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**MALE VOLLEYBALL PLAYERS' CONDITIONAL PARAMETERS IN DIFFERENT LEAGUES
IN THE EAST AND SOUTHEAST ANATOLIAN REGION**

ABSTRACT

The most important factor that determines the success of teams is the follow-up of conditional parameters in volleyball. In this study, we aim to compare conditional parameters of male volleyball players playing in different leagues in the East and Southeast Anatolian Region. This study includes total 57 players as voluntarily including the Diyarbakır DSİ and ve Muş Sağlıkspor players (N=28) from Third League teams to qualify for play-offs at the Turkish Volleyball season 2009-2010 and players of Mardin Kızıltepe Belediyesi, Şanlıurfa Tedaş, Gaziantep Şahinbey Belediye and Gaziantep Özel Erdem Koleji (N=29) from the Regional League. The antropometric parameters has been taken and also the sit and reach, standing long jump, vertical jump, handgrip strength tests from conditional parameters has been applied. *t Test* results show that the difference between teams is not statistically significant in terms of physical and conditional parameters ($p>0.05$). This study shows that male volleyball players' conditional parameters dont have a difference depend on leauges in the East and Southeast Anatolian Region.

Keywords: Volleyball, League, Conditional Parameters, East, Southest Anatolian

**DOĞU VE GÜNEYDOĞU ANADOLU BÖLGESİNDE FARKLI LİGLERDEKİ ERKEK
VOLEYBOLCULARIN KONDİSYONEL PARAMETRELERİ**

ÖZET

Voleybol branşında kondisyonel parametrelerin takibi takımların başarısını belirleyen önemli faktörlerdendir. Bu çalışmada Doğu ve Güneydoğu Anadolu Bölgesinden farklı liglerde oynayan erkek voleybolcuların kondisyonel parametrelerinin karşılaştırılması amaçlanmıştır. Araştırmaya Türkiye Voleybol 2009-2010 sezonunda play-off'a çıkan Üçüncü Lig takımlarından Diyarbakır DSİ ve Muş Sağlıkspor oyuncularını (N=28), Bölgesel Lig takımlarından Mardin Kızıltepe Belediyesi, Şanlıurfa Tedaş, Gaziantep Şahinbey Belediye ve Gaziantep Özel Erdem Koleji oyuncularını (N=29) olmak üzere toplam 57 sporcu gönüllü olarak katılmıştır. Antropometrik ölçümler ile kondisyonel parametrelerden otur-eriş, durarak uzun atlama, dikey sıçrama ve pençe kuvveti testleri uygulanmıştır. *t Testi* sonuçları fiziksel ve kondisyonel parametreler bakımından takımlar arasındaki farkın istatistiksel olarak anlamlı olmadığını göstermiştir ($p>0.05$). Bu çalışma Doğu ve Güneydoğu Anadolu Bölgelerinde farklı liglerde oynayan erkek voleybolcuların kondisyonel parametrelerinin liglere göre farklılık göstermediğini ortaya koymaktadır.

Anahtar Kelimeler: Voleybol, Lig, Kondisyonel Parametreler, Doğu, Güneydoğu Anadolu

1. INTRODUCTION (GİRİŞ)

Having millions of spectators and practitioners at the world and our country, the volleyball is a team sport with different technical and physical features according to positions. In recent years, the change of rules in volleyball helps volleyball to be more interesting and popular.

