

The Effect of the Transitional Period on Some Bio-Kinetic Abilities of Handball Players

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Abstract

The purpose of this paper is to identify the most important bio-kinetic capabilities of handball players in the transitional period between competitions, and identify the effect of the transitional period between competitions in tracking the level of the bio-kinetic abilities of handball players. The current research problem imposed the adoption of the descriptive research method in the style of follow-up studies, the limits of the total research community are represented by the advanced handball players participating in the league competitions for the sports season (2021-2022), and they are officially registered in the records of the Iraqi Central Handball Federation, numbering (177) players distributed by nature to (12) clubs. One of the most important results reached by the researcher is that: Handball players need to maintain the level of bio-kinetic capabilities for each of explosive ability, the strength characterized by speed, the endurance of the muscular strength of the arms, and the transitional speed that witnessed a decline in the duration of the training period of the transitional period, and the training of handball players in the transitional period led to a decline in their level of bio-kinetic abilities for both agility and coordination between the eyes and arms. One of the most important recommendations recommended by the researchers is that: it is necessary to support the coaches' knowledge of the importance of maintaining the state of the level of handball players when planning training for the transitional period, especially in each of the studied bio-kinetic capabilities, it is necessary to reconsider the planning of the training curriculum for handball players in the transitional period, taking into account the preservation of the state of the players' training level, the Central Handball Federation must improve the determination of the transition period between the competitions in the local league, taking into account the overlap with the timing of the international competitions in which the players of the local clubs participating in the league, and giving importance to this period specifically, and not neglecting its effects on the players, and interest in conducting sequential tests for each of the bio-kinetic abilities of handball players, to evaluate the planning of training curricula in the different training periods.

1. Introduction

Most of the training of advanced handball players in local leagues who seek to achieve sports format throughout the competitive season go through different training periods in terms of their goals and duration in sports training planning, and players must continue to continue progress and improvements in training factors to achieve their goals in professional sports, and this requires Researching the details of these improvements for each of these factors in these training periods, which calls for the need to provide academic support in accordance with the steps of scientific research for both those in charge of the training process and competition organizers as well as players, in order to achieve the desired goals of planning the training period loads and their applications.

The transitional period between the competitions is considered one of the recovery periods for the burden of efforts placed on the players during the time period of these competitions, and at the same time it is a training period to preserve the level of players from negative regression in the various training factors, and handball players are no less important than the rest of the football players. The other collective need to maintain the level of bio-kinetic capabilities that are related to their performance of the requirements of this game, which puts the coaches in charge of adopting the modernity of training curricula and giving importance to evaluating them in each training period according to tracking the levels of players in various bio-kinetic capabilities, as the development of the level of the handball game has been

observed in a way it is clear at the Arab and international level in recent years, and in order to preserve it, it is necessary to take note of everything that increases support through the results of academic studies that rely on measurement and testing in the language of numbers, and avoiding speculation and improvisations when developing logical solutions.

As it is necessary to pay attention to handball players during the transitional period with the same attention that is given to them in the preparation periods and the other competitive season, because of the mentioned importance, and to adopt the results of scientific studies in the light of the continuous transformations and modernity in the foundations and principles of the science of sports training.

Thus, the importance of the research lies in an attempt to highlight and conduct some tests and measurements of some bio-kinetic capabilities and follow-up comparisons of the results between the end of the first competition period and before entering the second competition period, when stopping and moving away from the competitive atmosphere, so that the results envisaged from this research have theoretical and practical importance, the first of which is in It may benefit the coaches of handball clubs in supporting their knowledge of how to track the level of their players in the targeted measurements for their players to reconsider their planning for their training followed in this transitional period after evaluating them in the light of the results, and the second importance of this research is applied in that it may benefit the players themselves in identifying the strengths and weaknesses in order to judge their level, and provide them with facilities on how to advance the training level without

being subjected to a state of overload that may cause a decline in their levels.

Research problem

The transition period begins in the annual training season in the Iraqi Central Handball Federation after the end of the competition period in the first stage of the league, and ends with the start of the preparation period for another competitive period in the second stage, and this period aims to remove all of the physical stress placed on the players and reduce the phenomenon of overload that may affect them after the period of the ended competitions, to provide a base of readiness for the players' bodies to accept the training loads that prepare them for a later competitive period, and this is the reality of the principle of continuity in the training process, as the research problem lies in that through the limits of the researchers' experience. In sports training as a coach and researcher in this academic field, he noticed that the coaches of some clubs need to be familiar with the methodology of planning sports training and its applications in this transitional period. The rest of the other training periods, as well as the lack of attention given to the organizers of this league. The duration of the period or not is related to matters related to the interference of the international championships for the national team players with the local championships of these players in the clubs participating in the league, although the scientific facts indicate that if the handball player does not benefit from the transitional period, he exposes himself in the subsequent training season to many disadvantages of risks in various aspects, in addition to that, stopping to continue training as required by the transitional period will cause players to regress within a week or two, which requires going into the description of the results of their levels in the bio-kinetic capabilities in this transitional period to evaluate the players because of this period of preventive and developmental importance for them.

Research objective

1. Identify the most important bio-kinetic capabilities of handball players in the transitional period between competitions.
2. Identify the effect of the transitional period between competitions in tracking the level of the bio-kinetic abilities of handball players.

Research hypotheses

1. There are statistically significant differences between the results of the three sequential measurements of the research sample in the bio-kinetic aptitude tests in the transitional period between competitions.

Research fields

2. Human field: Al-Kut Club advanced handball players participating in the local league competitions for the sports season (2021-2022).
3. Time field: (19/12/2021) to (10/2/2022)
4. Spatial field: The headquarters of Al-Kut Sports Club in Wasit Governorate, and the headquarters of Basra Municipality Club in Basra Governorate.

