

The Comparison of Some Physical and Physiological Features of National and Amateur Level Badminton Players of Uttarakhand

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Abstract

The aim of this study was to compare some physical and physiological features of National and amateur badminton players of Uttarakhand. The sample of the study were totally 31 Uttarakhand National male players (n=16, age: 16.6±1.3) and amateur level male players (n=15, age: 16.2±0.7) who regularly played badminton. After the body composition of players were determined, agility test, sit and reach test, multiple reaction test, hand grip strength test and Wingate anaerobic power test were applied to them. "Independent T-test" was applied for comparisons among independent groups. After statistical analyses, it was determined that Uttarakhand national players had higher values in height (cm), agility (second), right hand grip strength (kg) (p<0.01), body fat percentage and fat free mass (kg) (p<0.05) than amateur players of Uttarakhand. As a result, it was seen that the Uttarakhand national and amateur level badminton affected the height, agility, hand grip strength and body composition (lower body fat percentage and higher fat free mass) of players positively.

KEYWORDS: Badminton, physical and physiological characteristic, National players of Uttarakhand.

INTRODUCTION

Among the indoor games, badminton occupies a place of pride both as an individual as well as team sport. Scientific pedagogies and innovative approach have made the game more performance oriented than ever before. With the technical, tactical and training sides of the game, some other sides consisting of physical features, quick reflex and rhythmic movements have rendered the game a dynamic sport Badminton, like other racket sports, has in common a rapid succession of mostly Shorter maximal or submaximal efforts and short recovery phases. In these sport branches, speed, resistance, strength, coordination, reaction, anticipation have been accepted as prerequisites of game skills and technical success (Baron, R et al, 1992). It has been very important to determine the some specific features and parameters developing the performance of badminton players. There have been a lot of studies in the literature aimed at determining the physical and physiological features of badminton players (Hughes, M.G et al, 1995), (Kafkas et al. 2009). So it has become significant to determine some performance features of national and amateur badminton players comparatively, to investigate the tests applied to form a national level player profile and to measure from the point of physical and physiological features peculiar to badminton. The determination of physical and physiological features peculiar to badminton has been thought as an important matter and most of the studies have been conducted in this way. So in this study, it has been aimed to compare some physical and physiological features of national and amateur level badminton players of Uttarakhand.

MATERIAL AND METHOD

Participants and Protocol

The sample of the study were totally 31 Uttarakhand National male players in 2019-2020 season; consisting of Youth National male players (n=16, age: 16.6±1.3) and amateur level male players (n=15, age: 16.2±0.7) from uttarakhand state. The athletes were informed about the aim of study, their desire and motivation levels were tried to be enhanced. They were also informed about the tests and they were wanted to fill the volunteer participation form and each measurement device was familiarized to them before the test.

Physical Performance Tests:

The physical and physiological features of players have been tried to determine with these tests.

Anthropometric Measurements

Height and Weight Measurement: The height of players was measured by “Soehnle 5003”. Body weight was also measured by an electronic scale to the nearest 0.5 kg.

Body Composition Measurement: Body Fat Percentage: Tanita “BC 418 MA” bio impedance segmental body composition analyser (BiA) was used to determine the body composition of subjects.

Motor Tests

505 Agility Test: 505 Agility Test (12) was used to determine the agility levels of players. The players were wanted to try the test twice and to perform their best.

Flexibility Test: Sit and reach test was applied to determine their flexibility values.

Hand Grip Strength Test: In measurement period, the subjects were applied to a digital dynamometer (Takei TTK 5101; Takei Scientific Instruments, Tokyo, Japan). After the dynamometer was fitted for the hands of players, they tried the test three times. The tests were applied for each hand in standard position

Reaction Time Test: “Sport Expert Mps 501” multiple reaction test was applied to the subjects to determine the upper extremity reaction time

Anaerobic Power Test: Wingate anaerobic power test (Monark 894E) was applied to determine the anaerobic power and resistance. Load was 0, 75 gr/kg for the subjects.

