

Anthropometric measurements as determinant of performance of some offensive skills in volleyball - cubs class.

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Abstract

This study aimed to find the relationship between some anthropometric measurements (body length, weight, arms length, sitting torso length, abdominal circumference, waist circumference, thigh circumference) in terms of performance accuracy of the offensive skills (overwhelming transmission accuracy and overwhelming offensive hitting accuracy) in volleyball. The researcher used the correlation method, the sample was (n=14) fourteen players under -16 of Al-Amal Ariadi Beni Ouassin (Setif), who are numbers. for data collection, we used anthropometric suitcase and (2) two technical tests, besides we applied the appropriate statistical means represented in the correlation coefficients. in conclusion, it appeared that there is a significant correlation among some anthropometric measurements and the accuracy of the overwhelming transmission skill and the overwhelming offensive hitting. In this context, we recommend that anthropometric measurements should be included within the selection criteria while selecting volleyball players.

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1. Introduction

Competitive sport has recently undergone a major leap in terms of qualification training, as well with the growth of sport modern systems in many countries where we notice a sharp increase in the volume of training and competitive activities, when the value of the main indicators exceeded from 2 to 4 times of the data that was in 1960 (Al-Hajj, 2017, 3). which gave further concepts to the modern training processes concerning the composition and the preparation of the athletes in all aspects in competitive sport, in order to achieve the highest levels and break the world records. However, high-level sport is distinguished by the high volume and intensity of training programs compared to other sports which require the utmost possible effort by the coach and the player.

In this regard, volleyball as a team sport is characterized by the multiplicity of its skills that need special physical capacities which contribute largely to the accuracy of techniques in volleyball (Kheladi, 2019), the purpose is recognizing the main parameters to succeed in the training process, especially in the offensive skills. Accordingly, If the player does not have a high degree of physical ability, he will not be able to perform as an offensive player easily which affects the players' positioning during competitions (Agboubi & Ben lakhal, 2015). This is due to the fact that are considered as a decisive factor in winning competitions, particularly in case of equally or convergence of the tactical and skill level of teams. Moreover, volleyball is characterized by the quick and sudden changing positions and the diversity in motor performance of different skills, which demand a high standard of performance accuracy, while dealing with the ball in the air, especially there is a certain number of touching the ball before crossing the opponent's court. In addition, the higher the level of physical abilities, the more affects the level of defensive and offensive skills. Even so, the player needs explosive force and physical fitness to improve his skill performance (Kheladi, 2015, 5-6).

Overwhelming transmission accuracy and overwhelming offensive hitting accuracy are the most important offensive skills in competitive teams, players who excel at these two skills will be able to win the game. These two technical skills require strength, speed, agility and precision, they are ballistic movements (explosives) which destabilize the opposing defense with their speed.

In this way, special fitness should be developed with training plans based on permanent and programmed planning in order to achieve a high grade. As

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well as the skill training which contribute at the same time to the fitness development and the preparation of plans which leads to achievement (Al wichahi, 1983, 115).

Scientists suggest that physical abilities must include various scales to measure many of the characteristics involved in athletic or motor performance, these tests must measure (speed, muscle strength, strength marked by speed, agility, endurance, flexibility) and other capabilities that are considered essential for the general motor performance (Alaoui & Redouane, 2000, 76). Whereas a player who does not have good physical abilities cannot choose an appropriate plan to settle the match or to score points (Hussein, 1985, 72). By the same token, anthropometric measurements play a tremendous role in the sport field through their direct impact on the level and the effectiveness of performance, aswell the body structure and composition which consequently affect the processus of selection (one of the selection criteria) (Asli, Atta allah & Louh, 2017), also the anthropometric measurements determine the individual's suitability according to the type of activity and his ability to achieve a high level of technical performance in a particular activity (Ghanem, 2002, 58).

Scientific studies have proven that overall height, arm length and other measures positively affect the rapid acquisition of skills (Elliot & al, 1990; Hussein, 2011; Medjedovic, 2012). This improvement also requires a development of physical capacities especially the explosive power of the two legs and the arm which characterize the attack with the net of volleyball. The tactical intelligence on the field and the self-confidence of the player is also improved by the perfect acquisition of these techniques (Labane, Benchernine & Fahssi, 2017).

