



Design and codification of tests (physical–skill) installed according to the energy systems of volleyball players

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Abstract

The importance of research in designing physical and skill tests based on the energy systems of volleyball players appears because the tests that were developed were related to either physical or skill aspects without linking them with the energy systems working with them, and the physical and skill tests to be modestly placed under the hands of coaches to detect the levels of players and work to develop their levels through these tests. The research problem was the lack or absence of physical and skill complex tests, which should seek to identify complex tests according to the energy systems that suit the game of volleyball and determine these tests, which may give us a real indication of the physical and skill performance of the game, as these tests can be an alternative to individual tests to be comprehensive to measure physical, skill and physiological abilities and summarize for us the time and effort as well as the possibility of conducting analyses of each energy system and its impact on those components and detecting the weaknesses and strengths of those components to develop real-time solutions for them, so the researcher decided to delve into identifying complex(physical-skilled) skill tests based on new standards and levels in order to continue the progress and development of the game in order to use them in the process of evaluation Volleyball players. The objectives of the research are to design and regulate complex (physical and skilled) tests according to energy systems. The researcher used the descriptive approach in the survey style and correlations, due to its solvency and the nature of the research problem. The research community was determined in a deliberate manner, as the research community included young players in the specialized volleyball center in Dhi Qar Governorate who are between the ages of 16-18 years for the season (2023-2024) and who represent the youth category of (160) players. (10) players were selected for the exploratory sample and

(150) players were selected They represent the research sample with a percentage of (93.66%) from the original community. One of the most important conclusions was that the energy systems of the tests were two tests according to the phosphagene system and two tests according to the lactic system. Through the selected tests, the fact that there is an overlap between skill performance, physical performance and energy systems cannot be separated. Most of the tests were within the phosphagene system and within the lactic system. This confirms that the volleyball game is included in the non-oxygen energy system with a greater percentage than the oxygen system, in addition to the existence of a strong correlation between the physical and skill tests. As for the recommendations, the researcher recommended the adoption of the use of these tests in measuring players Volleyball from the physical, skill and physiological aspects for young people



and the possibility of coaches relying on these tests to really stand at the levels of their players during the training stage and in their training units because they are closer to real play situations.

1-Definition of the research:

1-1 Introduction and importance of research:

Volleyball is one of the team games that requires the development of many aspects, physical, skill, planning and raising the efficiency of the functional devices of players to face the pressure of high intensity training loads, especially since it is one of the games that are characterized by strength and speed of performance except for legal pauses that occur according to the requirements of play, which requires that the player has a very high physical efficiency and ability that makes him maintain his physical performance and skill ability with high accuracy and efficiency. Volleyball is one of the team games that require high levels of physical and skill performance, in addition to mental and intelligent abilities that contribute to the speed of decision-making and the accuracy of skill implementation during the game, and from this point of view, the need arises to design accurate and comprehensive tests that measure the physical and skill aspects of the complex, which are integrated with the physiological requirements of the energy systems that the player relies on during the actual performance of the game. Understanding the nature of energy systems (anaerobic , aerobic , and phosphagene) and using them to design tests that simulate realistic situations on the field is an essential step towards developing the physical and skill abilities of volleyball players. Hence, this research seeks to design and codify complex tests based on the nature of the energy systems used in the game of volleyball, thus contributing to improving the selection, training and evaluation processes of volleyball players, according to accurate and integrated scientific foundations. Therefore, the development in the field of volleyball that we observe through the achievements that are achieved and the level of remarkable performance performed by players in competitions is the result of the concerted efforts of coaches and players in organizing training loads that are effective in raising the physical, skill and functional efficiency of players, and sports training is not a science in itself to be able to achieve those achievements unless it is based on other sciences that are helpful to facilitate the way to success and prove it faster and better. From these sciences of physiology, tests and measurement , it is very important to study the functional capabilities of the player's body systems and their response to the training loads and pressures that he carries out in training and finally in competitions, as well as to know the type of energy expended and its impact on its performance and the extent to which those loads respond to it , which is mainly based on conducting physical and skill tests, to know the extent of



development that occurs through the measurements shown by the results of these tests , and then reveal the appropriateness of those loads with the level of training and the vocabulary of the training curricula. This research addresses a vital aspect of the volleyball training process, which is the design of complex physical skill tests based on energy systems, which have not received sufficient attention in previous research. The importance of this research lies in the design and construction of physical and skill tests according to the energy systems of volleyball players, by linking physical and skill performance to the requirements of the actual energy systems of the game , providing modern and standardized measurement and evaluation tools that help trainers identify the levels of players accurately and comprehensively , which contributes to directing training programs to include mental and cognitive aspects in addition to physical and skill, supporting sports selection and classification processes on accurate scientific grounds through objective tests that reflect the requirements of the realistic game, upgrading the level of preparation of players by designing tests that correspond to the real conditions of competitions, which leads to improving individual and collective performance on the field.

