Means and methods for establishing a morphological profile of volleyball players aged 9-12 years in southern Algeria

Ahmed Ali Chachou [1*]

[1] Laghouat University (Alegria), Laboratoire des dimensions cognitives et perceptions appliquées en sciences de l'entraînement sportif à travers des approches multiples, ahmedchachou@hotmail.fr

Submission Date 25/10/2022 Acceptance date18/12/2022 Published date 25/01/2023

Abstract

The object of the study aims to identify the morphological profile of volleyball players aged 9-12 years, for this purpose, we used the method of morphological measurements and physical tests on a sample composed of 115 young people practicing volleyball in a club in the southern region, and for data collection, we used a statistical tool, the student test. After collecting the results and processing them statistically, we concluded that there are young people who have similar morphological criteria at the international profile. On this basis, the study recommended the usefulness of selection based on the evaluation of the morphological profile.

Keywords: detection, volleyball, morphology, profile.

1. INTRODUCTION:

Currently, the orientation of the young athlete requires a harmonious development of several aspects of sport training. This development contains in particular, the basic training of the young person, in this regard (Didier Rey, 2009) mentioned that “the first element to take into consideration in this evolution, was the transition from elite sport to popular categories and the appearance of professionalism. With the latter, the sport would henceforth be characterized by the search for performance, the pursuit of records, measurement, the perfecting of technique and incessant competition”. And as Mimouni Nabila and al. (2009) stated that “the period of human life which goes from birth to adolescence”, and they added that “during childhood, the individual grows and develops until when he reaches the age of maturity”, this vision encourages us to analyze the performances obtained from a young age, like that of Nadia Comaneci. This last, at 14 years and 8 months, managed to get the gold medal at the Olympic Games in Montreal, Canada, and become one of the stars of gymnastics. She succeeds in fact, thanks to her routine on the uneven bars, to obtain the maximum score of 10, becoming the first gymnast to achieve this performance. A priori, the story where the case of Nadia presents the aspects of what is called the Unique case, or even a singularity which becomes efficient. But, if we take a step back, posteriori to

* Ahmed Ali Chachou

analyze Nadia performance, isn't that he very essence of pure talent? Does it not represent the finality, and the concretization of an ideal detection system which functions, thus optimizing the possibility of performance. But then, in this approach which is extrinsic, and which conditions the outcome of high performance (conducive environment, training method, diet, etc.). why other gymnasts couldn't achieve the same performance, precisely those who benefited from the same environment. If we do the theoretical analysis, it is clear that the creation of a favorable environment is essential to the achievement of high-level performance, but we must also believe that this is not enough to achieve performance such as that of Nadia.

For Platonov (1984), "the level reached by the performance makes them accessible only to individual, endowed with rare morphological qualities, associated with a very high level of development of functional and mental capacities…". This concept, as old it is, is still relevant, and as it was mentioned by Slifi Halem & al. (2011); that "knowledge of the biometric and physiological characteristics of young children are very useful in the context of detection, selection and orientation of young sports talents who are called upon to grow and perform at the same time". Thus, according to the study of this researcher entitled "morphological and physiological characteristics of school children aged 7-11 years in the region of Algiers", where he wondered about the function of morphological and physical differences observed within the two groups (practitioners and non-practitioners of physical activity)? with the aim of establishing comparisons of biometric data and physical abilities between a group of schoolchildren aged (7-11 years) who do not practice physical and sports activity from the "commune of Bab-EL-Oued" located in the center of greater Algiers and another group of students of the same age practicing physical activity and sports from the town of Hydra. They applied anthropometric measurements (weight, height, fat folds and corpulence index) and physical ability tests on 394 students including 205 girls and 189 boys with an average of age 9 years. They concluded that the students present a good physical condition thanks to the usual activity, in addition, they must profit from a regular and regulated physical activity. Therefore, it is first necessary to have specific morphological qualities and then to ensure functional and mental follow-up, any physical and specific requirement is based beforehand on body measurements specific to sports practice. This idea joins the study of Bounemri Zaki Saliha (2009), which is entitled "Basic training of the young handball player", whose objective is to show the importance of a training program relating to the development of physical qualities among 9-12-year old. she concluded that a good methodology for developing the different physical qualities needed for this age category is important. Also, she indicates that this