Research methodology and field procedures

Research Methodology

The current research problem imposed the adoption of the descriptive research method in the style of follow-up studies, which is defined as "a method of survey studies that are carried out on a group of individuals, and their variables are measured for successive times in periods of time determined by the researchers based on the specificity of his study and its requirements." [1].

Community and sample research

The available research community is defined as "the community that refers to the available number of the target research community that the two researchers can refer to directly in withdrawing the sample items from it. The limits of the total research community are represented by the advanced handball players participating in the league competitions for the sports season (2021-2022), and they are officially registered in the records of the Iraqi Central Handball Federation, numbering (177) players distributed by nature to (12) clubs, and their description is shown in the table (1)

Table (1) shows the description of the field of the research community

No.	Club name	Number	No.	Club name	Number
1	Al Shorta	15	7	altaawen	15
2	Army	15	8	Karbala	15
3	Al-Hashd ash-Shabi	15	9	Kufa	15
4	Diyala	14	10	Al-Musayyab	15
5	Sulaymaniyah	15	11	The Arabian Gulf	14
6	Basra Municipality	14	12	Kut	15
The total number of club players					177

The researchers were directed to study this community for the following reasons:

1. The handball players represent the community of the phenomenon observed in the research problem themselves, and they are available to the researcher to easily contact them and to facilitate the task of the various procedures, for the cooperation of the administrative bodies of the clubs and coaches.
2. Availability of human and material capabilities that serve the research procedures in the various clubs.
3. Ensuring the presence of handball players by virtue of their commitment to regular training in their clubs.

The two researchers chose the main research sample of them in a simple random way, and they are from the Al-Kut Sports Club handball players, which are (15) players, with a percentage of (19.481%) from their original community, and (10) players were chosen randomly from the Basra municipality club with a percentage of (12.987%) from Their community of origin, for the procedures of the exploratory experiment and the verification of the scientific conditions of the bio-kinetic aptitude tests, as "randomness in this type of sampling takes place in giving each element of the community the same opportunity to be selected within the sample or group, and this type is useful in the case of homogeneity community and the existence of common characteristics among the members of the original community." [2].

The two researchers also sought to verify the homogeneity of the main research sample in some

extraneous variables that may constitute extremism. In the results of the tests, as shown in Table (2)

Table (2) shows the homogeneity of the main research sample in some extraneous variables

Variables and their unit of measure	Number	Mean	Std. Deviations	Skewness	coefficient of difference
Training age (Gregorian year)	15	5.4	1.298	-0.199	% 24.037
Chronological age (Gregorian year)	15	19.07	0.884	0.574	% 4.636
body length (cm)	15	173.07	2.492	-0.79	% 1.44
Weight (body mass) (kg)	15	73.8	2.541	-.737	% 3.443
The normal skewness modulus of skewness is specified between (+1), the modulus of variation is less than (39%)					

The results contained in Table (2) show that the degrees of the research sample in each of the variables contained therein were moderately distributed within the determinants of the normal distribution, which means that they are homogeneous in them.

Tools, devices and means used in the research

1. According to the requirements of the research and its tests, the following tools, devices and means were adopted:
2. Scientific Research Methods:
3. Arab and foreign sources.
4. Official websites in the international information network (Internet).
5. Individual, direct interviews.
6. Paper questionnaires to solicit the opinions of academic experts.
7. Bio-kinetic aptitude tests.
8. Various paper forms to record the players' data and their results in the tests.
9. Devices, tools and means used in research tests:
10. An electronic scale for measuring weight and length, with a unit of weight (kg and two parts) and a unit of length (cm), type (W.L) Chinese-made, number (1).
11. A portable calculator for a laptop type (LENOVO) made in China, number (1).
12. Japanese-made digital electronic stopwatch, number (1).
13. Life Fitness American-made stationary bike, number (1).
14. A Japanese-made z5 video camera (Sony) for documentation purposes.
15. Leather metric tape measure.
16. Colored adhesive tape with a width of (5) cm.
17. Legal handballs (BLAX) (15) Chinese-made.
18. Chinese-made handball referee whistle (Sika).
19. Iron bar weighing (20) kg.
20. Flatbed.
21. A medical ball weighing (2) kg.
22. Leather belt.
23. High wood chair with trunk back.
24. Pull-up.

25. Plastic lists (5) Chinese-made.
26. Tennis ball.

Field Research Procedures

Identifying the main research variables

The limitations of the researchers' experience with what was stated in his observation of the research problem, imposed that it be given academic support to deviate from the research variables for the purpose of starting the methodological procedures, as they deliberately reviewed some of the available sources and studies concerned with the subject of the research, as a group of variables were initially identified, as this preliminary determination imposes. To have academically acceptable support. This support is represented in the first direction in defining the name of the concept of each variable and the importance of addressing it to solve the problem in a systematic manner, and in the second direction to avoid personal judgments in defining the concepts and characteristics of the variables, and I got an agreement (100%) to study it as a follow-up study by measuring three times in Time ranges of the transitional period between competitions, as follows: The bio-kinetic capabilities of handball players in the transitional period.

Identifying the bio-kinetic abilities of handball players

In order to be stripped of personal judgments in this determination, the two researchers reviewed many available academic sources and studies, specifically in the game of handball, to extract a set of bio-kinetic capabilities specific to this game in a precise and specialized manner, and by adopting the principle of economics in the procedures confirmed by scientific research within the two researchers nominated A group of these different physical and kinetic abilities from these bio-kinetic abilities in a paper questionnaire prepared for this determination, and proceeded to present it to a group of specialized experts to find out their agreement on the most important of these bio-kinetic abilities according to the relative importance of a graded scale from (5-1), and taking what is more than A percentage of (80%) or more of their agreement on it, and as shown in the following table (3) mentioned.