Based on this cause-effect relationship, our study hypothesizes that there is a strong correlation between anthropometric measurements and the performance accuracy of offensive skills studied in volleyball, but the principal purpose lies in the discovery of contribution ratios of these anthropometric measurements.

2. Method and Materials

The researcher used the correlation method whis conforms to the research specifications. The researcher selected the players from one of the youth clubs that are active in Setif Volleyball Association "Al-Amal Riyadi Beni Oussine", as a survey sample, consisting of (n=14) fourteen players which are active in a class under -16.

2.1. Participants

The study was conducted on a purposive sample of (n=14) athletes affiliated to Al-Amal Riadi Beni Oussin, represented the study sample (77.77%) of the team players, and this after excluding the 4 players was conducted their pilot experience. The characteristics of the sample, were follows as:

- Height: 177.93 ± 5.342 Cm.
- Weight: 62.79 ± 5.977 Kg.
- Torsional coefficient: -1.84, 1.45 (moderate distribution).

2.2. Materials

The collecting data materials used in the current study is the anthropometric measurement equipment (Tape measure, electronic balance and vertical length measuring column), overwhelming transmission accuracy test and overwhelming offensive hitting accuracy test (Hassanine & Abdel mounaim, 1997).

2.3. Design and Procedure

The study took place between November 2017 and April 2018. We splite the research team into (3) three sub-teams (Anthropometric measurements, overwhelming transmission accuracy test and overwhelming offensive hitting accuracy test), and we work in rotation.

Table (1) : The results of the sample distribution

Variables		Measuring unit	Average	Standard deviation	Torsional coef
Anthropometric measurements	Body Lenght	cm	177.93	5.342	-0.925
	Body Weight	cm	62.79	5.977	0.404
	Arms Length	cm	78.07	2.999	0.459
	Leg Length	cm	93.64	3.9783	-0.593
	Torso Length	cm	89.64	9.492	-1.848
	Abdominal Circumference	cm	77.07	5.030	0.108
	Waist Circumference	cm	87.50	8.093	-0.649
	Thigh Circumference	cm	49.00	3.508	1.197
Offensive skills	Overwhelming transmission accuracy	°	25.07	3.496	-0.447
	Overwhelming offensive hitting accuracy	°	23.93	3.362	-0.764

2.4. Statistical Analysis

The researcher used SPSS.20 for the statistic analysis, and he used ONE WAY ANOVA test.

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3. Results

In this paragraph, the researcher reviews the results obtained in this study, in order to verify the assumptions in light of statistical treatment, according to the following steps:

*** Correlate at the significance level 0.05**

**** Correlate D at the significance level 0.01**

Table (2) : The results of the Pearson correlation matrix between the anthropometric measurements under study and accuracy The overwhelming transmission of the sample members

Anthropometric measurements	Corelation coef (r)	Signification
Body Lenght	0.705**	0.05
Body Weight	0.20	0.49
Arms Length	0.454	0.10
Leg Length	0.678**	0.008
Torso Length	0.413	0.14
Abdominal Circumference	-0.477	0.08
Waist Circumference	-0.341	0.23
Thigh Circumference	-0.113	0.70

Through table (2), it is clear that there is a direct correlation between body length and skill accuracy the transmission is about 0.05 for the significance level, which is estimated at: 0.705, which is a strong correlation that shows the importance of body length in accuracy overwhelming transmission skill performance, we also recorded a correlation of 0.20% at the significance level of 0.49 for the relationship between weight and accuracy of the crushing transmission, as we note that there is an average correlation with respect to the length of the arms with a correlation of its capacity 0.454 at the significance level 0.1, in addition to a strong correlation between the length of the two legs and the accuracy of the transmission skill crushing 0.678 at the significance level 0.01, with an average direct correlation of 0.413 at a level significance of 0.14 with respect to the length of the trunk sitting and the accuracy of the overwhelming transmission skill, as we recorded an inverse correlation For each of the remaining measurements (abdominal circumference, waist circumference, thigh circumference) that is, the lower these measurements, the accuracy of the overwhelming transmission skill increased with medium association with abdomen circumference, waist circumference, and weak association with waistline.