Research problem:

Tests are one of the important means and one of the very necessary requirements in monitoring the development of the player or team and the researcher being one of the practitioners of volleyball as well as the opinion of many specialists in this field. After reviewing many tests and problems facing those in charge of the game and the use of scientific sources and references, it was found that there is a lack or absence of physical and skill complex tests. Therefore, it is necessary to seek to identify complex tests according to the energy systems that suit the game of volleyball and determine these tests, which may give us a real indication of the physical and skill performance of the game. These tests can be an alternative to solitary tests to be comprehensive to measure physical, skill and physiological abilities and shorten us time and effort, as well as the possibility of conducting analyses for each energy system and its impact on those components and detecting the weaknesses and strengths of those components to develop real-time solutions to them, which is one of the important factors that affect the accuracy and speed of motor performance. Therefore, the researcher decided to delve into the identification of skill (physical-skilled) tests based on new standards and levels in order to continue the progress and development of the game in order to use it in the process of evaluating volleyball players.



Research objectives:

- 1- Designing and codifying composite (physical-skilled) tests according to energy systems.

1-4 Research Areas:

1-4-1 Human Field: Youth Players in Volleyball Specialized Centers in Dhi Qar Governorate for the Year 2023-2024

1-4-2 Time Range: Duration from 24/9/2023 to 25/6/2025

1-4-3 Spatial scope: Club training centers in Dhi Qar Governorate with volleyball

3- Research Methodology and Field Procedures :

3-1 Research Methodology

Therefore, the researcher used the descriptive approach in the survey method and correlational relationships, given its solvency and the nature of the research problem.

3-2 The research community and sample

The selection of the community and the research sample is closely related to the objectives set by the researcher for his research, as it is often difficult for the researcher when studying a phenomenon using all members of the community. It is impossible to select, observe or measure all these individuals under controlled circumstances. Therefore, the researcher resorts to selecting a representative sample of the original community. The research community was determined in a deliberate manner, as the research community included young players in the specialized volleyball centers in Dhi Qar Governorate who are between the ages of 16-18 years for the season (2023-2024) and who represent the youth group of (160) players. (10) players were selected for the survey sample and (150) players representing the research sample and (93,75%) of the original community were selected.

(e) Focus area 5.

Shows the distribution of the research population and the percentage

ت	Name of the Center	Numbers Total	Exploratory Sample	Construction Sample	Standardization sample
1	Training Center in Nasiriyah	27	5	12	10
2	The training center in Shatra	22		12	10
3	The training center in	25	5	10	10



Al-Gharraf					
4	The training center in Suq Al-Shuyukh	20		10	10
5	Training Center in Chabaish	23		13	10
6	Al-Batha Training Center	19		10	9
7	Al-Nasr Training Center	19		10	9
8	Citadel Capital Training Center	5		3	2
Total		160	10	80	70

3-3 Means, tools and devices used in the research:

- Note
- Personal interviews:
- Tests and Metrics
- A. Arabic Sources and References
- Statistical analysis:
- International Information Network (Internet)
- data dump
- Software and applications used in the computer
- MEASURING TAPE
- Medical scale type (Chinese) number (1).
- The volleyball court is legal .
- Legal volleyballs (MIKASA) (Chinese) number (7) .
- Adhesive tape (5) cm wide.
- Rubber ropes of different weights and colors (8).
- Overburden
- Straps
- Vertimax Base.

1– 4 Field research procedures:

For the purpose of determining the most important variables (physical qualities) for the physical and skill tests of volleyball, the researcher used sources, scientific references and personal interviews, through which the variables are identified in a questionnaire and presented to experts and specialists in tests and measurement, as well as specialists in volleyball for the purpose of polling their opinions in determining the most important physical qualities on which the game is based. After collecting the forms and separating the data, the qualities of moral significance were evaluated and nominated by the relative importance of each attribute.