Identifying the physiological variables of handball players

Following the aforementioned methodological method in the reliability of the determination itself, however, the large number of physiological variables and their branching imposed on the researchers to conduct direct individual interviews with a group of academic specialists to include the nomination of a group of these physiological variables in a paper questionnaire form prepared by the researchers specifically for this determination, and proceeded to present it to a group of experts Specialists to know their agreement on the most important of them according to the relative importance as well, and as shown in the following table (3):

Table (3) shows the results of the relative importance of determining bio-kinetic aptitudes

Abilities	no.	Name of the candidate bio-kinetic abilities in handball	The number of repetition of selection according to the most important of them					Weighted arithmetic mean	Importance relativity	Reliability according to the agreement	
			5	4	3	2	1				
			repetition	repetition	repetition	repetition	repetition				
bio-kinetic abilities	physical abilities	1	explosive ability of the legs	3	2	3	5	4	2.706	54.118	excluded
		2	explosive ability of the arms	14	1	1	0	1	4.588	91.765	chosen
		3	endurance muscular strength	13	1	1	1	1	4.412	88.235	chosen
		4	strength characteristic speed of the legs	5	1	3	4	4	2.941	58.824	excluded
		5	strength characteristic speed of the arms	15	1	0	1	0	4.765	95.294	chosen
		6	Transition speed	12	3	0	1	1	4.412	88.235	chosen
		7	endurance speed	2	4	3	7	1	2.941	58.824	excluded
		8	Kinetic speed of the arms	3	3	4	2	5	2.824	56.471	excluded
		9	Kinetic response time	4	1	5	1	6	2.765	55.294	excluded
	kinetic abilities	1	agility	14	2	1	0	0	4.765	95.294	chosen
		2	Flexibility of the trunk	2	4	2	6	3	2.765	55.294	excluded
		3	kinematic flexibility of the trunk	4	2	3	3	5	2.824	56.471	excluded
		4	Compatibility between eyes and legs	3	2	2	3	7	2.471	49.412	excluded
		5	Compatibility of the eyes and arms	14	1	2	0	0	4.706	94.118	chosen
6		fixed balance	3	3	3	2	6	2.706	54.118	excluded	
7		moving balance	2	3	4	6	2	2.824	56.471	excluded	

The relative importance of choosing aptitude = (80%) or more, number of specialized experts(17) =

It is noted from the results of the agreement contained in Table (3) that (5) bio-kinetic capabilities were identified, represented by (the explosive ability of the arms, endurance of muscular strength, transitional speed, agility, and compatibility between the eyes and arms) to achieve the acceptable conditions in this procedure.

Determining and characterizing the research variables tests

1. "The need to use the test as a tool for collecting data on the phenomenon under study appears when the two researchers want to quantitatively estimate the properties of the phenomenon. The test is a tool for estimating the performance or characteristics of the subjects." [3].
2. The academic determinants of measurement and evaluation imposed that the tests of the variables investigated by experts specialized in physical education sciences be agreed to suit the research sample and its specificity. Capabilities and variables

agreed upon in the aforementioned procedure.

3. A questionnaire was designed for each of them with these bio-kinetic capabilities, and included tests extracted from academic sources and studies, and presented to experts specialized in their orientations in order to adopt measurement tools suitable for repeated measurement in this research, and as shown by the results of the following table (4)
4. As "the reliability of tests and standards and their fields, dimensions, axes, or sections are subject to their representation of the concept or theory on the one hand, and (80%) or more of experts agree on it on the other hand, according to what the scientist (Bloom) stated in his acceptance of the interpreted variation of the agreement in this percentage, and the availability of Reliability condition for its representation of the phenomenon, to be considered true according to the definition of the concept of truth.

Table (4) shows the agreement on bio-kinetic aptitude tests							
no.	Bio-kinetic capabilities	Test determined by agreement	number of agree	number of disagree	Chi-2	agreement ratio	Agreement
1	explosive ability of the arms	Throwing a medicine ball with a weight of (2) kg	17	0	17	100%	agreement
2	strength characteristic speed of the arms	Pushing an iron bar (20) kg for (10) seconds	16	1	13.24	94.118%	agreement
3	endurance muscular strength of the arms	Arm muscle strength	15	2	9.94	88.235%	agreement
4	Transition speed	Run (20) meters	16	1	13.24	94.118%	agreement
5	Agility	Run the zigzag in a Barrow way	17	0	17	100%	agreement
6	Compatibility of the eyes and arms	Throwing and receiving balls against the wall	16	1	13.24	94.118%	agreement
Number of Specialized Experts = (17)							

Specifications of the bio-kinetic aptitude tests

1. First: The test of throwing a medical ball, weighing (2) kg, with both hands from above the head from a sitting position: (Hassanein. 2004)
2. Objective of the test: To measure the explosive power of the arms and shoulders.
3. Tools: a flat space area, a leather belt, a chair, a medicine ball weighing (2) kg, and a measuring tape.
4. Performance Specifications: The tester sits on a chair holding the medical ball with both hands above the head, with the torso attached to the edge of the chair. Using the hands only (without using the trunk).
5. Conditions:
6. The tester is given three attempts, the best of which is scored for him.
7. The tester is given an independent attempt at the beginning of the test as a performance exercise.
8. When the chair vibrates or moves during the performance, the score is not counted and another attempt is given to replace it.
9. Registration:
10. The score for each attempt is: the distance between the front edge of the chair and the closest point the ball places on the ground towards the chair.
11. The degree of the tester: It is the degree of the best attempt of the attempts
12. The three.
13. Unit of measurement: (cm).

Second: Iron bar push test (20) kg for (10) seconds: Sayed [4]

1. Objective of the test: To measure the speed characteristic of the two arms.
2. Devices and tools: Iron bar weighing (20 kg), a table, and an electronic stopwatch.
3. Procedures: The tester sits on the bench and holds the iron bar from the middle, then raises the bar to the top for a period of (10 seconds).
4. Recording: The number of times to be uploaded to the top within (10 seconds) is recorded.
5. Instructions: The tested player is given one attempt.
6. Unit of measurement: (number of times) which is the number of correct iterations within (10) seconds.