Successful participation in team sports requires from each player a high level of technical and tactical skills and suitable anthropometric characteristics [1 and 2]. The players in volleyball struggle in high energetic and unstable conditions in order to hit ball and direct ball to other players [3]. Also volleyball requires comprehensive abilities including physical, technical, mental, and tactical abilities. Among them, physical abilities of the players are more important as these have marked effects on the skill of players and the tactics of the teams because ball games require repeated maximum exertion such as dashing and jumping [4]. To evaluate these physical abilities, the anthropometric measurements, parameters of the body composition such as the percent body fat (% FAT), fat-free mass (FFM) and somatotype components are often used [1]. Studies on the physical characteristics of the human body to-date indicate that the morphological characteristics of athletes successful in a specific sport differ in somatic characteristics from the general population. Volleyball players are typically taller than the players of other games [5]. Volleyball require handling the ball above the head; therefore, having a greater height is an advantage in these sports [6]. Higher body mass however, is a hurdle for volleyball players in achieving good jumping height [7]. Although professionalism increases in volleyball, we can point out insufficient scientific studies in literature; it is seen that previous studies mainly focus on elite women volleyball players [8, 9 and 10]. Studies made related to male volleyball players is limited. In the few studies, on the anthropometric characteristics of volleyball players have been reported in literature and vertical jump, standing long jump, handgrip strength and flexibility have been mainly examined from conditional parameters [4, 11 and 12] however, similar studies in the context of Turkey are limited [13, 14, 15, 16, 17 and 18]. Especially studies about male volleyball players playing in different leagues in the East and Southeast Anatolian Region antropometric and conditional parameters are extremely limited [19].

The purpose of the present study was to some antropometric and conditional features of male volleyball players playing in different leagues (third-regional) at East and Southeast Anatolian Region.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

There is extremely limited study and data related to male volleyball players at East and Southeast Anatolian Region [19] where number of licensed players is few because it has high rate of unemployment and poverty according to other regions despite high young population [20, 21, 22 and 23] and sports culture is not achieved.

For this reason, we aim in this study to compare some physical and conditional features of male volleyball players playing in different leagues (third-regional) at East and Southeast Anatolian Region. The reason why third and regional league is preferred is that the players have limited opportunity to make regular training for various reasons at East and Southeast Anatolian Region and lower leagues sending players to upper leagues; this has been revealed adverse effect to physical and conditional levels at players with data of scientific studies, and we make contribution to literature in male volleyball players.

3. METHOD (YÖNTEM)

3.1. Participants (Araştırma Grubu)

This study includes total 57 volunteer players including Diyarbakır D.S.İ (N=13) and Muş Sağlıkspor (N=15) players from Turkish Male Volleyball Third League Group C teams qualified for play-off at season 2009-2010, the Mardin Kızıltepe Belediyesi (N=6), Şanlıurfa TEDAŞ (N=9) from Regional League Group M, and Gaziantep Şahinbey Belediye (N=7) and Gaziantep Özel Erdem Koleji (N=7) from Group N teams. The mean age of the subjects is 20.61 ± 4.9 for third league and 20.55 ± 4.3 for regional league. The background of players has been determined as 6.57 ± 4.1 for third league and $8,28 \pm 4.2$ for regional league. Information related to research group is present at Table 1.

Table 1. Number of teams and players of research group by leagues
(Tablo 1. Araştırma grubunun liglere ve gruplara göre dağılımı)

| Third League (N=28) | | Regional League (N=29) | |
|----------------------|------|---------------------------------|------|
| Team- Group | | Team- Group | |
| Diyarbakır D.S.İ (C) | N=13 | Mardin Kızıltepe Belediyesi (M) | N= 6 |
| Muş Sağlıkspor (C) | N=15 | Şanlıurfa Tedaş (M) | N= 9 |
| | | Gaziantep Şahinbey Belediye (N) | N= 7 |
| | | Gaziantep Özel Erdem Koleji (N) | N= 7 |
| Total: 57 | | | |

3.2. Data Collection Tools (Veri Toplama Araçları)

The physical and conditional measurements of subjects has been performed at indoor at which both teams made training at 2nd week of March /2010. The subjects were required to sign an information and informed consent form prior to the study. Information related to study has been given to subjects; warm-up has been done. Measurements have been made with following methods.