Schedule 2.

Shows the agreement of experts and specialists on determining physical abilities in order of relative importance

T =	Physical capacities	5	4	3	2	1	mean Weighted Arithmetic Mean	Importance partial	Rationale
		Repeti tion	Repeti tion	Repe tition	Repeti on	Repeti on			
1	Maximum capacity of two arms	0	1	1	2	8	1.727	545	No modem selected.
2	Maximum Abdominal Capacity	0	0	6	4	1	2.363	.272	No modem selected.
3	Maximum back capacity	0	2	1	8	0	2.454	090	No modem selected.
4	The maximum strength of the two men	9	2	0	0	0	Stop.	364	Selected
5	Power characteristic of the speed of the arms	0	2	1	8	0	2.454	090	No modem selected.
6	Velocity Characteristic Abdominal Strength	0	1	1	2	8	1.727	545	No modem selected.
7	Speed Characteristic Back Strength	0	0	6	4	1	2.363	.272	No modem selected.
8	The speedy power of the two legs	9	2	0	0	0	Stop.	364	Selected
9	Carrying power to the arms	0	0	6	4	1	2.363	.272	No modem selected.
10	Abdominal Strength Tolerance	0	2	1	8	0	2.454	090	No modem selected.
11	Strength tolerance for the back	0	0	6	4	1	2.363	.272	No modem selected.
12	She holds the power for the two men.	9	1	1	0	0	727	545	Selected

Number of Iraqi experts and specialists = 11

3 – 4 – 1 Identification of research variables and tests :

Through the researcher's access to a lot of studies and research that researched the field of volleyball , and the survey of many scientific references that



examined the most important capabilities in terms of physical and skill and reference to a large number of specialists and professors in the field of game, tests, measurements and mathematical physiology, as the tests were presented initially to experts and specialists.

TABLE 3

Shows the relative importance value and acceptance ratio of tests and skills

No.	Tests and Skills	Relative importance	2. Acceptance Ratio	Significance
1.	Vertical jumping on Vertimax base and performing the Qatari smashing batting skill.	72 %	54.54	Pass
2.	Pushing the weighting trolley and sending the crusher.	70 to 90		Pass
3.	TRX bars and crushing multiplication from the back area of area (1) .	81		"Not Approved"
4.	Jumping and weighting for both legs and the offensive block wall.	27%		Pass
5.	Pushing the medicine ball back against the wall and performing the crushing beating	43,63%		"Not Approved"
6.	Throwing the medical ball over the head back and performing the crushing sending skill	38:18		"Not Approved"
7.	Deep jumping and performing Offensive block wall skill	40%		"Not Approved"
8.	The quick partridge at the checkpoints alternately and perform the posterior crushing batting skill	80%		Pass

3-4-2 Preparing the preliminary version of the tests and presenting them to experts and specialists :

Quiz 1

Test Name: Vertimax Base Vertimax Jumping and Diagonal Smacking Skill Performance.

Purpose of the test : Measure the maximum strength of the two legs and the accuracy of the Qatari high crushing beating.

Tools used : A legal volleyball court, (5) legal volleyballs and a colored strip to divide the areas of the opposite stadium by (5) referees.

Level and gender : Volleyball players for youth (16-18) years old

Method of performance : From the position of standing on the base (Vertimax) and fixing the player from the lower area of the trunk with the rubber rope belt installed in the base, the player begins to push strongly and quickly with the legs up vertically by bending the knees at a 90-degree angle with a fast and strong weighting with the arms back and then forward - high above the level of the head. When landing, the



player bends the knees at a 90-degree angle for one time, and then the laboratory performs the crushing high Qatari beating towards the inner triangle, the second half of the grid from area (4) .Anaerobic phosphagene power system (ATp-pc) used in the test

Registration : The method of registration for the virtimax jump test is calculated as follows :

The length of the player with arms extended high at the highest point – the distance he travels up (90 cm and above - 5 min) (80 cm - 4 min) (70 cm – 3 min) (60 cm – 2 min) (50 cm – 1 min)

The laboratory records the scores obtained in the three attempts, that is, the final score for this test is (15), the lowest score (3), divided by the time of performance of the repetitions, the final score = accuracy / time for each player. It is considered an attempt if the ball falls outside the specified points.

Quiz 2

Test Name: Crushing Weighting & Dispatching Trolley Push.