Statistical Analysis: SPSS 17.0 package program was used for statistical analyses. “Independent T-test” was applied for comparisons among independent groups. The confidence interval was accepted as $p < 0.05$ and $p < 0.01$

FINDINGS**Table 1. The Anthropometric Features of National and Amateur Badminton Players of Uttarakhand**

Variables	National (n=16)		Amateur (n=15)		p
	Mean	Sd.	Mean	Sd.	
Age(year)	16.6	1.3	16.2	0.7	.342
Height(cm)	174.1	7.4	162.0	7.5	.008**
Weight(kg)	66.2	9.6	62.4	11.2	.345
Body Fat %	12.9	5.7	16.5	4.5	.026*
Fat Free Mass(kg)	58.9	8.2	52.1	7.6	.054*

** (p<0.01),*(p<0.05)

In the comparison of anthropometric features of national and amateur badminton players, it was understood that national players had higher values in height, bodyfat percentage and fat free mass than amateur players (p<0.01), (p<0.05), (Table 1).

Table 2. The Comparison of Some Physical and Physiological Features of National and Amateur Badminton Players of Uttarakhand

Variables	National (n=16)		Amateur (n=15)		p
	Mean	Sd.	Mean	Sd.	
Hand grip right(kg)	46.4	8.6	37.8	7.5	.010*
Hand grip left(kg)	42.4	9.4	39.5	9.5	.354
Agility (sn)	2.4	0.4	2.8	0.4	.002*
Flexibility (cm)	36.8	8.8	35.6	7.4	.642
Multiple reaction (sn)	0.8	0.02	0.6	0.04	.158
Peak power (w/kg)	12.5	2.4	12.3	3.5	.605
Average power (w/kg)	7.2	0.6	7.0	1.5	.425
Fatigue index %	82.6	7.8	76.8	5.4	.216

*(p<0.01)

In the comparison of physical and physiological features of national elite and amateur badminton players, it was seen that national players had higher values in right hand grip (kg) and agility (sn) than amateur players

($p < 0.01$), (Table 2).

DISCUSSION

In this study, it was aimed to compare some physical and physiological features of National and Amateur Badminton Players. There were significant differences among height, body fat percentage and fat free mass values of youth elite and amateur badminton players (Table 1). In the comparisons, it was understood that elite players were taller, had lower body fat percentage and more fat free mass than amateur players (Table 1). In a similar study conducted by (Ooi et al, 2009). It was seen that elite players were taller, heavier and stronger. In another study conducted by (Kafkas et al, 2009), there were significant differences in body fat percentage values (national players: $8,75 \pm 1,91$, amateur players: $16,81 \pm 1,61$) of same height and age group of junior national and amateur players, besides, national players were stronger and faster. The results of this study and literature review (19.28) has showed that the age to start sport and the level (elite – amateur) of the individuals in the same age group have affected the physical development of them significantly. National badminton players had lower body fat percentage and more fat free mass than amateur players, it was understood that the physical activity and the level of players led to important changes in body composition. In this study, after the right hand grip strength values of players were investigated, it was seen that elite players were stronger than amateur players ($p < 0.01$), (Table 2), (Kafkas et al, 2009), found in the study on 11 year old badminton players that elite players ($18,43 \pm 4,16$ kg) had significantly higher values than amateur players ($13,97 \pm 1,05$ kg) in hand grip strength. When the values of Kafkas et al. 2009, were compared to this study, it was determined that national and amateur players had lower values in hand grip strength, so it could be said that the hand grip strength had considerably developed with the age and maturity level.

In a study by Cohen et al. 1992, on 15 year old adolescents, the hand grip strength of males was 39.0 ± 7.9 kg. Although this result showed similarity with the findings of amateur badminton players in this study, the strength values of national players were higher. So it could be said that national level sportive activities had considerably improved the hand grip strength of individuals. In a study by Yıldız 2002, on men and women national badminton players, it was seen that the right hand grip strength of men players was 31.36 ± 4.56 kg, the left hand grip strength of them was 29.22 ± 5.86 . Therefore the right hand grip strength values of badminton players were higher than the left hand grip strength values. With this result, it could be said that the right hand was more dominant than the left hand for badminton players. When the reaction times of elite and amateur players were compared, there was no significant difference ($p > 0.05$), (Table 2). Polat.G, 2009 found that the reaction time of control group was 0.8 ± 0.1 sn, badminton group was 0.6 ± 0.0 sn after 12 week badminton trainings and there were significant differences between two groups. When the findings of Polat were compared to this study, it was possible to say that the reaction time values of players (national 0.5 ± 0.01 and amateur 0.5 ± 0.03) were lower. This could be because the age group was different and national players had higher values in reaction time.