3.3. Anthropometric measurements (Antropometrik Ölçümler)

All anthropometric measurements has been done according to the Anthropometric Standardization Reference Manual [24]. Height and weight measurements has been done with the Soehnle Ultrasonic brand digital height measuring device (Soehnle Professional GmbH & Co. KG, Germany) with ± 1 mm precision while subjects wear shorts with bare foot; weight measurements have been done with Tanita BWB 800 Digital Scale (Tanita Corporation of America, Inc., USA) with 0.01 kg precision. Diameter measurement (shoulder) has been done with the Holtain (Crosswell, Crymych, Pembs., SA41 3UF, UK.) sliding caliper with 0.2 mm precision, perimeter measurements (chest, in flexion, arm, forearm, lower back) and length (arm, fathoms) has been done with Gulick meter with 0.1 cm precision and skinfold thickness has been done with (triceps, abdomen, subscapula) Holtain skinfold caliper (Crosswell, Crymych, Pembs., SA41 3UF, UK.) with 0.2 mm precision.

3.4. Conditional Measurements (Kondisyonel Ölçümler)

The sit and reach test has been applied in flexibility measurement. The measurement has been done with the Lafayette (Lafayette Instrument Company, USA) flexibility measurement bench with ± 1 mm precision. Vertical jump has been measured with the Electronic Takei vertical jump meter (Takei Kiki Kogyo, CO. Ltd., Japan) and standing long jump has been measured with the standard meter and strength has been measured with Jtech digital hand grip dynamometer (JTECH Medical, Salt Lake City, UT). Two rights with 1 minute intervals has been given to all subjects and best degree has been considered.

3.5. Data Analysis (Veri Analizi)

t Test has been applied in Independent Groups for determination of difference between them with descriptive statistics in comparison of physical and conditional parameters of male volleyball players playing in Regional League and Third League teams. All statistical proceedings has been performed by using statistical package program and 0.05 significant level has been considered.

4. FINDINGS AND DISCUSSION (BULGULAR VE TARTIŞMALAR)

t Test has been applied in Independent Groups for determination of difference between physical measurements between regional league and third league. The results show that there is no statistically significant difference between averages of height, weight, arm length, fathoms length and shoulder diameter, perimeter measurements, chest, arm, forearm and lower back, skinfold thickness (triceps, abdomen and subscapula) ($p>0.05$) (See Table 2).

Table 2. Antropometric measurement averages
 (Tablo 2. Antropometrik ölçümlere ait ortalamalar)

| | League | | | | <i>t value</i> |
|------------------------|-----------------|------|--------------|-----|----------------|
| | Regional (N=29) | | Third (N=28) | | |
| | Mean | SD | Mean | SD | |
| Height (cm) | 178.345 | 5.9 | 180.829 | 5.7 | -1.603 |
| Weight (kg) | 75.497 | 11.5 | 72.689 | 7.1 | 1.098 |
| Arm length | 59.552 | 3.0 | 60.518 | 3.1 | -1.178 |
| Fathoms length (cm) | 180.293 | 7.4 | 182.500 | 8.6 | -1.030 |
| Shoulder diameter (cm) | 41.300 | 1.8 | 40.204 | 1.9 | 2.180 |
| Chest (cm) | 91.276 | 6.1 | 89.357 | 4.5 | 1.341 |
| Arm (cm) | 30.910 | 2.7 | 29.354 | 4.9 | 1.469 |
| Forearm (cm) | 27.859 | 2.1 | 27.150 | 1,6 | 1.402 |
| Lower back | 78.983 | 6.6 | 76.161 | 5.6 | 1.719 |
| Triceps (mm) | 10.966 | 6.2 | 8.061 | 3.4 | 2.162 |
| Abdomen (mm) | 15.638 | 9.3 | 12.254 | 5.4 | 1.662 |
| Subscapula 88mm) | 12.966 | 6.5 | 9.207 | 2.5 | 2.846 |

*indicates $p<0.05$

t Test has been applied in Independent Groups with aim of determination of difference for flexibility, vertical jump, standing long jump and right-left handgrip strength between Regional group and Third league; result is shown that there is no statistically significant difference between teams by league ($p>0.05$) (see Table 3).