Purpose of the test : Measure the strength marked by the speed of the two legs and the accuracy of the crushing transmitter.

Level and gender : Volleyball players for youth (16-18) years old

Tools used: a legal volleyball court, 5 legal volleyballs and a colored strip to divide the areas of the opposite stadium

Method of performance : From the position of the stop in front of the weight cart, the player pushes the cart for a distance of (10 meters) for one time, and then the tested player stands on the side of the final line of the stadium, which is (10 meters) away from the net , where the tested player is holding the ball to perform the crushing serve to cross the net ball to the planned half of the stadium and the weight of the cart with the weights is 50 kg.

Registration: The player takes the score of the area in which the ball is located for each correct transmission, and since each laboratory player has (3) attempts, and since the scores are distributed over areas of (1-5) degrees, the maximum score for this test is (15) degrees, noting that in the event that the ball falls on a line separating two areas, the laboratory player is counted as the highest area score, which is considered an attempt in the event that the ball falls outside the specified points.

Quiz 3

Test Name: Jumping and weighting for both legs and offensive blocking wall.

Purpose of the test : Measure the strength characteristic of the speed of the two legs and the accuracy of the offensive blocking wall



Tools used: a legal volleyball court, 5 legal volleyballs and a colored strip to divide the areas of the opposite stadium

- Performance description: From the standing position and weighting the lower limbs using the weighting suspenders, the player takes approximate steps for a distance of (3 meters) and then bends the knees at an angle of about 90 degrees and jumps forward higher with raising the knees at the level of the belt during the performance , then the laboratory performs the skill of the block wall in its vertical and lateral forms and from the front pitch area by performing three successful attempts from the playing area (1-3) and an area in the event that the ball falls on the line is calculated to the highest degree .

Method of scoring : The maximum score for this test is (9), noting that if the ball falls on a line separating two areas, the laboratory player is counted as the highest area score, which is considered an attempt if the ball falls outside the specified points.

3-5 Exploratory experiments:

First : The first exploratory experiment:

The exploratory experiments were conducted on a sample of (10) players from the Specialized Center for Nasiriyah and Gharraf, in order to identify the following :

1. Adequacy of the supporting team (*).
2. Safety and adequacy of the instruments used in the tests .
3. Calculate the time allotted for each test .
4. Method of sequencing tests in terms of performance .
5. Method of recording the tests by the work team.

The first exploratory experiment was conducted on (7/5/2024). Through the application of the exploratory experiment, the organizational aspects of performing the tests were identified, sufficient time was taken to rest between one test and another, and the assistant team was directed to how to register for the performance of the tests, as well as following up the players in the tests and delivering the ball to the laboratory player at the correct time, in addition to installing the correct position of the camera for the purpose of filming the performance of the testers .

Second : The second exploratory experiment:

Then the second reconnaissance experiment was conducted on (14/5/2024) on the same group of players in the same stadium and at the same time as the first reconnaissance experiment in order to verify the scientific basis of the tests .

3 – 6 Scientific foundations of tests :

1-Validity of the test :



The researcher used (the veracity of the arbitrators) by presenting the tests to a group of experts and specialists in the field of scientific research, tests, measurement, training and specialization in volleyball to determine the validity of the tests and make adjustments to them

Test Reliability:

The researcher used to calculate the stability coefficient (test and retest method) and in an interval between the first and second test (7) days. The first application was conducted on 7/5/2024 at 9 am on (8) players from the researcher community and outside the sample. The application was reapplied on 14/5/2024 at 9 am. The researcher extracted the stability coefficient through the correlation coefficient (Pearson) between the results of the first application and the results of the second application and extract the significance of the correlation, as the values of the correlation coefficient were significant when compared to the level of significance, and this means that the tests have a high degree of stability because the level of significance < (0.05) . As shown in Table (4).