physical preparation for young handball players (9-12 years old) is not a simple task and is based more on in-depth scientific knowledge. In addition, Bensalem Salem (2009) announces that "today we must take a serene, lucid and serious look at the training of young people". The conclusions drawn from this research affirm what is quoted by Platonov (1984) that "from the start of the second stage of the training cycle, there appears the need to verify that the morphological characteristics of the young athlete are consistent with those measured in top athletes ". Platonov (1984), asserts that “these models establish the profile of morphological or functional qualities, which are associated with obtaining good performance”. The profile of morphological qualities, which is the subject of this research, and that specific to volleyball players, can we identify and describe the morphological aspect specific to volleyball players, precisely concerning the age of 9-12 years? What is the function of detection by anthropometric data, in the development of morphological model of volleyball players relative to our research population?

As “it is difficult today to reach the prestigious high level in the field of sport in general and volleyball in particular, unless the athlete's training sessions are planned based on the scientific basis” (Belfritas Yacine &, 2019) and for Weineck (1997) “the development of a directory of characteristics, in addition to determining the age conducive to performance, specific to each discipline; are the first conditions for detecting young talent…”. Thus, he adds that “this directory only exists in a very small number of disciplines”, , and this is precisely one of the key concepts of this study, knowing that the profile of morphological characteristics specific to volleyball players is very complex to elaborate especially when it comes to a population of children, growth and maturation are for a significant part of the factors that influence the morphological appearance of young volleyball players. At the end of these multiple previous studies, we assume the development of morphological model specific to volleyball players aged 9-12 years by comparing it with a reference model. Our objective is to focus on morphological and physical data to establish a detection model specific to our study population.

2. Methods

2.1 Sampling and selection method

The population of this study consists of young volleyball players aged 9-12 years from southern Algeria, in order to respect the objective of our study, we opted for a sport population, young children practicing volleyball in a club. Our choice fell on a set of clubs from the southern Algeria region, but for reasons appropriate to our study, we chose those who are committed to the Algerian volleyball federation, as well as the problem posed, allowed us to make a reasoned choice of few wilaya clubs representing southern Algeria made up of

115 young volleyball players aged 9-12 (boys) who are distributed in four wilaya (36 from Laghouat, 25 from El-Bayadh, 30 from Djelfa, 24 of Ghardïa), and the sampling was chosen in stratified random manner.

2.2 Search procedure

All research involves methodological choices related not only to the object of study, but also and above all to the nature of the research itself. It also takes into account the means such as the equipment used to carry out the work in the field. To carry out this work, we have chosen anthropometric measurements, which seem to us to be the most appropriate methodological support to achieve our objectives. In this regard, we have undertaken a study which aims to identify the problems related to the detection of young volleyball players at the level of the Algerian federation.

2.2.1 Methodological approach

In order to carry out our research, we followed the so-called experimental research approach, with pairing of groups, this protocol includes a post-test without a control group.

2.2.2 Identification of variables

- Dependent variable: the detection of morphological data, since they influence and formulate the morphological profile.
- Independent variable: morphological profile, since it is influenced by morphological data.
- - Intermediate variable: the volleyball player aged 9-12, since he intervenes on the two variables mentioned before (dependent and independent).

2.2.3 Analysis tools:

We used in our research the anthropometric method which represents the measurements of the bony landmarks by Martin. R (1928), then by Ross et al. (1982), we followed the model of Frisancho (1990), Gladisheva and Kozlov (1977), applying the measurements on the right side of the subject, this is mentioned in the research of Mimouni Nabila et al (2009). These measurements were taken using an anthropometric kit of the Holtain LTD type which contains precise instruments; an anthropometer intended to measure the longitudinal and transverse dimensions of the body. Its precision is 0.5 cm to measure the stature and the wingspan 1 and 2, the forearm span, and for the diameter of the shoulder we used a Caliper with olivary ends: large ruler of the anthropometer, graduated from 0 to 600 mm to which we add two curved rods. The weight in Kg obtained through a scale named medical.