Third: Muscular endurance test (arms muscle strength)

1. Objective of the test: To measure the endurance of the muscles of the arms.
2. Tools: Barrel.
3. Performance Description: The tester stands below the crossbar, giving the start signal. The tester starts pulling with the arms to raise his body until he reaches his chin above the crossbar, then lowers his body until the arms are fully extended as he was in the starting position and repeats the previous performance as many times as possible without stopping.
4. Recording: Each correct and complete contraction in which the tester reaches his chin above the crossbar is counted.
5. Unit of measurement: the number of times.

Fourth: Transitional speed test (Hassanein. 2004)

1. Objective of the test: To measure the transitional velocity.
2. Tools: A paved running path of length (30 m), two lines (20 m) between them are drawn, one for the start and the other for the end, leaving a space after the finish line (10 m), a stopwatch, a whistle.
3. Performance specifications: The tester stands behind the starting line, taking a high starting position, when he hears the referee's signal, he runs in a straight line until he crosses the finish line.
4. Conditions:
5. Running in a straight line.
6. Low starting or running shoes with spikes are not allowed.
7. Two laboratories are allowed together due to the availability of the competition element.
8. Each tester has three attempts, the best of which is calculated, taking into account the sufficient rest between one attempts.
9. Recording: The tester is recorded the best (time achieved) in his three allowed attempts, to the nearest (1/10) sec.
10. Unit of measurement: (the second) and its parts.

Fifth: Agility test (zigzag ran the Barrow method) (Hassanein. 2004)

1. objective of the test: To measure the total agility of the body during its transitional movement.
2. Tools: A rectangular running field built on solid

ground, its length (4.75 m) and its width (3) m, an electronic stopwatch, five lists of lists that are used in the high jump or corner flags, such as those used in football, noting that the length of not less than The stand or the banner is about (30) cm high.

3. Procedures and Conditions:
4. The tester takes the standby position from the high start behind the starting line, and when he is given a signal at the start, he sprints between the five legs three times in a row.
5. The tester is given only one attempt.
6. Registration: The time it takes for the tester to cut the rectangle three times in succession is recorded to the nearest (1/10) of a second, starting from the moment the start signal is given until he crosses the finish line.
7. Unit of measurement: (the second) and its parts.

Sixth: The test of throwing and receiving balls against the wall al-Hakim [5]

1. Objective of the test: To measure the kinetic coordination between the eyes and the arms.
2. Tools: tennis ball, wall, colored masking tape.
3. Procedures and Conditions: The tester stands in front of the wall at a distance of (5) meters from it, and behind the line drawn on the ground with colored adhesive tape, as shown in Figure (6), to be tested according to the following sequence:
4. Throwing the tennis ball five consecutive times with the right hand, provided that the tester receives the ball after it bounces off the wall with the same hand.
5. Throwing the tennis ball five consecutive times with the left hand, provided that the tester receives the ball after it bounces off the wall with the same hand.
6. Throwing the tennis ball five times in succession with the right hand, provided that the tester receives the ball rebounding from the wall with the left hand.
7. Registration:
8. For each correct attempt, one (1) mark is awarded to the tester.
9. The maximum score for the test in the fifteen correct attempts is (15) degrees.
10. Unit of measurement: (degree).

Scientific conditions for bio-kinetic aptitude tests

First: The honesty of the bio-kinetic ability tests

The two researchers adopted the Face Honesty by presenting it to the questionnaire of the previously mentioned opinion to obtain the agreement of the specialized experts, and it is an approved procedure in the various sources of measurement and evaluation for sports tests in the sciences of physical education and sports, and this type of honesty determines that the test measures what it was designed for. The two researchers agreed on it for each test by (80%) or more, and with this procedure, the researchers verified the apparent honesty of the six bio-kinetic aptitude tests.

Second: Objectivity of bio-kinetic aptitude tests

The scientific conditions for the foundations of test accreditation should be of a high degree of objectivity to confirm the availability of the accuracy factor in the impartiality of the test taker. Basra municipality on Sunday (19/12/2021) and statistically treating the scores of the two arbitrators with a simple (person) correlation coefficient, as shown in the following table (8), so that each test acquires the condition of objectivity.

Third: The stability of bio-kinetic aptitude tests

"The reliability coefficient shows the relationship between two sets of test scores on the same individuals, as there are several ways to obtain these scores, including this re-application." (Murad and Suleiman. 2005), the two researchers verified the stability of each of the bio-kinetic aptitude tests by using the test method and re-applying the test (Test Retest). The exploratory finding has the same objectivity as the first application of this procedure, and then after (14) days. These tests were re-applied on the same sample, and the scores of the two applications were statistically treated using the Guttman L.A formula for stability because of the similarity of the scores of repeated tests in the future. With this procedure, all the tests gained the required stability, and as shown in Table (5):

Table (5) shows objective results and stability of bio-kinetic ability tests					
Test name	Objectivity		stability		Test acceptance notes
	person(Level sig)Guttman L.A(Level sig	
Throwing a medicine ball with a weight of (2) kg	0.955*	0.000	0.915*	0.000	Objective and stability
Pushing an iron bar (20) kg for (10) seconds	0.963*	0.000	0.922*	0.000	Objective and stability
Arm muscle strength	0.957*	0.000	0.948*	0.000	Objective and stability
Run (20) meters	0.975*	0.000	0.955*	0.000	Objective and stability
Run the zigzag in a Barrow way	0.948*	0.000	0.937*	0.000	Objective and stability
Throwing and receiving balls against the wall	0.939*	0.000	0.919*	0.000	Objective and stability
The degree of freedom (n-2) = (8) the level of significance (0.05) * the correlation is significant if the degree of (Sig) ≥ (0.05)					

The results of Table (8) show that the values of the scientific foundations and coefficients for the objectivity and stability of the tests were high and acceptable, and thus they are ready to start the follow-up study procedures.