3- Objectivity :

The researcher found the objectivity coefficients for each of the composite tests by finding the simple correlation coefficient (Pearson) between the results of the two arbitrators in the first application conducted during the exploratory experiment, and the correlation coefficients were high, which indicates the objectivity of the tests used in the current study.

table (4)

Indicates the reliability and objectivity coefficient of the tests under study

ت	Testing	Stability coefficient	قيمة Sig	Objectivity coefficient	Sig value
1	Vertimax jump on Vertimax base andperform the crushing batting skill	0.88	0.000	0.93	0.000
2	Pushing the weighting trolley and sending the crusher	0.87	0.000	0.94	0.000
3	Jumping and weighting for both legs and offensive blocking wall	0.89	0.000	0.91	0.000
4	The quick partridge at the checkpoints alternately and perform the posterior crushing batting skill	0.88	0.000	0.92	0.000



3-8 Main Experience:

After ensuring the safety and validity of all procedures through exploratory experiments and included in the scientific conditions of the tests , the researcher conducted his main experiment after preparing the requirements for conducting all the experiment from the assisting cadres and fixing the test times on 3 days and the period from 20-22 /5/2024 on the research sample of (70) players . The researcher also extracted the discriminatory ability of the tests by ranking the raw scores ascendingly and taking (27%) of the upper scores and (27%) of the lower scores because it is the best ratio by which we obtain the highest discrimination coefficients () and the test (t) was applied between the two groups of independent samples by (19) players of a low group and an equal upper group as shown in Table No. (5) , from which we note that all tests have a high discriminatory ability at the level of significance (0.5)

Table (5).

Shows the discriminating ability of the tests in question according to the main sample

ت	Test Name	Low-level group		high group		A calculated
		Q	.	C	.	
1	Vertimax vertical jump on Vertimax base and diagonal smash	3.455	.209	3.	0.189	473
2	Pushing the weighting trolley and sending the crusher	666	0.516	5.	0.000	6.325
3	Jumping and weighting for both legs and offensive blocking wall	1.833	0.408	4.000	0.000	13.000
4	The quick partridge at the checkpoints alternately and perform the posterior crushing batting skill	28/166	983	Triple 3.	0.816	4.153

3 – 9 Statistical methods used in the research :

The researcher used the spss software version 25 .

4-Presentation, analysis and discussion of research results:

4-1 Presentation, analysis and discussion of the results of the test of the research variables:

Table (7)

Shows the arithmetic media, standard deviations, torsion coefficient and kurtosis of tests (physical – skilled)

ت	Statistical Processing Methods:	Unit of measure	Arithmetic Mean	Standard error	Standard Deviation	Twisting!	Kurtosis
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	Variables						
2	Vertimax jump on Vertimax base and perform Qatari Aces	Degree	9	0.34586	2.89370	.062	732
1	Pushing the weighting trolley and sending the crusher	Degree	14	0.653	57623	0.140	610
3	Jumping and weighting for both legs and offensive blocking wall	Degree	2571	0.41588	3.47949	390	0.085
4	The quick partridge at the checkpoints alternately and perform the posterior crushing batting skill	Degree	9	32429 Minden	71321	-0.004	.790

4.2 Standard Scores and Adjusted Standard Scores for Vertimax Vertical Jumping Test and Qatari Smacking Skill Performance

Table 21

The display of the benchmark scores and the modified benchmark scores for the Vertimax vertical jump test on the Vertimax base and the performance of the Qatari crushing batting skill show

ت	Testing	Repetition	UNTRANSLATED_CONTENT_START الدرجة المعيارية UNTRANSLATED_CONTENT_END 	Modified Standard
1	15	1	2.05	70.54
2	14	5	1.71	67.08
3	13	1	1.36	63.63
4	12	6	1.02	215/60/17
5	11	13	67	56.71
6	10	7	33.	A/53/26
7	9	7	02	49.80
8	8	7	37.	46:35
9	7	9	0-71	89
10	6	6	1.06	39.44
11	5	1	- 1:40.	98
12	4	7	-1.75	32.52
	Range	11		
	Base Length ...	2.2		



4-2-1 Displaying Vertimax Vertical Jump Test Levels Results on Vertimax Base and Diagonal Smacking Skill Performance

SCHEDULE 8

Shows the standard levels of the sample and the ratios achieved in each Vertimax test level and the performance of the Qatari crushing multiplication skill

ت	Label for Levels	Achieved Count	Achieved Percentage
1	Very Good	7	14.
2	Good	19	27.
3	Good	14	20
4	Weak	16	(8:5)
5	Very Weak	14	20

Table(9)

Shows sample levels on Vertimax base vertical jump test and performs Qatari crushing batting skill

ت	Level Label	Range	
		Form	To
1	Very Good	84 12	15
2	C	10.63	12.83
3	Average	8.42	10.62
4	Weak	6.21	8.41
5	Very Weak	4	6.2

4-3 Standard scores and modified standard scores for the crushing weighting and dispatching vehicle thrust test