Table 1. Representation of proofs of anthropometric measurements

Criteria	Sigles	Protocoles
Height in cm	/	Measure with an anthropometer, the body is straight and the feet pointed. Result in cm
Wingspan 1 and 2	W.1/2	Wing.1: standing, face against the wall, heels on the ground, 1 arm raised to touch the highest possible point. Wing.2: Standing, face against the wall, heels on the ground, 2 arms raised to touch the highest possible point. Hold the pitch touched by the lower hand. Result in cm
Weight in kg	/	Measure with an accurate scale. Result in kg
Arms in cm	/	Measure with a caliper with olive tips. Result in cm
Shoulder width Forearm length	/	Mesurer avec un anthropomètre. Résultat en cm
Standing jump in cm (Block)	SJ	Best of two bouldering jumps, facing the target, feet parallel, without prior movement, jumped as high as possible to hit with 2 hands. Results in cm
Jump with elk in cm (Attack)	JWE	Touch as high as possible with one hand after 2 to 3 steps. Best of two jumps. On a board on the wall. Result in cm.

Regarding the evaluation of the physical tests, we followed the protocol closest to the specialty, Test of jump without momentum (block technique) and jump with momentum (attack technique) the height reached without jumping corresponds to the wingspan of the test subject, these proofs are affirmed by Sargent Test (1924). This protocol is referenced by the French Volleyball Federation (FFVB) and the Algerian Volleyball Federation (FAVB).

2.2.4 Static techniques used

We used two variables of the descriptive statistics: the mean and the standard deviation, and for the analytical statistics we favor the student test (T. Test) in order to identify our research objective when comparing the profiles.

3. Results

Descriptive analysis of the results of the anthropometric parameters

In this part, we will present the results of our sample which allow us to report anthropometric measurements: height, weight, wingspan 1-2, shoulder width and forearm length.

Table 2. Representation of the average results of the morphological parameters of our sample

criterion / Age (year)	height		weight		wingspan 1 (cm)		wingspan. 2 (cm)		shoulder width		forearm length	
	M	S. D	M	S. D	M	S. D	M	S. D	M	S. D	M	S. D
9Y N= 25	141	4.34	33	2.76	181	3.30	179	2.50	33.88	1.85	37.66	1.56
10Y N= 25	155	2.12	35.33	2.62	203	7.37	200.4	7.17	32	2.28	40.40	4.49
11Y N= 25	161.25	4.65	38.50	1.92	208.50	8.29	205	8.33	38.75	7.25	38.74	6.29
12Y N= 25	173.94	5.99	44	4.79	225.05	4.42	221.94	3.13	42.27	5.17	41.50	5.87

The table above provides information on the results of the data by age group (height, weight, wingspan 1-2, shoulder width, forearm hand length in cm) of the young volleyball players in our sample. The highest average height value in 12-year-olds with (173±5.99), as well as the smallest is recorded in 9-year-olds with (141±4.34). For the weight we notice that the highest average value is (44 ± 4.79) in the age group of 12 years, and the smallest is recorded (33 ± 2.76) in those of 9 years. With regard to wingspan1, the highest average value is that of 12-year-old boys with (225.05±4.42), and the smallest is recorded among 9-year-olds with (181±3.30). The highest average value of wingspan 2 is recorded at 12 years old with (221.94±3.13), and the smallest is recorded at 9 years old with (179±2.50). From the summary of these recording, it can be said that the evolution of morphological parameters is corelated with age. The latter is one of the "complex morphological factors" according to Platonov (1984).

Table 2. Representation of the average results of the physical parameters of our sample

Physical tests / Age (years)	Standing jump		Jumping with elk	
	M	S. D	M	S. D
9 years	205	±4.35	210	± 3.80
10 years	234	3.25	239	3.05
11 years	240.75	2.90	252.95	2.29
12 years	251.16	±3.05	259.50	± 4.11

Table (2) provides information on the results of the data by age group (jump without swings, jump with swings in cm) of young volleyball players. Regarding the standing jump (SJ), we notice that the highest average value is that of 12-year-olds with (251.16±3.05), and the lowest is recorded among 9-

year-olds with (205±4.35).