Table (3): The results of the Pearson correlation matrix between the anthropometric measurements under study and accuracy overwhelming attacking by members of the sample

Anthropometric measurements	Coreelation coef (r)	Signification
Body Lenght	0.766**	0.01
Body Weight	0.179	0.54
Arms Length	0.519	0.05
Leg Length	0.574*	0.03
Torso Length	0.366	0.19
Abdominal Circumference	-0.277	0.337
Waist Circumference	-0.442	0.11
Thigh Circumference	-0.261	0.368

Through table (3), it is clear that there is a strong direct correlation between body length and skill accuracy overwhelming offensive hit at the significance level 0.01 with a correlation coefficient of 0.766 and a strong correlation as well for leg length and arms length, the coefficient of correlation 0.574 and 0.519, respectively, at the significance level 0.05, and we recorded an average correlation of a factor of 0.366 with respect to the length of the trunk sitting with a significance level of 0.19 With the accuracy of the offensive crushing skill, the link between weight and the accuracy of the offensive crushing skill is almost nonexistent With a weak correlation of 0.179, in contrast there is an inverse correlational relationship for each of the abdominal circumference with: - 0.277 f. The waist circumference with a correlation of - 0.442 and the groin circumference with a correlation of - 0.261.

Table (4): Results of the coefficient of determination (r2) and The error of estimation between the anthropometric measurements under study and accuracy Perform overwhelming transmission skill among the sample members

Anthropometric measurements	Coef of determination (r2)	Estimation error	Degree freedom	(f) calculated	Signification
Body lenght	0.496	2.58	1-2-13	11.83	0.005
Body weight	0.040	3.56		0.49	0.494
Arms length	0.206	3.24		3.12	0.103
Leg length	0.459	2.67		10.18	0.008
Torso length	0.171	3.31		2.47	0.142
Abdominal circumference	0.228	3.19		3.53	0.085
Waist circumference	0.116	3.42		1.58	0.233
Thigh circumference	0.013	3.61		0.15	0.701

Through the table (4), the contribution of length is 49.6% at 2.58 as an error of estimation at the significance level 0.005, which is a significant percentage with the accuracy of the overwhelming transmission performance. As for the weight, its contribution was negligible 4%, with a rating error of 3.56, at the significance level of 0.494, and for the length of the arms, the ratio was 20.6 with an error of 3.24 at the significance level of 0.10, and also for the length of the two men the contribution percentage

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reached to 45.9% with an error of 2.67 and a significance level of 0.008, which is a significant value indicating a significant contribution to the accuracy of a performance. The overwhelming transmission, while the contribution to the length of the stem from sitting was 17.1% with an error of 3.31 and an indication level 0.14%, abdominal circumference by 22.8%, waist circumference by 11.6%, and thigh circumference is the contribution Was 1.3%.

Table (5): Results of the coefficient of determination (r^2) and The error of estimation between the anthropometric measurements under study and accuracy Perform Overwhelming offensive skill among the sample members

Anthropometric measurements	Coef of determination (r^2)	Estimation error	Degree freedom	(f) calculated	Signification
Body lenght	0.587	2.24	1-2-13	17.08	0.001
Body weight	0.032	3.44		0.398	0.54
Arms length	0.270	2.99		4.43	0.057
Leg length	0.329	2.86		5.89	0.032
Torso length	0.134	3.25		1.85	0.199
Abdominal circumference	0.077	3.36		0.99	0.337
Waist circumference	0.196	3.13		2.92	0.113
Thigh circumference	0.068	3.37		0.87	0.368

It is clear from table (5) that the percentage of the length contribution to the accuracy of the overwhelming attacking skill is a high percentage was estimated at: 58.7%, with an error of 2.24 at the significance level of 0.001, while weight contributes to a percentage Slim 3.2%, arms length 27%, legs length 32.9%, and the length of the torso sitting by 13.4%, the waist circumference by 19.6%, and the contribution of the thigh circumference was also weak by 6.8%.

Table (6): Coefficient of determination for multiple linear correlation between the Anthropometric measurements under study and accuracy Perform overwhelming transmission skill among the sample members

Anthropometric measurements	Coef of determination (r^2)	Estimation error	Degree freedom	(f) calculated	Signification
Body lenght Body weight Arms length Leg length Torso length Abdominal Circumference Waist circumference Thigh circumference	0.884	1.921	5-8	4.757	0.051

It is clear from table (6) according to the recorded coefficient of determination that the anthropometric measurements are explained the value of 88.4% of the variance in the accuracy of the overwhelming transmission performance at the significance level of 0.05, which is indicative of what

indicates that anthropometric measurements have a significant effect on the accuracy of the overwhelming transmission performance in this category.