"Consistency refers to consistency of the data and getting the same answers again if the tool is re-applied." [6].

The two exploratory experiments

To confirm the logical sequence of procedures, "After the two researchers have finished preparing the tests and subjecting them to logical analysis by the two researchers themselves and a group of arbitrators, he moves to the next step, which is to test the test or what is known as the exploratory study." [6].

As the purpose of these two experiments was to test each of the tests in the field before starting to apply them in

the main follow-up study, and these two survey experiments were applied to the players of the survey sample at the headquarters of the Basra municipality club whose number for this procedure is 10 players, as follows:

The first exploratory experiment

1. It was implemented on Monday (20/12/2021) at nine o'clock in the morning, and its purpose was as follows:-
2. Clarification to the assistant working group about the method and procedures for applying bio-kinetic aptitude tests to ensure clarity of the contents of the instructions for bio-kinetic aptitude tests.
3. Knowing the time required to apply for each test for organizational purposes, which the two researchers need when implementing it to apply the main follow-up study.
4. Identifying the obstacles that the researchers will face when conducting the main follow-up study to reduce them.
5. The researchers found the need to prepare handball players in a state of rest before carrying out these tests.

Second exploratory experiment

It was implemented on Tuesday (21/12/2021) at nine in the morning. Its purpose was similar to the purposes of the first reconnaissance experiment and with the same auxiliary work team. However, it specialized in experimenting with the method and procedures for applying bio-kinetic aptitude tests and how to calculate the results of each one.

The researchers found the need to take into account the logical sequence of applying the tests, and what each test requires in preparing the players, whether in a state of rest, or in a state of warm-up before starting the application of the bio-kinetic capabilities tests in question.

Application of the main follow-up study

After completing the procedures for adopting the selection of study tests for each of the variables investigated, the two researchers proceeded to conduct the main follow-up study by applying it to the main study sample for the application and identified with the players of Al-Kut Sports Club handball, numbering (15) players, with the help of the assistant work team, and according to the official administrative correspondence And documenting the biomechanical tests procedures for

each of the three measurements by means of these tests, as it was after the end of the first stage of the local handball league before the start of the transitional period on (29/12/2021), in the middle and at the end of it on (9/2/2022).), for a period of more than (40) days, taking into account the following sequence in the procedures for applying each test in the three measurements:

1- Bio-kinetic aptitude tests: they were applied according to the following sequence: Wall throwing and receiving test, Barrow zigzag running test, Medical ball throwing test (2) kg, Iron bar pushing test (20) kg for (10) seconds, Running test for (20) meters, Muscle strength endurance test After each tested player finished applying each of the bio-kinetic aptitude tests in the three sequential measurements in the transitional period, the scores were collected and classified into forms for each test in preparation for statistical treatment.

Statistical means

The results were processed using (SPSS v26) system to calculate the percentage, mean, standard deviation, (Levine) test for homogeneity of variance, and the one-sample analysis of variance (F) test (Orthogonal Comparisons) for one sample. And (Sidak) test to compare the repeated means of the correlated sample.

2. Results and discussion

Presentation, analysis and discussion of the results

After completing the application of the three sequential measurements for each of the tests during the transition period, the data of the Al-Kut handball club players representing the sample of the application were collected and processed statistically

Presentation, analysis and discussion of the results of the three sequential bio-kinetic abilities tests in the transitional period for handball players

Presentation and analysis of the results of the follow-up bio-kinetic ability tests in the three transitional periods for handball players

The two researchers present the statistical parameters of the three sequential measurements of the values of the results of the bio-kinetic aptitude tests, as shown in Table (6), illustrated by the following graphs, and then analyzed

Table (6) shows the values of the statistical parameters of bio-kinetic aptitudes in the results of the three follow-up tests

bio-kinetic abilities	measuring unit	First measurement		Second measurement		Third measurement		Contrast homogeneous	Level sig	Type homogeneous
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
explosive ability of the arms	cm	424.07	1.944	413.8	1.568	409.6	1.454	0.583	0.563	Non homogeneous
strength characteristic speed of the arms	number of times	15.87	0.743	13.13	0.64	10.6	0.507	0.452	0.64	Non homogeneous

endurance muscular strength of the arms	number of times	13.6	0.507	11.93	0.704	10.33	0.488	0.125	0.883	Non homogeneous
Transition speed	Sec	3.321	0.03	3.455	0.022	3.563	0.019	0.928	0.403	Non homogeneous
Agility	Sec	11.73	0.799	13.47	0.64	14.53	0.64	0.796	0.458	Non homogeneous
Compatibility of the eyes and arms	Degree	17.53	0.516	15.8	0.775	13.87	0.743	0.641	0.532	Non homogeneous
n = 15 Significance level (0.05) two degrees of freedom (2-42)										

The results of Table (9) show that Leven's values of homogeneity of variance were not statistically significant for each of the values of bio-kinetic aptitude tests at the level of significance (0.05) and two degrees of freedom (2-42).

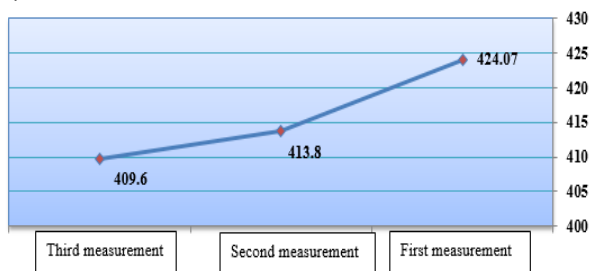


Figure (1) shows the arithmetic mean curve to test the explosive ability of the two arms in the three measurements