With regard to the highest average of jumping with elk (JWE) is that of the 12 years old with (259.50 ± 4.11), as well as the lowest average is recorded in the age group of 9 years with (210 ± 3.80). So, from these experimental results, we conclude that the vertical jump has a relationship with age and with the longitudinal and transverse measurements of the young volleyball players in our sample.

In the second part of the experiment (comparative analysis), we chose the model of the French volleyball selection and which contains morphological criteria of 14 young people aged 9-12 years, for this we took some criteria (height, weight, wingspan 1, wingspan 2, SJ and JWE) specific to the 14 players in our sample in a stratified way to compare them with 14 players.

Table 2. Comparative representation of the morphological and physical data of volleyball players from: (south region, National team France)

		South region	Nationale Team France		
		N=14		T.TEST	COEF.F
		DDI=26			
Height	Medium	167.46	174.67	T.SIN	F=0.389
	Standard deviation	6.90	6.46		
Weight	Medium	50.77	46.05	T.SIN	F=0.887
	Standard deviation	7.75	7.66		
Wingspan 1	Medium	219.21	229.42	T.SIN	F=0.176
	Standard deviation	6.13	5.71		
Wingspan 2	Medium	213.21	226.07	T.SIN	F=0.505
	Standard deviation	4.20	4.35		
SJ	Medium	256.29	268.35	T.SIN	F=1.814
	Standard deviation	4.61	3.07		
JWE	Medium	243.21	281.00	T.SIN	F=2.103
	Standard deviation	8.92	7.90		

Concerning the comparative experimental analysis between the two models: model of the southern Algerian region and model of the French selection: the statistical results showed that T. test significantly in favor of the French selection for the majority of the criteria of the protocol, and moreover the differences between the two models are 7.67 cm in size and 10.21 cm for Wingspan 1 and 12.86 cm for Wingspan 2, as well as 12.06 cm and 37.79 cm

for both types of jumps. Except that the weight is in favor of the southern Algerian region selection with a difference of 4.72 kg.

At the end of these results, we deduce that the French breeders not only apply the morphological and physical test protocol but also identify those who have the best physical morphological qualities.

4. Discussion

This work constitutes the outline of a study relating to the predictive variables of volleyball performance.

In this first phase, we affirm the first hypothesis, with the aim of developing a morphological model of volleyball players aged 9-12 years old, who represent southern Algeria. These different data allowed us to describe the anthropometric characteristics, specific to children aged 9-12 beginning the practice of volleyball, to situate them in relation to each year of age. The interpretation of weight and height for our entire sample shows a continual increase. Bone age and an essential benchmark, puberty is triggered at a bone age of 13 years, the height gain of our sample has undergone a great evolution, namely that it goes from 141cm (9 years) to 173.94 (12 years), as well as the greatest gain in height occurs between 9 years and 10 years with an average of 14 cm and between 11 years and 12 years with an average of 12 cm, but the most significant weight gain occurs in two periods: between 8 and 9 years old, and between the 11th and 12th year. So, from the age of 9 to 12 years old the measured weight gain is 3kg.

In the second period, we find an average gain of 6 kg in the 11th year which corresponds to the influence of puberty, according to Tanner and all : 85: the weight in boys experiences a pre-puberty deceleration, there is a plateau between 5.6 years and 10.11 years, a puberty acceleration which occurs between 8.9 years and 12.13 years. Every time we notice in our sample a slight acceleration in growth from the age of 9-10. means that the child is constantly growing but less quickly. This growth rate reaches a trough just before adolescence, to then present an acceleration, according to the study by Mimouni N. & al. (2009)

Anthropometric measurements (shoulder widths, forearm-hand lengths)

The diameter of the width of the shoulders in boys evolves from 28 cm at 9 years old up to 42.27 at 12 years old so we have noticed an evolution 14 cm from 9 years old, as well as all the transverse dimensions at this age are coupled to longitudinal growth (Rauche, 2005 in van Praagh, 2008:99). So, it would be logical that the more important this transversal dimension is, the better the relaxation will be, and vice versa.

Regarding the forearm-hand length of our samples, the marked average is

between 38 at 9 years and 41.55 at 12 years, so the developed average is 2.05 cm, and this is essential to perform a technical gesture such as that the block (the elbow high arm against the ear) it is necessary to have long segments and precisely the segments which come out at the top of the net, and this is an observable mark to facilitate the execution of the offensive block.