Table (7): Results of a mono-contrast analysis ANOVA for multidimensional linear regression analysis for combined Anthropometric measurements and accuracy of overwhelming transmission performance for the sample population

Anthropometric measurements	Sum Squares	Degree freedom	Square average	(f) calculated	Signification
Regression	140.47	8	17.55	4.57	0.051b
Rest	18.45	5	3.69		
Total	158.92	13			

It is clear from table (7) that the value (f) is 4.57 At the level of significance 0.05, which is significant, which indicates significant regression and the presence of a significant relationship of overwhelming transmission in terms of anthropometric measurements under study.

Table (8): Multidimensional linear regression analysis for combined Anthropometric measurements and accuracy of overwhelming transmission skill performance for the sample population

Anthropometric measurements	Coefficients		Standard deviation	(t) calcul	Signification
	Regression constant	Regression coef			
	-110.82		47.55	-2.33	0.067
Body lenght		0.58	0.38	1.52	0.188
Body weight		-0.25	0.23	-1.06	0.336
Arms length		0.18	0.46	0.39	0.706
Leg length		0.03	0.26	0.11	0.901
Torso length		0.07	0.07	0.91	0.401
Abdominal circumference		-0.46	0.17	-2.70	0.043
Waist circumference		0.03	0.09	0.39	0.709
Thigh circumference		1.14	0.47	2.42	0.060

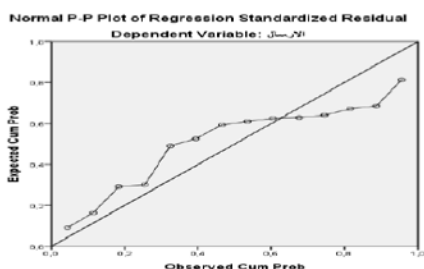


Diagram (1) :
Regression graph of
the transmitter skill is
overwhelming

The accuracy of the transmitter skill is overwhelming = $-110.83 + 0.58$ (Body lenght) -0.69 (Body weight) $+0.18$ (Arms length) $+0.03$ (Leg length) $+0.07$ (Torso length) -0.46 (Abdominal circumference) $+0.03$ (Waist circumference) $+1.14$ (Thigh circumference)

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Table (9): Coefficient of determination for multiple linear correlation between the Anthropometric measurements under study and accuracy Perform overwhelming offensive skill among the sample members

Anthropometric measurements	Coef of determination (r ²)	Estimation error	Degree freedom	(f) calculated	Signification
Body Lenght Body Weight Arms Length Leg Length Torso Length Abdominal Circumference Waist Circumference Thigh Circumference	0.722	2.85	5-8	1.623	0.308

Table (10): Results of a mono-contrast analysis ANOVA for multidimensional linear regression analysis for combined Anthropometric measurements and accuracy of accuracy of overwhelming offensive performance for the sample population

Anthropometric measurements	Sum Squares	Degree freedom	Square average	(f) calculated	Signification
Regression	106.07	8	13.25	1.62	0.308b
Rest	40.85	5	8.17		
Total	146.92	13			

It is clear from table (10) that the value (f) is 4.57 at the level of significance 0.05, which is significant, which indicates significant regression and the presence of a significant relationship of overwhelming offensive in terms of physical measurements under study.

Table (11): Multidimensional linear regression analysis for combined Anthropometric measurements and accuracy of overwhelming offensive skill performance for the sample population

Anthropometric measurements	Coefficiens		Standard deviation	(t) calcul	Signification
	Regression constant	Regression coef			
	-94.486		70.757	-1.335	0.239
Body lenght		0.722	0.573	1.260	0.263
Body weight		-0.158	0.352	-0.450	0.672
Arms length		0.072	0.694	0.104	0.921
Leg length		-0.329	0.389	-0.845	0.437
Torso length		0.111	0.114	0.969	0.377
Abdominal circumference		0.064	0.258	0.249	0.813
Waist circumference		-0.090	0.144	-0.626	0.559
Thigh circumference		0.369	0.704	0.525	0.622