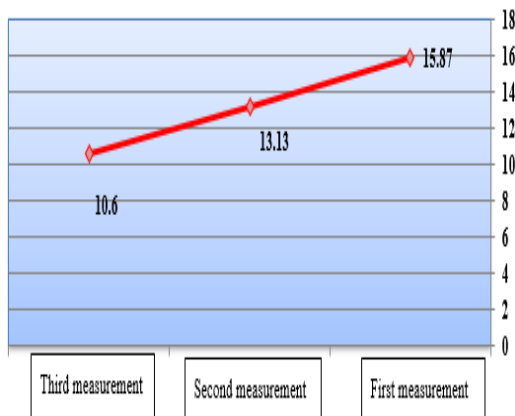


Figure (2) shows the arithmetic mean curve to test the strength characteristic speed of the arms of the arms in the three measurements

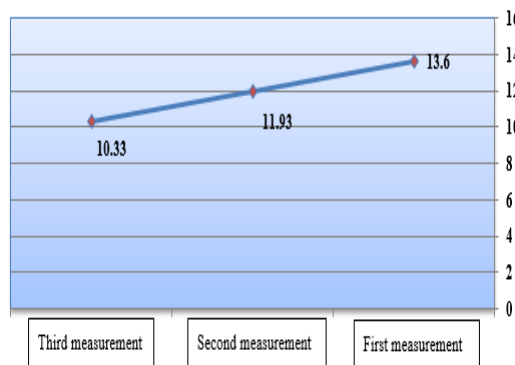


Figure (3) shows the arithmetic mean curve of the

muscular strength endurance test in the three measurements

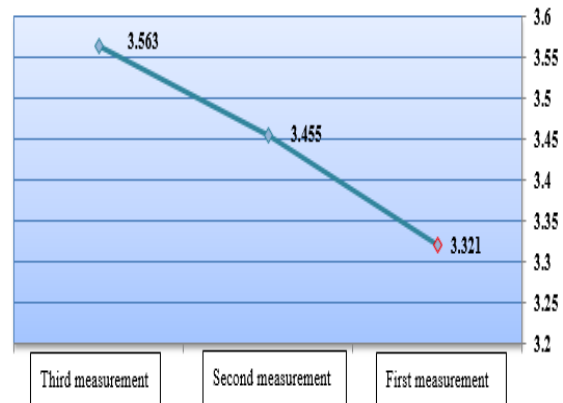


Figure (4) shows the arithmetic mean curve of the transitional speed test in the three measurements

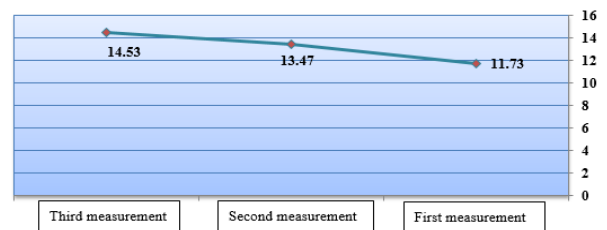


Figure (5) shows the arithmetic mean curve of the agility test in the three measurements

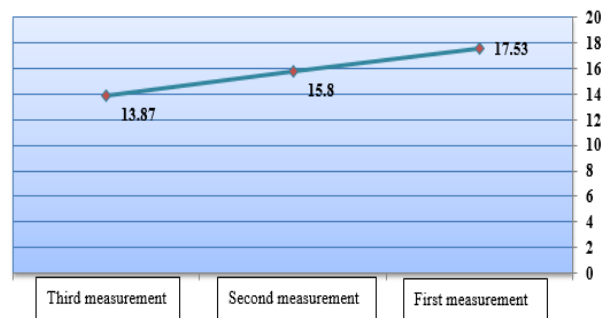


Figure (6) shows the arithmetic mean curve of the compatibility test between the eyes and arms in the three measurements

For the purpose of knowing the differences between the three follow-up measurements mentioned in Table (6), their results were processed by the (F) test for repeated measurements for comparisons between the results of one sample (Orthogonal Comparisons) as shown in Table (7) and then analyzed:

Table (7) shows the results of the (F) test for repeated measures among the three follow-up measures of the bio-kinetic ability tests

bio-kinetic abilities	Contrast source	sum of squares	Degree of	mean of	F value	Level sig	Type sig
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			freedom	squares			
explosive ability of the arms	between measurements	1661.644	2	830.822	298.414	0.000	sig
	within one measurements	116.933	42	2.784			
strength characteristic speed of the arms	between measurements	208.133	2	104.067	256.102	0.000	sig
	within one measurements	17.067	42	0.406			
endurance muscular strength	between measurements	80.044	2	40.022	121.221	0.000	sig
	within one measurements	13.867	42	0.33			
Transition speed	between measurements	0.439	2	0.219	393.776	0.000	sig
	within one measurements	0.023	42	0.001			
Agility	between measurements	59.911	2	29.956	61.673	0.000	sig
	within one measurements	20.4	42	0.486			
Compatibility of the eyes and arms	between measurements	100.933	2	50.467	106.691	0.000	sig
	within one measurements	19.867	42	0.473			

n = (15) the number of measurements for each test (3), the significance level (0.05) the calculated (F) value is a function if the degree of (Sig) ≤ (0.05)

It is evident from the results of Table (10) that the (F) values calculated between the three follow-up tests for each of the bio-kinetic aptitudes, respectively (298.414, 256.102, 121.221, 393.776, 61.673, 106,691) were statistically significant compared to the values of (Sig) degrees that were smaller than (0.05) all at the level of significance (0.05) and degrees of freedom (2 and 42), which indicates the significance of the statistical

differences between these measurements for each of the bio-kinetic abilities mentioned in this table. In order to find out the significance of the comparison differences between the orthogonal arithmetic means for one sample for all the values of the (F) test for repeated measurements for comparisons between the results of one sample Table (8):

Table (8) shows the results of the (Sidak) test for the significance of differences between the arithmetic means for the three follow-up measures of the bio-kinetic ability tests

