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The Effect of the High Repetitions Method on Developing Strength Endurance in the Arms and some Basic Wheelchair Basketball Skills for Youth

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Abstract

The importance of the research is evident in raising the level of muscular strength endurance in the arms for wheelchair basketball players for the purpose of achieving better results in the match by providing the important and basic physical requirement for this game, in addition to delivering scientific information to basketball coaches about the method of high-repetition training and its role in developing muscular strength endurance. And offensive skill performance in wheelchair basketball. The most important objectives of the research were: identifying the effect of the high-repetition method on developing strength endurance in the arms and some basic wheelchair basketball skills for youth. Research methodology: The researcher used the experimental method with a two-group design (control and experimental) for its suitability in solving the research problem and achieving its objectives. Research community and sample: The research community was determined by the players of the Maysan Sports Team Committee for the Disabled for the sports season (2022-2023) participating in the Iraqi Premier League. Their number reached (15 players) and they are accredited and registered in the list of the Iraqi Central Federation. (5) were excluded due to the difference in the degree of their disability. For this reason, the research sample became (10) players, constituting (66.67%) of the original population, and they were divided randomly (by lottery) into two control and experimental groups. The number of each group was (5) players, and the following was concluded: The high repetition method is important in the process of developing endurance. Arm strength and some basic wheelchair basketball skills for youth. The recommendations were. Adopting the high repetition method is important in the process of developing endurance, strength in the arms and some basic skills in wheelchair basketball for youth. and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Good Health).

Keywords | **high repetitions, strength endurance, basic skills, chair basketball.**

Introduction:

Scientific development helps innovation and creativity in various fields that humans need, including the sports field. Scientific research and investigation of scientific facts had a major role in building the foundations of correct training, in addition to helping to build exercises and shape the training load in a way that serves the player's

physical ability and specialization in the type of game. This is why we find training. The athlete is in a state of constant change and development as a result of the specialized scientific experiments provided by researchers that help the player advance the level of the game and achieve various sporting achievements and tournaments. Wheelchair basketball is one of the sports in

which competition has become high-level and achieving sporting achievements and tournaments is not an easy matter, which requires... Training depends on the level of pace of the match and its physical and skill requirements. This is why we find that wheelchair basketball players depend on the arms more than the rest of the body's members in the process of performance, pushing the chair, turning with or without the ball, skill performance, and other matters, and throughout the periods of the match, and here it requires the muscular strength of the arms. For long periods, that is, in scientific terms, it requires strength endurance in the arms, which requires the use of training that keeps pace with this development, including high repetitions, which contributed to raising the level of strength endurance for various sports, and it must be tested on wheelchair basketball players, as both Singer and Robert believe. Muscular strength endurance is "the ability of the nervous system to overcome a certain resistance for the longest possible period in the face of fatigue. This period usually ranges between (6) seconds to (8) minutes, as the pushing or pulling force leads to an increase in the distance traveled as a result." To increase speed while maintaining a high degree of performance endurance during that specific period of time" (3). Hence the importance of research is evident in raising the level of endurance and muscular strength of the arms for wheelchair basketball players for the purpose of achieving better results in the match by providing the important and basic physical requirement for this game, in addition to delivering scientific information to basketball coaches on the method of training high repetitions and its role in developing endurance. Muscular strength and offensive skill performance in wheelchair basketball. In the research problem, we find that carrying the muscular strength of the arms is the basic physical ability of wheelchair basketball players to help him move with the chair, turn, and stop quickly while using the ball at the same time for handling or scoring and other offensive skills. In other words, the development

of this ability will It makes the player distinguished in the arena and difficult to beat. Through the researcher's modest experience in the game of basketball, his specialty in training athletes for people with special needs, and his observation of the level of performance of basketball players in wheelchairs, he noticed that there was fluctuation and weakness in performance, especially in the end periods of the match, in the level of the players' strength endurance of the arms, the most important part used in the match, which is due to The training used is not focused on that physical ability, which carries strength to the arms, which made the researcher think about the appropriate training that addresses this research problem, which he found in the high-repetition method that depends on the largest repetitions in performance and the appropriate length of the match periods, which will help in addressing the problem and work to achieve Developing the strength endurance of the arms and raising the offensive skill level of wheelchair basketball players. The objectives of the research were: identifying the effect of the high repetitions method in developing the strength endurance of the arms and some basic skills in wheelchair basketball for youth, identifying the differences between the results of the post-tests between the two groups. Control and experimental in developing endurance and strength in the arms and some basic skills in wheelchair basketball for youth. As for the research hypotheses: There are significant differences between the results of the pre- and post-tests for the control and experimental groups and in favor of the post-tests in developing strength endurance in the arms and some basic skills in wheelchair basketball for youth. There are significant differences between the control and experimental groups in the results of the post-tests and in favor of the experimental group in developing endurance. Arm strength and some basic skills in wheelchair basketball for youth were areas of research. The human domain: Wheelchair basketball players of the Maysan

Committee for the Disabled. The spatial domain: Wissam Oraibi Sports Hall in Maysan Governorate. Time frame: for the period from 1/2/2023 to 3/14/2023.