Physical test (jump and height)

For the high jump with or without momentum of our sample the results indicate that there is a progression of the height of the jump evolves positively as the ages grow from 9 years old to 12 years old. The difference that exists between the two jumps is that in the running jump the use of the arms and as important as the standing jump the execution of the two steps forward makes it possible to increase the acceleration of the arms and therefore to increase the force developed by this segment, and according to SARGENT, D A. (1921), the vertical relaxation corresponds to the difference between the heights reached without jumping and with jumping, the relaxation index corresponds to the addition of the results obtained with and without momentum, the height reached without jumping corresponds to the wingspan of the test subject. The combination of the vertical trigger and the weight of the subject makes it possible to have an estimate of its power. indeed, “Increase in muscle mass of the body as a result to perform strength, speed and muscular endurance training, and lack of fat and adipose tissue is noticed as a result of performance of various exercises aerobics” (Ziani Zakaria, 2021), so we can thus affirm that, at an equal jump height, the subject whose weight is greater and also more powerful at the level of its lower limbs », and he adds that the level of performance estimated according to the importance of the relaxation measured in centimeters can be consulted below.

The second phase revolves around the confirmation of our second hypothesis, that of the comparison of the morphological and physical model of the southern Algerian region with an international model of volleyball players aged 9-12 years specific to the French volleyball federation, the statistical analysis revealed significant differences for height between the selection of the southern region and the French selection (T. Test = 2.311) in favor of the selections, on the other hand the weight shows a non-significant result (T. Test = 1.356) between the two selections, As for wingspan 1 and 2 (T. Test = 2.815 for wingspan 1), (T. Test = 2.315 for wingspan 2) the results are significant in favor of the French selection.

So according to these results we can say that there are morphological and physical criteria that allow us to develop a detection model, but what draws our attention about the comparison of the results is that it is necessary select young people who have morphological and physical characteristics corresponding to international criteria.

5. Conclusion

As confirmed by Asli Hocine & Al. (2021) that “Physical and sports activity has become an unavoidable necessity to rebalance young people, physically, psychologically and socially”. As part of our study, we processed a set of criteria (height, weight and wingspan 1.2, shoulder width, forearm-hand length) and physical criteria in order to have a more precise idea of the two parameters of height and weight of these young volleyball players. Knowing that “volleyball is one of the team sports in which the morphological shape of the player is very important such as height and weight” according to ZREF Mohamed and LEGUELIB lakhedar (2019). For this we have deduced that it is necessary to determine the requirements of detection by morphological and physical evaluation in the establishment of a morphological profile specific to young volleyball players in order to respond objectively to certain details which still remain unanswered, to know the importance of morphological and physical criteria to achieve performance in volleyball through ideal detection, and according to Blidi Touati and all (2018) "the case of selection which is considered a decisive step in the career of the future talent which also translates the enthusiasm for this sport”. So, it would be wiser to set up a profile of young volleyball players with values corresponding to the detection criteria. Bransilav Antala and Jaromir Sedlacek (2009) say that "the successes of athletes in high-level competitions are not occurrences but they are the result of a long systematic work, oriented towards the discovery of sports talent, its inspiration, its development with the outlet in the sporting performance of the high level”. Indeed, the current requirements of performance require, according to Bayer (1993) “a detection which can no longer be built on the simple intuitive empiricism of the man in the field, but make the appeal to a scientific reflection for the determination of the criteria which will precede the orientation of the players”. And, according to the various observations made through our investigation (bibliography analysis, anthropometric measurements, physical tests) we concluded that there are problems of detection and selection at the level of the morphological criteria specific to young volleyball players.

Following this, the the experimental results of our research allowed us to track a means of evaluation international morphological criteria.

Among the useful recommendations which relate to simple and clear orientations we quote:

- It is necessary that our coaches, whatever their qualifications, become familiar with the evaluation of sports sciences in general, particularly detection and these different criteria specific to young children.
- consider certain indices of physical development for the systematic evaluation of athletes which is useful when selecting for this age category.

- the development of anthropometric and physical investigation skills tests in order to identify the morphological profiles of our young athletes.