Bio-kinetic aptitudes and the difference between the three measurements		Result arithmetic mean of difference	Level sig	Type sig
explosive ability of the arms	1 - 2	10.267*	0.000	Significant in favor of the first measurement
	1 – 3	14.467*	0.000	Significant in favor of the first measurement
	2 – 3	4.2*	0.000	Significant in favor of the second measurement
strength characteristic speed of the arms	1 - 2	2.733*	0.000	Significant in favor of the first measurement
	1 – 3	5.267*	0.000	Significant in favor of the first measurement
	2 – 3	2.533*	0.000	Significant in favor of the second measurement
endurance muscular strength	1 - 2	1.667*	0.000	Significant in favor of the first measurement
	1 – 3	3.267*	0.000	Significant in favor of the first measurement
	2 – 3	1.6*	0.000	Significant in favor of the second measurement
Transition speed	1 - 2	-0.134*	0.000	Significant in favor of the first measurement
	1 – 3	-0.241*	0.000	Significant in favor of the first measurement
	2 – 3	-0.107*	0.000	Significant in favor of the second measurement
Agility	1 - 2	-1.067*	0.000	Significant in favor of the first measurement

	1 – 3	-2.8*	0.000	Significant in favor of the first measurement
	2 – 3	-1.733*	0.000	Significant in favor of the second measurement
Compatibility of the eyes and arms	1 - 2	1.733*	0.000	Significant in favor of the first measurement
	1 – 3	3.667*	0.000	Significant in favor of the first measurement
	2 – 3	1.933*	0.000	Significant in favor of the second measurement
* The difference is significant at the level of significance (0.05) n = (15)				

It is noted from the results of [Table \(11\)](#) that the arithmetic mean difference between the three follow-up measurements for each of the bio-kinetic aptitude tests was significant in favor of the first and then the second measurement at the level of significance (0.05), which means a decline in the level of handball players at the end of this transitional period.

Discussing the results of the sequential bio-kinetic aptitude tests in the three transitional period for handball players

The results contained in the tables of statistical features and the differences between them and the significance of the differences (6), (7) and (8) showed that the effect of the transitional period between competitions was negative at the low level of the bio-kinetic capabilities contained in all these tables, and the researchers attribute this as follows:

First: explosive ability of the arms

The researchers attribute this decline in the level of explosive power to the fact that the training during the transitional period is not sufficient to allocate the training units aimed at developing this ability within the determinants of training in the anaerobic phosphagenic system, which requires (3) units per week for a period of (8-10) training weeks, as well as The burdens of the competition period in the first phase of the league, which required a sufficient period of time for recovery, and this requires a review of the planning of sports training units, taking into account the period allocated according to the curriculum of the Central Handball Federation, which imposes changes that must be taken into account to maintain the level in this period, especially And that the club's ranking in the league ranges between (11) and (12) out of a total of (12) clubs participating in this league, which calls for an increased focus on areas of weakness and development towards achieving progress in the level of players, and enhancing the club's ranking in the league. As "developing the level of muscular ability is one of the important things that every coach seeks to achieve and every player tries to reach, and this development must be logical and without exaggeration, as the emergence of fatigue is a physiological problem that negatively affects physical and skill performance." [Wilmore et al. \[7\]](#). Also, "muscular strength plays the main role in improving performance and preventing sports injuries, as the information available not long ago was that muscular strength is the basic rule and an important requirement for almost all sports." [\[8\]](#). Also, "the arrival of the athlete

is affected by the development of muscular strength, which is one of the most important elements of physical fitness as well as the development of other physical capabilities." [\[9\]](#).

Second: strength characteristic speed

The researchers attribute this decline in the level of this bio-kinetic ability, which is similar to the explosive ability in that it is a sum of explosive forces that combine strength and speed with less intensity. To develop within the determinants of the anaerobic phosphine system, as well as the accumulation of the burdens of physical efforts for the period of competition on the research sample resulting from the first stage of the league, which required a sufficient rest period to compensate for energy stores, to meet the requirements of what this important kinetic ability needs in handball, and this is what calls for the planning of units in this period takes into account the focus on the foundations and principles of sports training when developing them in the desired positive direction. As "the information available not long ago that muscular strength is of great importance, but in recent years we can note that muscular strength is certainly important, but by combining it with speed to become strength (ability) and it will certainly be more important.

After regular training, the player is able to instruct the main muscles to contract more, while the antagonist's muscles are in a high degree of relaxation or rest, which is reflected in the amount of strength the muscle produces, because the antagonist muscles do not exercise any resistance (counter action), especially in contractions fast muscle.

Third: Endurance of muscular strength

The researchers attribute this decline in the level of endurance of muscular strength of handball players in the transitional period to the fact that taking into account the period of rest necessary for recovery from endurance was insufficient between the training units in the transitional period, as the increase in training loads on the players does not mean that it will be There is an increase in the level of development of this bio-kinetic ability, unless the planning and implementation of its own exercises are improved during this period, as it combines endurance and muscular strength and is linked to an increase in the availability of vital energy needed to work with it on the one hand, and the type of exercises and methods used to develop it on the other hand, This also calls for a reconsideration of giving importance to her handball training in a way that suits the efforts the player has received and what he will receive from them in the next

stage of the league competitions. As "the ability to maintain a high level of strength for the longest possible period of time in the face of fatigue and to perform the largest number of repetitions refers to the concept of improving muscular strength endurance." Also, "in endurance training, the vital energy improves physiologically and chemically and changes in it, and this appears in the form of an evolution in the adequacy of the work of the various organs and systems; in addition to the distinction of performance by an economy of effort as a result of the player's continued performance of the load despite the beginning of his feeling of fatigue and then begins his adaptation to this is the lamb. In addition, "the endurance of muscle strength and the intensity of its contraction depends on the properties of the material, its weight, shape and size that is intended to be lifted or transferred, or the form of kinetic performance. Means of training in different body positions." [10].