Method and Procedures:

Research Methodology: The researcher used the experimental method designed for the two groups (control and experimental) for its suitability in solving the research problem and achieving its objectives. He identified the research community represented by the players of the Maysan Sports Team Committee for the Disabled for the sports season (2022-2023) and the participant in the Iraqi Premier League, and their number reached

(15 players), and they are They are accredited and registered in the list of the Iraqi Central Union, and (5) were excluded due to their different degree of disability. For this reason, the research sample became (10) players, constituting (66.67%) of the original population, and they were divided randomly (by lottery) into two groups, control and experimental, and the number of each group was (5) players. The two samples were homogeneous and equal, as in Table (1), using the coefficient of variation for homogeneity and using the t-test for samples that were not related to equality.

Table (1)

It shows the homogeneity and equivalence of the control and experimental groups in the research variables.

Measurements and tests	Measurement	Control group			Experimental group			Calculated T value	Significance level
		S	A	Coefficient of variation	S	A	Coefficient of variation		
strength endurance	number	16,542	0,674	4,074	16,647	0,754	4,529	0,207	Insignificant
Side aiming skill of finishing with a shot	number	12,698	0,847	6,753	2,741	0,965	7,573	0,067	Insignificant
passing speed	second	9,847	0,691	7,017	9,887	0,741	7,494	0,079	Insignificant
	number	11,697	0,784	6,702	11,734	0,658	5,607	0,072	Insignificant

The tabular value of (T) at the degree of freedom (8) and under a probability of error (0.05) is • (1.860).

Means of collecting information:

Data collection methods:

Arab and foreign sources. Tests and measurements.

Equipment and tools used: Legal basketball court. (5) basketballs, (3) electronic stopwatches, (6 meters) measuring tape, and a medical scale.

Determining the research variables: After reviewing the sources and references and according to the specificity of the research and its requirements in defining the research problem and addressing it, the following variables were identified: strength extension for the arms. Side aiming. The dialogue ends with correction. Scrolling speed.

Tests used:

1-Power stretch for the arms (8) (Marwan).

Purpose of the test: to measure the force extension of the arms.

-Tools needed: a horizontal bar.

-Description of performance: The tester takes a hanging position with the arms so that the hands are fistful (held from below). The tester raises his body up until the chin reaches the level of the bar without swinging the body or legs, then his body rises to return to the normal position.

Recording: Performance is counted for the - greatest number of times.

2-Side aiming test. (8) (Marwan)

-Purpose of the test: To measure shooting skill by performing shots towards the basket from a specific place on one side of the goal near the two corners of the court.

Tools needed: **a basketball goal and a - basketball.**

-Description of the performance: The tester shoots from the specified place on either side of the goal near the corners of the court and at a distance of (6m) from the center of the basket, with two hands or with one hand, provided that he performs (10) shots from one side of the basket, then moves to the other side, and the tester is allowed to shoot. He performs some throws as an experiment.

-Scoring: Two points are counted for each successful shot (attempt) in which the ball enters the basket, and one point is counted for each shot (attempt) in which the ball touches the ring but does not enter the basket. No marks are counted for each shot in which the ball touches the ring but does not enter the basket.

3-Testing the dialogue ending with correction (8) (Marwan).

-The purpose of the test: to measure the speed of dribbling and the speed of aiming.

-Necessary tools: Three chairs placed on one line with the third chair following the target. The starting line is drawn at a distance of (19.5m) from the target. The distance between the starting line and the first chair is (6m) and the distance between the rest of the chairs is (4.5m). Stop Watch.

-Description of performance: The tester starts running in the wheelchair from the start with the ball when he hears the start signal in a zigzag manner between the seats, dribbling the ball until it reaches the bottom of the target to score, then picks up the ball and returns in the same manner. When shooting, he notices the necessity of scoring a goal. If the tester does not succeed in that, he repeats it. Try, then start returning according to the specified itinerary until it crosses the starting line.

-Recording: The time traveled by the laboratory is calculated from the moment the start signal is issued until it crosses the starting line after implementing the previous steps in the performance specifications.

4-The Rebound Wall Test (8) (Marwan).

-Purpose of the test: to measure scrolling speed.

-Necessary tools: a smooth wall with a rectangle drawn on it (120 cm

-Description of the performance: The tester sits with his chair behind the line drawn on the floor, which is 180 cm away from the wall. Using a basketball, the tester passes on the wall as many successive passes as possible in ten seconds, provided that the ball does not touch the ground during the performance.

