 0.50 (male 2.84 ± 0.48 female 2.87 ± 0.55) sec. visual reaction left hand average 2.90 ± 0.41 (male 2.83 ± 0.40 female 3.01 ± 0.43) sec. auditory reaction right hand mean 3.04 ± 0.55 (male 3.04 ± 0.57 female 3.04 ± 0.54) sec. auditory reaction left hand mean was measured as 3.00 ± 0.61 (male 3.01 ± 0.62 female 2.99 ± 0.63) sec. The values found by Kafkas et al. (15) differ according to the study we have done. While the values of national players are lower, the values of amateur players are higher. This is thought to be due to the fact that amateur players' sports year are lower than the participants who participated in our study. Values found by Arabacı (1), Esen et al. (9), Revan et al. (29) are lower than our study. The reason for this is thought to be due to both the average age and the high year of sports.

The French & Stalter badminton test average of the participants in our study was found to be 109.77 ± 26.07 (male 104.14 ± 24.57 female 118.37 ± 26.59). Hastie et al. (13) preferred the use of clear inverse for two reasons in their study. The first of these reasons is the easy management of the test, and the second and most important reason is that it contains an important skill in the game of badminton. In their study, Hastie et al. (13) performed the clear test in 10 shots and determined the pre-test as 19.03 and the post-test value as 33.38. The values obtained from the posttest are similar to the percentage we did with our study. In their study, Demir et al. (6) investigated the effect of teaching fifth grade primary school students on badminton basic skills teaching with concept maps. They used the French & Stalter badminton test as a badminton practice test. By applying clear and short service shots as 10 shots, they determined the clear test as 11.95 in the pre-test, 11.37 in the post-test, and 8.62 in the pre-test and 5.46 in the post-test. These values are lower than the data obtained from our study, and this difference is thought to be due to the participants not being active players. In the study conducted by Farrow (10), French & Stalter badminton test values were 120.25 in males and 88.42 in females. According to the study we have done, while the values of male participants are high; the values of female participants are lower.

The McPherson & Lockhart badminton test average of the participants who participated in our study was determined as 91.93 ± 8.90 (male 90.10 ± 9.17 female 94.74 ± 7.91). The values found by Rana and Rajpoot (26), Zhu and Chen (36), Ding et al. (8), Singh and Mitra (32), Rasaniya and Chahar (27) are low compared to our study. The reason for this difference is thought to be due to the low sports history of the participants included in the study.

As a result, while the selected biomotor ability and technical skills of 10-11 year old badminton players were investigated, a significant relation was found between technical tests, agility and anaerobic power, and French & Stalter technical test and reaction visual right hand; No significant correlation was found between vertical jump, grip force left and right hand reaction visual left hand, reaction auditory right hand and reaction auditory left hand, and technical tests.

With the idea that it will contribute to the literature, the following are suggested;

It should be applied for badminton players of different ages and it should be determined whether the results differ.

Different technical skill tests and biomotor measurement methods should be applied for a similar age group and the direction of the results should be determined

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