Fourth: Transitional speed

The researchers attribute this decline in the level of transitional speed to the fact that the effect of training in the transitional period did not take into account the nervous fatigue resulting from the first stage of the competitions that preceded the transitional period, which had a negative impact on the neuromuscular control processes related to showing this inherited ability, and reduced the ability to empower players in Shortening the test time, due to the decline in the level of muscle strength in the previously mentioned sequential measurements, and the link between strength training and speed training, the latter was also negatively affected by the lack of interest in exercises according to the determinants of the phosphagenic system in allocating the number of units in the training weeks and in allocating the rest between units, and what Between the exercises in one training unit, to enable the neurological processes to recover their sufficiency in harnessing the stimuli of the repetitive movements that increase the transitional speed of the two legs, and this was evident in the results in this regression, which seems slight in time, but the moral differences proved this weakness in these Bio-kinetic susceptibility.

As "transitional speed depends on the flexibility of nerve processes to allow a rapid exchange between excitation and activation and enables the muscle to carry out movements in the ideal unit of time, and the processes of receiving and processing information enable the rapid ideal response to stimuli, and the processes of coordinating the internal work of the muscle and coordinating the joint work of the muscles to build a high speed.

As "trainers must build multi-faceted training curricula in a way that they focus on comprehensive exercises that are directed towards improving the level of functional work appropriate for the athletes' bodies in the different stages of training, especially the physical abilities similar to the future requirements of the type of sports activity practiced in order to facilitate the athlete's ability to acquire and perform The technical skills of the game, which leads to better achievements.

Fifth: Agility

The researchers attribute this decline in the level of agility for handball players in the transitional period to the decline in the level of both muscular strength and kinetic speed, considering the relationship of this ability with them, as agility training is linked to training these two bio-kinetic capabilities, in addition to that, the nature of practice and repetition was not at the required level. In the training units during the duration of the competitions, which appeared in the absence of training and giving negative rest to the players for reasons related to the policy and management of the club in dealing with their training, and thus the results confirm what was stated in the research problem in the lack of attention to these capabilities and the lack of attention to the negative effects resulting from the interruption of training, In addition to exaggerating the frightening degrees of the training load in order to recover, so that it is necessary to take into account the level of players in the league to allocate the appropriate hospitalization for them and the nature of their continued participation in the training and competitive season, and this came with a negative impact on agility. As "the arrival of the athlete is affected by the development of muscular strength, which is one of the most important elements of physical fitness, as well as the development of other physical qualities such as speed, endurance and agility." Baechele et al. [9]. In addition, "the individual's possession of a high level of agility helps to practice many sports activities successfully to participate in the development and advancement of kinetic skills." Al-Sadoun [11]. In addition, "kinetic performance in sports activities requires a high degree of kinetic coordination, meaning the ability to show appropriate kinetic actions in certain circumstances based on previous kinetic experiences or perfect skills, in other words, the ability of the athlete to act in the face of different conditions during the performance.

Sixth: Compatibility between the eyes and arms

The reasons for the decline in the level of this bio-kinetic ability do not differ from its predecessors, which the researchers attribute to the effect of negative interruptions for the players and the lack of interest in planning sports training in line with modernity in maintaining athletic format, especially the decrease in the level of strength and speed and the lack of performing regular movements in the repetitions that the players apply in Training units exercises, which have a role in increasing the neuromuscular control to show the required compatibility in various skills, as the alignments are affected by the players' continuity in continuing to perform the exercises, to enable the nervous system and increase its sufficiency on this organization. It is illogical to improve unless there is a continuation of the training without interruption the importance of compatibility between the eyes and arms in handball cannot be overlooked in planning the training of the transitional period, and the failures that result from its decline in the players must be avoided.

The player's possession of high compatibility abilities not only helps in his performance of kinetic skills completely and accurately, but also goes beyond that to include avoiding expected errors. The central nervous system is

based on the function and the system, and that the structure and complexity of the system and the function are compatible through this important organ, because the function of the central nervous system is the speed of choosing the appropriate response to different stimuli, whose effect is seen directly.". Also, "intramuscular coordination includes the number of working units, the frequency and speed of nerve signals, and the time reciprocal relationship between the works of kinetic units." also, "compatibility requires a high sufficiency of the nervous and muscular system, as it depends on the integrity of the muscles and nerves, and their connection in one work together.

3. Conclusions and Recommendations

Conclusions

After completing the treatment of statistical comparison of the results of the sequential measurements, the researcher reached the effect of the transition period on the bio-kinetic capabilities, which is represented by each of the following conclusions:

Handball players need to maintain the level of bio-kinetic capabilities for each of explosive ability, the strength characterized by speed, the endurance of the muscular strength of the arms, and the transitional speed that witnessed a decline in the duration of the training period of the transitional period.

The training of handball players in the transitional period led to a decline in their level of bio-kinetic abilities for both agility and coordination between the eyes and arms.

Recommendations

According to the researcher's conclusions, he developed a set of the following recommendations:

It is necessary to support the coaches' knowledge of the importance of maintaining the state of the level of handball players when planning training for the transitional period, especially in each of the studied bio-kinetic capabilities.

It is necessary to reconsider the planning of the training curriculum for handball players in the transitional period, taking into account the preservation of the state of the players' training level.

The Central Handball Federation must improve the determination of the transition period between the competitions in the local league, taking into account the overlap with the timing of the international competitions in which the players of the local clubs participating in the league, and giving importance to this period specifically, and not neglecting its effects on the players.

Interest in conducting sequential tests for each of the bio-kinetic abilities of handball players, to evaluate the planning of training curricula in the different training periods.

It is very important for the Ministry of Youth and Sports to coordinate with the faculties of physical education and sports sciences to invest the academic expertise specialized in testing bio-kinetic abilities in sports clubs because of their role and importance.

The researchers also recommend paying attention to conducting similar studies that deal with evaluating the training curricula followed with handball players in other training periods, by addressing the measurement of bio-kinetic capabilities.

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