Table 10 Financial resources requested

Shows the display of the standard scores and the modified standard scores for the crushing weighting and dispatching vehicle thrust test

ت	Testing	Repetition	UNTRANSLATED_CONTENT_START Standard score UNTRANSLATED_CONTENT_END	Modified Standard
1	19	2	1.93	69.30



ت	Testing	Repetition	UNTRANSLATED_C ONTENT_START Sta ndard score UNTRANSLATED_CONT ENT_END	Modified Standard
2	18	7	1.54	65 – 42
3	17	5	1.15	61.53
4	16	7	(0.77)	57-65
5	15	8	.38	53.77
6	14	12	01	89
7	13	6	40	46.01
8	12	8	(0.79)	" (42:13).
9	11	9	1.18	38.24
10	10	6	1:56	34.36
	Range	9		
	Base Length ...	1,8		

4-3-1 Display the results of the levels for the thrust test of the crushing weighting and dispatching vehicle

Table 11

Shows the standard levels of the sample and the percentages achieved at each level for the crushing weighting and dispatching vehicle thrust test

ت	Label for Levels	Achieved Count	Achieved Percentage
1	Very Good	14	20
2	Good	15	2/1
3	Good	18	25.71
4	Weak	8	.11
5	Very Weak	15	21.42

Table 12 Indicators regarding the change in the number of migrants with tertiary education in countries of the Organization for Economic Cooperation and Development: 1990-2000

Shows sample levels in the crushing weighting and dispatching cart push test

ت	Level Label	Range	
		Form	To



1	Very Good	17	19
2	C	15.43%	17
3	Average	13.62	15
4	Weak	81	13
5	Very Weak	10	11.8

4-4 Modified standard scores and benchmark scores for the bounce and weight test for both legs and the offensive bumper wall

Table 13

Shows the display of the standard scores and the modified standard scores for the bounce and weight test for both legs and the offensive bumper wall

ت	Testing	Repetition	UNTRANSLATED_ CONTENT_START الدرجة المعيارية UNTRANS LATED_CONTENT_EN D	Modified Standard
1	23	2	1.65	66.51
2	22	6	1.36	63.63
3	21	5	1.08	60-76
4	20	6	0.79***	88
5	19	11	50	55.01
6	18	8	21.	52.14
7	17	7	.07	49.26
8	16	7	36	46.39
9	15	1	65	43.51
10	14	2	-94	40.64
11	13	3	1.22	37.77
12	12	7	-1.51	34.89
13	11	5	1:80).	32.02
	Range	12		
	Base Length ...	2.4		

4-4-1 Presentation of the results of the levels for the bouncing and weighting test for both legs and the offensive buffer wall

Table 14

Shows the standard levels of the sample and the ratios achieved in each level for the bouncing and weighting test for both legs and the offensive bollard

ت	Label for Levels	Achieved	Achieved Percentage
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		Count	
1	Very Good	13	18.57
2	Good	25	35 .
3	Good	15	21.42
4	Weak	5	7
5	Very Weak	12	17.14

4. Discussion of the results:

The four tests that received the highest saturation were the Qatari crushing batting tests, the crushing serve, the offensive blocking wall and the back crushing batting. These volleyball offensive skill tests are the deciding factor for the results when achieving the largest number of points against the opposing team. There are many situations and different distances in the implementation of these skills. These skills were carried out with a compound performance with physical performance. The first test is the Qatari crushing batting. The player performs the vertical jump on the Vertimax base and the skill performance as the vertical jump on the base has an impact Effective in increasing the



force exerted and improving it to optimize the force in the direction required to be achieved. The results of the study showed that the vertical jump test using the jumping platform achieved a high correlation coefficient with the performance of the crushing batting skill, which indicates a strong relationship between the explosive muscle power of the players and their level of performance of this offensive skill. The crushing batting skill depends heavily on the ability to jump high, which is necessary to achieve a suitable height to hit from a high point above the net. Vertical jumping is a direct indicator of the strength of the lower leg muscles (quadriceps, quadriceps) The higher the ground momentum during jumping, the greater the ability of the player to carry out crushing batting at a wider angle and greater strength, which confuses and dominates the opponent's defenses. The physical intelligence scale is an important element to enhance the player's motor intelligence index.