-Recording: The number of passes on the wall is recorded within (10 seconds), with the ball having to be directed towards the rectangle each time.

Exploratory experience:

The researcher conducted a reconnaissance experiment on 1/2/2023 on some of the players of the original research sample (Maysan Committee Club for Wheelchair Basketball Players) for the following purposes: codifying the exercises used and finding the appropriate training load in terms of intensity, volume, and comfort. Knowing the difficulty level of constant muscle strength and its suitability for the disabled.

Scientific foundations of the tests: Standardized tests were relied upon and are characterized by honesty, consistency, and objectivity.

Field experience:

Pretests: Pretests were administered on 1/8/2023

User training:

Characteristics of the high-repetition training method: "This type of training is characterized by its reliance on performing exercises with large numbers of repetitions, and in order to achieve this goal, the intensity must be low. Therefore, the possibility of developing strength through this type of work is weak, as the sources indicate that the exercise that In which the load is less than (66%) of the maximum, it does not develop strength. Note that strength endurance training

with this type of training is based on the repetitions of one exercise being (30-50 repetitions for each set) and at an intensity of (30-50%) of the maximum. Either the number of sets is (3-4) sets, and the time element can be adopted in performing the largest possible number of repetitions in a specific time. One of the advantages of this type of training is that it leads to an increase in the concentration of lactic acid and other combustion exhausts in the muscles, which leads to Increasing the athlete’s ability to perform with a high percentage of these products, knowing that the accumulation of lactic acid and other products during exercise exceeds their quantity during the race and can lead, as Adel Turki pointed out, to this type of training leading to improved blood circulation, which stimulates metabolism. Nutrition and increasing the rate of elimination of combustion products, thus improving muscular endurance” (3). For this reason, a set of required exercises for endurance and muscular strength of the arms were developed and were applied in a high-repetition method according to the following details:

-Number of months: two months.

- Number of weeks:** (8) weeks.
- Number of training units:** (24) training units.
- Training unit days:** Sunday, Tuesday, Thursday.
- Severity:** The severity ranged from (30-50%).
- Size:** The size was determined according to the -required intensity.
- Rest:** The pulse has been adopted as an -indicator of rest.

It was programmed in the main section of the trainer’s training units, and was applied during the special preparation period. The training application began on 1/9/2023 and ended on 3/13/2023.

Posttests: Posttests were administered on -3/14/2023.

-Statistical methods: The statistical system (SPSS) was used to process the results using the following: 1- Arithmetic mean. 2- Standard deviation. 3- Coefficient of variation. 4- Percentage. 5- T-test for correlated samples. 6- T-test for uncorrelated samples.

Results:

Table (2)

It shows the arithmetic means and the calculated and tabulated T-values for the pre- and post-research variables for the control group.

Physical tests	measuring unit	Arithmetic mean		Standard error	Calculated T value	Significance level
		pre	post			
endurance strength for arms	Number	16,542	17,895	0,587	2,304	significant
Side aiming	number	12,698	13,996	0,499	2,601	significant
skill finishing with a shot	Second	9,847	8,452	0,488	2,858	significant
Scrolling speed	number	11,697	13,124	0,539	2,647	significant

The value of the table (t) at the degree of freedom (4) and under the probability of error (0.05) amounted to = 2.132

Table (3)

It shows the arithmetic means and the calculated and tabulated T-values for the pre- and post-research variables for the experimental group.

Physical tests	measuring unit	Arithmetic mean		Standard error	Calculated T value	Significance level
		pre	post			
endurance strength for arms	number	16,647	19,214	0,996	2,577	significant

Side aiming	number	12,741	15,632	0,896	3,226	significant
skill finishing with a shot	Second	9,887	7,099	0,949	2,937	significant
Scrolling speed	number	11,734	15,324	0,889	4,038	significant

The value of the table (t) at the degree of freedom (4) and under the probability of error (0.05) amounted to = 2.132

Table (4)

It shows the arithmetic means and the calculated and tabulated (t) values for the dimensional research variables between the control and experimental groups.

Physical tests	measuring unit	Arithmetic mean		Experimental group		Calculated T value	Significance level
		s Post	A	Post s	A		
endurance strength for arms	number	17,895	0,784	19,214	0,895	2,22	significant
Side aiming	number	13,996	0,764	15,632	0,773	3,012	significant
skill finishing with a shot	Second	8,452	0,542	7,099	0,435	3,899	significant
Scrolling speed	number	13,124	0,698	15,324	0,839	4,036	significant

The value of the tabular T at the degree of freedom (8) and under a probability of error (0.05) is (1.860).