Table 3. Results for conditional parameters
 (Tablo 3. Kondisyonel parametrelere ait sonuçlar)

| | League | | | | <i>t value</i> |
|-------------------------------|-----------------|------|--------------|------|----------------|
| | Regional (N=29) | | Third (N=28) | | |
| | Mean | SD | Mean | SD | |
| Flexibility (cm) | 36.603 | 8.4 | 37.211 | 5.5 | -0.321 |
| Vertical jump (cm) | 65.345 | 7.7 | 62.393 | 6.7 | 1.533 |
| Standing long jump (cm) | 225.021 | 25.0 | 229.686 | 28.0 | -0.662 |
| Handgrip strength -right (kg) | 98.897 | 16.3 | 96.964 | 18.3 | 0.420 |
| Handgrip strength -left (kg) | 91.138 | 13.7 | 90.357 | 15.6 | 0.200 |

*indicates $p<0.05$

The cities at East and Southeast Regions are ranked as the least developed cities in Turkey [25]. These regions have few number of licensed player because of higher unemployment and poverty rates than other regions and non-achievement of sports culture despites high

young population at region [20, 21, 22 and 23]. In this study, we aim to compare physical and conditional parameters of male volleyball players playing in different leagues at East and Southeast Anatolian Region. The mean age of the subjects is 20.61 ± 4.9 for third league and 20.55 ± 4.3 for regional league. Because there is no limitation of age factor in volleyball branch, there can be young and middle age players at same team. In addition to this, we suggest to give importance to background practices in long term success and to give success opportunity to young players.

It is stated that volleyball players must be tall in order to fulfill skills related to game [14]. In this study, we have found that the mean height and weight of third league male volleyball players is respectively 180.829 ± 5.7 cm, 72.689 ± 7.1 kg. the mean height and weight of regional male volleyball players is respectively 178.345 ± 5.9 cm and 75.497 ± 11.5 kg. There is no significant difference between mean height and weight. Albay [26] has stated that mean height of volleyball team players at university is 186.79 cm, mean weight is 79.77 kg. Lale et al. [14] has stated the mean height is 1.97 ± 4.57 cm. mean body weight is 86.91 ± 6.92 kg. Tiryaki [27] has found when he examined the physical features of volleyball national team players in 1984 Olympiad that their height is 192.6 cm, body weight is 87.9 kg. Ergün [28] has found mean height of male team playing in first league of Turkey is 190.4 cm, body weight is 82.00 ± 5.04 kg, Demiralp [18] has found that mean height is 186.00 ± 1.03 cm, body weight is 78.04 ± 1.18 kg, Çelenk [29] has found that mean height of volleyball players is 185.27 ± 3.69 cm, body weight is 73.40 ± 6.25 kg, Kurt [15] has found that mean height is 181.82 ± 6 cm, mean weight is 74.09 ± 9.3 kg, Cinel et al. [30] has found mean height of volleyball players is 182.87 ± 4.3 cm, body weight is 79.87 ± 2.2 kg. Tall height has advantage in volleyball for some positions and affects success positively. In the upper leagues, we can see that height increases. In volleyball, teams compete by manipulating skills of spiking and blocking high above the head. Therefore, the presence of tall players is an indispensable factor in the success of a team. We think that low mean height is caused by structure of region in this study. High poverty and unemployment rate, high number of siblings negatively affect the adequate and balanced nutrition at region. Also player selection is affected by perception in East and Southeast Anatolian Region that volleyball is women sport.

Length, perimeter and diameter measurements has give information about physical growth and training level at players. The arm length 60.51 ± 3.1 cm, fathoms length 182.50 ± 8.6 cm, shoulder width 40.20 ± 1.9 cm, chest perimeter 89.35 ± 4.5 cm, arm perimeter 29.35 ± 4.9 cm, forearm perimeter 27.15 ± 1.6 cm, lower back perimeter 76.16 ± 5.6 cm of third league male volleyball player is found in this study. The mean length, arm length 59.55 ± 3.0 cm, fathoms length 180.29 ± 7.4 cm, shoulder width 41.30 ± 1.8 cm, chest perimeter 91.27 ± 6.1 cm, arm perimeter 30.91 ± 2.7 cm, forearm perimeter 27.85 ± 2.1 cm and lower back perimeter 78.98 ± 6.6 cm of third league players is found. In the study of Albay [26] length measurements arm 31.67 cm, forearm 25.72 cm and fathoms 191.25 cm, perimeter measurements chest 94 cm. arm 31.57 cm, forearm 26.46 cm, lower back 79.08 cm is found.