The second test dealt with the weighting cart push test as a test that measures the characteristic strength at speed, and its relationship with the crushing sending skill in volleyball, as well as its relationship with the level of physical–motor intelligence. A good correlation coefficient was obtained, but not very high. The results of the study showed that the weighting cart push test, which is one of the characteristic strength tests at speed , achieved a good correlation coefficient with the performance of the crushing sending skill in volleyball, as well as a positive relationship with physical–motor intelligence. However, this correlation did not rise to the level of very high correlation. Physiologically, the cart push works to lengthen the muscle fibers and thus the cycle of stretching and shortening the muscle fibers to produce movement characterized by great strength within a short time, which positively reflects on the development and development of the maximum thrust force in the muscles of the legs. In order to obtain high–level results from (decentralized) contraction, the (central) contraction that follows (decentralized) contraction of the muscles



must occur directly⁽¹⁾. (James and Robert 1985) believe that the great development in the character of explosive force is due to push and pull exercises, which have become a means of developing the work of the nervous–muscular system to respond more strongly and quickly while performing movements that require muscular effort, followed directly by a shortening of the muscle itself⁽²⁾

The strength in these cases is a measure of the explosive ability, and one of the advantages of the playing style in the crushing transmission is that it is performed with high strength and speed. This confirms the importance of the explosive ability of the two men well. The researcher also adds that the amount of force correlations and their times comes as a result of the high level of the research sample, through the implementation of pushing the trolley by weight in order to develop it. Studying the level of force is a measure of the amount of efficiency and diversity of the tests used. These qualities are important for volleyball players, especially the sending players and the capsins. "Rapid force is very important and necessary in competitions of games with three movements that are performed once, as in shooting games, jumping, or in all team games, which include complex movements." ⁽³⁾.

The need for force and its development is important for volleyball players, and the diversity of methods, methods, approaches and tools is the important and decisive factor. Overwhelming dispatch is one of the most important skills that need this type of force⁽⁴⁾,

⁽¹⁾ Gambetta: V. Plyometric for Beginner. Basic, N.S.A. by I.A.A.F., Q, Magazine, Roma. March, 1989, PP 184–185.

⁽²⁾ James: C.R.B.S, Robert C. F. Op.Cit, p.29.

2 John & Nelson, 1989, Practical Measurements For Evaluation in Physical Education Minnesota . Burgess Publishing Co, P 295 .

⁽³⁾ Mohamed Abdo Saleh and Mufti Ibrahim Hammad: Source previously mentioned,1994 , p. 58.



that the maximum explosive capacity can appear in many cases, including overwhelming dispatch in volleyball, and that tests must contain such new methods to develop force (1).

The crushing sending skill in volleyball depends on the speed of energy transfer from the muscles of the lower body to the upper, especially through the torso, shoulder and arm, which requires a distinctive force of speed. The weighting cart push test is a physical indicator to measure the ability of the player to produce rapid force in a short time, a property that partially intersects with the requirements of the crushing transmission. However, the crushing transmission also requires high coordination in movement, precise muscular control, and technical guidance of the ball, which are elements that may not be fully measured by a physical test. The good relationship between this test and physical–motor intelligence indicates that players with high motor efficiency and motor intelligence show better coordination between strength and speed during the implementation of physical movements. Physical–motor intelligence depends not only on strength, but on the ability to employ the body flexibly and consciously in different situations. Therefore, the correlation of this test was good, but not very strong.

This may be because the test measures a purely physical aspect (strength marked by speed), while the overwhelming sending skill requires technical and tactical elements as well. Physical–motor intelligence includes multiple dimensions such as balance, rhythm, coordination, and the ability to adapt movement, and it is not fully represented in the cart push test. Also, the difference in the level of technical performance between players should be a factor in reducing the intensity of the correlation, as it is advisable to use the weighting cart push test as an aid to measure the strength characteristic of speed, but it does not fully represent skill performance or physical intelligence.

As for the third test, it discusses the weight–bouncing test (attached to the legs) and its relationship to the buffer wall and the physical–motor intelligence through the central muscle contraction that occurs as a result of overcoming resistance during the performance

(4) Qasim Hassan Hussein and Iman Shaker Mahmoud: Source previously mentioned , 1998, p. 226.



of the test by bringing the working muscles closer to their center and the eccentric muscle contraction in which the muscles contract away from their center. It worked to increase the amount of muscle fibers raised as a result of the resistances used in weighting, which in turn led to an increase in the muscular force produced. This was confirmed by Jabbar Ali Jabbar "The muscle force produced increases as the number of muscle fibers raised in one muscle or muscle group increases"⁽¹⁾ Where the used resistors that the muscles try to overcome by weighting and as a result of the increase in muscle strength increased the efficiency of the player in overcoming external resistances and thus increasing the height to work on a successful and effective offensive repelling wall.