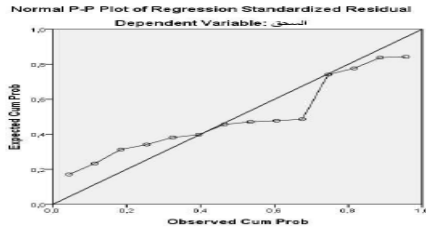


Diagram (2):
Regression graph of
the offensive skill is
overwhelming

The accuracy of the offensive skill is overwhelming = -94.48 +0.72 (Body lenght) -0.15 (Body weight) +0.72 (Arms length) -0.32 (Leg length) +0.11 (Torso length) +0.06 (abdominal circumference) -0.09 (waist circumference) +0.36 (thigh circumference)

4. Discussion

According to these results similar to those found by (Almaghribi & Hussein, 2007; Matar, 2011; Rouab & Boumaaza, 2019), it becomes clear to us that the height factor for the legs and arms and the body length is an important factor in the accuracy of performing an overwhelming attack skill (Table 2 and 3). The Pearson coefficient calculation shows that the two anthropometric measurements that affect accuracy in the two types of attacking techniques studied are body lenght first and leg length second. These confirmations are in agreement with those of Hussain (2011) who showed that height, leg length and arm circumference are the anthropometric factors who affect attacking techniques in volleyball. The rest of the parameters are not significant (Table 2 and 3).

The results also show us that the precision of these two types of attacking techniques are negatively related to the anthropometric measurements of circumferences studied (Table 2 and 3), the study of (Djaar, 2010) shows us that even in football ball, yet a sport of foot, the correlation between the circumference of the leg and the accuracy of the shot is too low (0.298).

To achieve excellent performance in overwhelming transmission accuracy Skill and overwhelming offensive hitting accuracy Skill, players must improve their lower limb power (Saleh, 2007; Tahir & Zouag, 2019) without significant muscle mass gain which will negatively affect the end result of these techniques.

The lengths are an important and necessary thing for volleyball players, this is consistent with the statement of Allawi (1979) that building the body in terms of height and weight is one of the most important factors that help young people reach high levels. Each particular sport game requires special

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physical specifications that must be considered youngster's choice (Ali, 2009; Hassanein, 2003; Sulaimane, 2004), and if we know the type of somatotype, we can estimate the optimal physical capacities of the player (Belgherissi, Bengoua & Hadjar, 2020). This is the essence of the detection of young talent in modern volley ball, confirmed by many studies (Hamouda, 2010; Abdel-khalek, 2003) which showed the existing correlation between anthropometric measurements and physical tests. Each physical activity requires specific body characteristics that can be seen when selecting the appropriate individual and the availability of these measurements, lengths, symptoms and others are among the basic requirements.

Abdel-khalek (2003) say that there is a relationship between formation, the anthropometric measurements of the individual in terms of weights, lengths and oceans and between the possibility of reaching high levels and often. What each physical activity requires specific body characteristics that can be seen when selecting the appropriate individual and the availability of these measurements, lengths, symptoms and others are among the basic requirements (Abdel amir, 2006). Their anthropometric measurements can influence the level of physical capacities who aslo influence every position in the game (Boumediene, Koutchouke & Mime, 2018). The youth volleyball that is required for it is the basis upon which the other qualities, such as technical and physical which are also selection parameters (Houar, Bengoua & Zerf, 2020), are built skill and other indications, and this is confirmed by Hassanein (1987). The importance of antropometric measurements increases because of its relationship to many motor indicators.

5. Conclusion

This study shows that there is a correlation between length (Body length and leg length) and the accuracy of the offensive skills studied (overwhelming transmission accuracy and overwhelming offensive hitting accuracy), but not with the others anthropometric measurments studied. We can formulate two multiple linear regression equations. Anthropometric measurements should be taken into account when selecting young volleyball players. Coaches can use these formulas to select specialist players and improve their specific training program (Boukchiche et al, 2020). To sum up, the player who has good muscular strength with long lengths will have a great technical adventure, although volleyball sometimes has a weak correlation

between physical and technical qualities according to Aoun & Bouloufa (2015).

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