Skinfold thickness measurements is for determination of body fat rate in players. An increased fat weight will be detrimental in volleyball because the body is moved against the gravity (e.g. weight of the body without contributing to its force production or energy producing capabilities [1]. According to parts, skinfold thickness of volleyball players from third league is found triceps 8.061 ± 3.4 mm, abdomen 12.25 ± 5.4 mm, subscapula 9.20 ± 2.5 mm. Regional league skinfold thickness triceps 10.96 ± 6.2 mm, abdomen 15.63 ± 9.3 mm,

subscapula 12.96 ± 6.5 mm is found. There is no significant difference in terms of skinfold thickness values of volleyball male third league and regional league players. Albay [26] has found subcutaneous fat values as triceps 9.6 mm, abdomen 14.6 mm, subscapula 10.8 mm, Yıldırım [13] has found triceps 8.03 ± 2.23 mm. abdomen 10 ± 2.87 mm. subscapula 9.03 ± 2.28 mm. in this study, the player's subcutaneous fat measurements is very low. It is thought that relates to poverty and inadequate nutrition at region.

When we consider flexibility feature from conditional parameters, it is found 37.21 ± 5.5 cm at third league male volleyball players, and 36.60 ± 8.4 cm at regional league volleyball players. There is no significant difference between flexibility averages of two league players. When we consider studies related to flexibility feature at male volleyball players; Ersöz et al. [16] has found as 26.33 ± 2.13 cm, Demiralp [18] has found as 31.63 ± 5.70 cm. Flexibility is one of the most important criteria affecting success at volleyball branch. It is seen that flexibility value is higher at upper leagues.

It is stated that vertical jump test is important at estimate of continuity at volleyball players [31, 32 and 33]. In terms of Vertical jump values, means of third league male volleyball players is 62.39 ± 6.7 cm, means of regional league is 65.34 ± 7.7 cm. there is no statistically significant difference between both means. When we examine the studies related to vertical jump in male volleyball players, Demiralp [18] has found them at first league male volleyball players as 76.19 ± 1.16 cm, Çelenk [29] has found as 55.83 cm. When studies are examined, it is observed that vertical jump values increases at upper leagues, and it is important factor in success of teams.

Standing long jump is used to measure lower extremity force [34 and 35]. While mean standing long jump of third league volleyball players is 229.686 ± 28.0 cm it is found as 225.021 ± 25.0 cm at regional volleyball players. There is no statistically significant difference between both leagues.

The structure and function of hand is very important at performance at ball games playing with hand [36]. The mean handgrip strength of volleyball players is found 96.96 ± 18.3 kg for right hand, 90.35 ± 15.6 kg for left hand. In the regional league, it is found 98.89 ± 16.3 kg for right hand, 91.13 ± 13.7 kg for left hand. There is no statistically significant difference between right and left hand in terms of mean handgrip strength at both leagues. When we examine the studies related to handgrip strength at male volleyball players, Demiralp [18] has found mean handgrip strength as 48.40 ± 1.00 for right hand, 46.66 ± 0.90 for left hand. The difference between values found in our study and that values is caused by measuring device. While we are using digital hand dynamometer, the standard dynamometer is used in other study. Barut et al. [36] has found right hand handgrip strength as 24.46 kg for 9-18 age group 133 volleyball player, left hand handgrip strength as 24.35 kg. we think that difference between studies is callused by age group difference.

5. CONCLUSION AND RECOMMENDATIONS (SONUÇ VE ÖNERİLER)

In conclusion; the data obtained from our study shows that there is no different between physical and conditional parameters of male volleyball players playing in third league and regional league at East and Southeast Anatolian Region. In the present study the anthropometric and conditional characteristics of the athletes have not been evaluated in relation to their performance, but were instead compared with each other. More data would be helpful on the above

studied variables along with fitness and physiological variables to assess relationship among them and with performance in volleyball.

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