The results of the statistical analysis revealed that the vertical jump test using weights (tied to the legs), which is one of the most accurate indicators of the strength characteristic of the speed of the muscles of the lower limb, recorded a very high correlation coefficient with the performance of the block wall skill in volleyball, as well as with the scale of physical-motor intelligence, which reflects the close relationship between physical indicators based on muscle explosion and the integration of skilled motor performance.

The explanation of the relationship with the block wall skill depends on the ability to jump fast and strong in accurate timing, in order to counter the attack of the opposing team. The weight jump test embodies the ability to achieve maximum height in a short time with resistance to additional load (weights), which accurately simulates the requirements of defensive jumping in the block wall . Players who have high results in this test usually show accurate timing, appropriate height, and immediate muscle response, which are essential elements in the success of the block wall.

Explanation of the high correlation with somatic-motor intelligence does not only mean "movement", but also includes the player's awareness of his body, his ability to direct it accurately, and instantaneous interaction with motor situations.

(¹) Jabbar Ali Jabbar : Sports Training, 1st Edition, Iraq , Southern Crystal Company, 2014, p. 56.



Recording a very high correlation between the weight jump test and the motor intelligence scale indicates that players with high physical intelligence enjoy high muscular control in light of resistance, rapid neuromuscular coordination, and mental flexibility in investing strength and speed to serve the skill context.

This test is an ideal indicator in selecting players who are distinguished in defensive performance, especially in the front line. It can be considered one of the supporting measures in evaluating motor intelligence, especially in sports that require an immediate muscular response. The high correlation shows that the strength distinguished by speed is directly related to motor intelligence, not only physically, but in terms of the ability to control the body during rapid movement and resistance, and the adoption of the weight jump test as a basic measurement tool within the selection tests of the players of the barricade centers and its integration into the tools of evaluating physical–motor intelligence for its ability to detect the quality of motor performance associated with time, accuracy and strength.



Conclusions and recommendations

5.1 Conclusions :

In light of the results presented, the researcher came to the following conclusions:

- 1- In light of the conditions for accepting the factors, (4) tests were extracted, which represented the highest morale
- 2-The tests were two tests according to the phosphagene system and two tests according to the lactic system
- 3- Through the selected tests, the fact emerges that there is an overlap between skill performance, physical performance and energy systems that cannot be separated .
- 4- Extracting the standard scores of the extracted tests gives importance and scientific value to measuring and analyzing performance
- 5-The most tests were within the phosphagene system and within the lactic system, and this confirms that the game of volleyball is included in the non-oxygen energy system with a greater percentage than the oxygen system .
- 7- The tests that have been rated physical and skill vehicle measure the characteristic for which it was developed

5.2 Recommendations

- 1- Adopting the use of tests in measuring volleyball players from the physical, skill and physiological aspects of young people .
- 2- Adopting the standards reached in evaluating the performance of young players in volleyball .
- 3- Trainers rely on these tests to really stand at the levels of their players during the training phase and in their training units because they are closer to real play situations.
- 4-The possibility of adopting standard scores by setting standard levels for the extracted tests.
- 5-The possibility of conducting a similar study on other categories using these tests to extract standard scores for those categories .
- 6- Designing other composite tests on samples other than the youth group that have not been previously researched.

Sources:

(¹) Jabbar Ali Jabbar : Sports Training, 1st Edition, Iraq , Southern Crystal Company, 2014, p. 56.

(4) Qasim Hassan Hussein and Iman Shaker Mahmoud: Source previously mentioned , 1998, p. 226.



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- (3) Mohamed Abdo Saleh and Mufti Ibrahim Hammad: Source previously mentioned,1994 , p. 58.
- (¹) Gambetta: V. Plyometric for Beginner. Basic, N.S.A. by I.A.A.F., Q, Magazine, Roma. March, 1989, PP 184–185.
- (¹) James: C.R.B.S, Robert C. F. Op.Cit, p.29.
- 2 John & Nelson, 1989, Practical Measurements For Evaluation in Physical Education Minnesota . Burgess Publishing Co, P 295 .