In this study, it was found that there was no significant difference in flexibility variable ($p > 0.05$), (Table 2). In a similar study, Kafkas et al 2009, found that there was no significant difference between elite ($21,9 \pm 7,3$ cm) and amateur badminton

players ($17,7\pm 2,6$ cm) in flexibility. So it could be said that flexibility was not a determinant of being an elite level player. Besides, with the development of flexibility, it has been widely known that the sport injuries have been largely prevented. Lieshout & Lombard 2002, found that the flexibility value of 14-18 year old male badminton players was 32.0 ± 7.0 cm. This result has showed similarity with our study. After the comparisons, it was seen that there was no significant difference between the anaerobic power of national and amateur players ($p>0.05$), (Table 2). Nevertheless, it is understood that the anaerobic power values of elite players were higher (Table 2). In a similar study by Ooi et al 2009, it was determined that there were no significant difference between the anaerobic power of elite and non-elite badminton players. This could be because anaerobic power was not a determinant of being an elite level player in different game levels. Besides, anaerobic power is needed to be improved, due to the fact that there have been some conditions in the game like that short time quick attack, effective defense and sudden reverses. In the literature, it was noted that elite players had higher values in anaerobic power than non-elite players in different levels. Franchini et al.2011. Horswill et al (1989), found that there were significant differences in arm anaerobic power values (376 ± 20 W - 331 ± 22 W) and leg anaerobic power values (540 ± 25 W- 467 ± 29 W) of elite ($n=18$) and non-elite ($n=18$) wrestlers, who were in the same age group, same weight and sport age. Abellan et al (1), noted that there were significant differences in arm anaerobic power values (peak power: Elite 781 ± 154 W- Amateur: 643 ± 140 W, average capacity: Elite 523 ± 83 W- Amateur: 433 ± 78 W) between the elite and amateur wrestlers and the anaerobic power had an important role in the success of a wrestler. Franchini et al.2011, said that there were also significant differences in arm average anaerobic capacity ($5,73\pm 0,77$ – $5,36\pm 0,75$) and peak power W/kg ($7,63\pm 0,98$ – $7,00\pm 1,30$) values between the elite and non-elite judoists. Kounalakis et al 2008, determined that the arm anaerobic peak power and average capacity values of elite and amateur handball players were $7,6\pm 0,8$ W/kg – $6,7\pm 1,1$ W/kg and $5,3\pm 0,6$ W/kg – $4,7\pm 0,9$ W/kg respectively and it was understood that elite handball players had significantly higher values. With these results, considering the physiological demands of sport branches, it could be said that anaerobic power and capacity had an important role for being an elite athlete. In another study conducted by Meckel et al (2009), on adolescent football players (16-18 years old), it was seen that the anaerobic peak power was (W/kg) 10.6 ± 0.9 and the average anaerobic power was (W/kg) 8.7 ± 0.4 . When this result was compared to our study, it was said that the badminton players had higher values in anaerobic power variable. When the agility values of elite and amateur badminton players were compared, it was seen that elite players were more agiler than amateur players ($p<0.01$), (Table 2). So this has been because agility has been an important determinant for elite and amateur players in badminton. In the study by Hazar & Taşmektepligil (2008), on badminton players, whose average age was 12 ± 0.96 years, the average of Illinois agility test was 22.38 ± 1.58 sn. As a conclusion, it was determined that the elite players had lower body fat percentage, were taller, stronger and more agiler than the amateur players. As is seen in the studies about elite and amateur level differences, the training programs and frequency developed for badminton as well as physical and physiological fitness to level up the athletes elite level have been a very important role in developing both morphological and functional features of athletes.

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