- to detect children not only the most promoters, but also those who have morphological qualities (height, reach 2 arms) specified in volleyball.

- This being said that detection by morphological criteria in volleyball remains a vague and rich field of research to be exploited at several levels because many studies have not yet specified anthropometric indices specific to this discipline.

6. Bibliography and Notes List

-Emmanuel Van Praagh. (2008). PHYSIOLOGIE DU SPORT / ENFANT ET ADOLESCENT, De Boeck Bruxelles.

-Platonov Vladimir.Nicolaivitch (1984). L'entrainement Sportif (Théorie Et Méthodologie), « Revues EPS », Paris, Tremblay,288.

-SARGENT D.A (1921). the physical test of a man American physical Education Review,26,188-194.

-Tanner J. M (1962). Growth at Adolescence, 2nd Edition Blackwell Scientific Publication, Oxford, 133.

-Weineck Y. Manuel detrainment, Vigot, Paris .1997,331,93.

-Bensalem Salem (2009). La Détection Et La Prise En Charge Des Jeunes Talents Sportifs (Cas De L'academie Football Dju Paradou-Ac), 6, 6, 31-44

-Blidi touati, Mokkeds Moulay, Idriss Zerf Mohammed, Bengoua Ali (2018), Critères Du Choix De L'équipe Type : Cas Des Footballeurs Des U17, revue Sciences et Techniques des Activités Physiques et Sportives- Mostaganem (RISTAPS), 15, 1, 194-208.

-Bounemri, Zaki Saliha. (2009). Formation De Base Du Jeune Handballeur, revue Sciences et Techniques des Activités Physiques et Sportives- Mostaganem (RISTAPS) 6, 6, 26-31.

-Branslav Antala Jaromir Sedlacek (2009), La place de l'école dans le système de la sélection des Jeunes talents sportifs, revue Sciences et Techniques des Activités Physiques et Sportives- Mostaganem (RISTAPS), 6 ,6 64-71.

-Didier Rey (2009). Les aléas historiques du talent sportifs, revue Sciences et Techniques des Activités Physiques et Sportives- Mostaganem (RISTAPS), 6, 6, 4-111.

-Mimouni N., Mimouni S., Lammari F., Zaki S. (2009). Etude De Quelques paramètres morphologiques chez les élèves De Sud-ouest Algérien Age De 6-12 Ans, revue Sciences et Techniques des Activités Physiques et Sportives- Mostaganem (RISTAPS), 8 ,8, 33-46.

- Slifi Halem & othes (2011), Morphological and physiological characteristics of schooled children aged 7-11 years of the Algiers Region, Journal of sciences and techniques of physical activities, 5, 2, p. 10-12.

-عسلي حسين، كرارمة أحمد. صغير نور الدين. (2021) ،مساهمة الالتزام الرياضي في تنمية بعض المهارات الحياتية لدى الناشئين حسب متغير نوع الرياضة والعمر التدريبي، المجلة الجزائرية للأبحاث والدراسات-جيجل، المجلد

4 -العدد 4 ، ص 470-486

- بلفريطس ياسين. نابي محمد ناجح. غنام نور الدين(2019) ، أثر برنامج تدريبي مقترح بطريقة التدريب المدمج على تحسين أداء بعض المهارات الأساسية (التمرير، دقة التسديد، الجري بالكرة) لدى لاعبي كرة القدم أقل من 19 سنة، المجلة الجزائرية للأبحاث والدراسات-جيجل، المجلد 2 -العدد 4، ص 155-172.

- محمد زرف، لخضر لقليب (2019)، العلاقة بين بعض المؤشرات الانتربومترية ومهارة استقبال الإرسال لدى لاعبي الكرة الطائرة u17، مجلة علوم وتقنيات النشاط البدني الرياضي-وهران، المجلد 5 -العدد 2، 10-19.

-زياني زكرياء (2021)، النمط الحياتي وعلاقته بزيادة الوزن والسمنة: دراسة مقارنة بين عينتين من الشباب، الممارسين للبرامج التدريبية الغذائية وغير الممارسين، المجلة الجزائرية للأبحاث والدراسات-جيجل ،4 ،4، 499-518.