Discussion:

Through the presentation of Tables (2) and (3), it appears to us that there is a development for the control and experimental groups in the endurance of the muscular strength of the arms and the offensive skill performance of basketball players in wheelchairs. This is evidence of continuing training and communicating with the coach in applying the planned training units without interruption, and this is considered Among the principles and objectives of the science of sports training, Marwan Abdel Majeed and Muhammad Jassim Al-Yasiri state, “The goal of the sports training process is to bring the individual athlete to the highest level of athletic achievement in the event or activity in which the athlete specializes” (9). Also, the planning of sports training in building the training curriculum depends on the ideas and mental plans of the coach and according to what the wheelchair basketball players see in order to raise the required level and in turn affects the level of skill performance. This is evidence of the success of the established curriculum and the development of the level of the two groups, as Muhammad Ali Al-Qat mentioned. “The success of the training curricula is measured by the extent of progress achieved by the individual athlete by

the type of sporting activity practiced and by the skill, physical and functional level achieved, and this depends on the adaptation that the athlete achieves with the training curriculum that he applied” (6). Either (Muhannad Abdel Sattar Al-Ani) believes that “there is a scientific fact that must be taken into account, which is that the exercises used in the training curricula lead to the development of performance if they are built on scientific foundations in organizing the training process, using the appropriate load, observing individual differences, under good training conditions and under the supervision of specialized trainers.” As the training programs that are codified and organized according to scientific principles work to develop the physical and skill level of the players” (10). Either by displaying Table (4) we show that the experimental group is superior to the control group, and this indicates that the high repetitions method is a successful method. In raising the level of strength endurance of the arms and its impact on offensive skill performance, Muhammad Reda Ibrahim believes: “The conditions of sports training depend on the level of development of its components, the higher the level of achievement according to the needs of the race” (7). This

method is considered one of the successful methods in Developing strength endurance, as it is an important ability in the game of chair basketball, and its development is evidence of resistance to fatigue, and since this method involves large loads that depend on the volume of training used, therefore, the fatigue resulting from training helps to adapt, and there is also the need to pay attention to rest according to the fatigue produced in order not to fall into Overload, and this is what (Qasim Hassan Hussein) indicates: "Rest periods should be appropriate because a short rest period leads to fatigue and thus the development of strength endurance" (5). While (Qasim Al-Mandalawi and Mahmoud Al-Shatti) point out: "Force endurance is It is the ability to work for a long period of time and repeat a movement with sustained effort" (4). Regarding offensive skill performance, its development came definitively as a result of the development of the physical aspect. In other words, if the physical qualities necessary for performance are lacking, it will not be possible to raise the level of performance and achievement related to the physical aspect. This is why (Amr Allah Ahmad Al-Basati) confirms, "that athletes in various sporting events They cannot master the basic skills that characterize every activity if they lack the necessary physical qualities specific to the sporting activity" (1).

Osama Kamel Rateb and Ali Muhammad Zaki believe: "In the process of preparing a swimmer, appropriate physical exercises are used, which help in achieving the highest possible achievement" (2). Also, high-volume training is the most appropriate training because it deals with the competition atmosphere in terms of distance, time, performance, and repetition of the appropriate and difficult manner, which was reflected in the result of the test, which revealed the truth of this development through the accuracy of performance and its speed during implementation, and this is what was confirmed by (Wajih Mahjoub): "Repetition and training gives... The skill has more proficiency, more

competition, and more precise motor brilliance (11).

Conclusions:

1-The high repetition method is important in the process of developing endurance and strength in the arms and some basic skills in wheelchair basketball for youth.

2-Using large sizes in an atmosphere similar to the type of performance in competition gives better results in developing endurance and strength in the arms and some basic skills in wheelchair basketball for youth.

Recommendations:

1-Adopting the high repetition method as it is important in the process of developing endurance, strength in the arms and some basic skills in wheelchair basketball for youth.

2-Emphasizing the use of large sizes in an atmosphere similar to the quality of performance in competition gives better results in developing endurance and strength in the arms and some basic skills in wheelchair basketball for youth.

Author's declaration:

Conflicts of interest: None

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

Ethical-Clearance: this manuscript approved by local ethical committee of physical education and sport sciences college for women on (June /2024)

Author's contributions:

All contributions of this study were done by the researcher (Z.S.) who get the main idea and work on writing and concluding also with number of experts, Haider Abdul-Razzaq (Al-Basrah University) in Statistics, Stuart Biddle in revision, Taj Al-deen Alaa Al-deen in translating, Aida Al-awamleh in proofreading.

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Appendix (1)
(Sample of training modules)
Week: First, intensity: 30%

Training unit (1) Exercise time: 50-52 minutes

Section	Time per minute	Exercises	size	
Chief	2,40	1-Sit on the chair behind the basket carrier and pull the elastic ropes forward with the arms that are attached to the basket carrier.	2x20	Pulse return to limit allows for long repetitions
	2,30	2-Sitting on the chair, swing the dumbbells forward and backward.	2x20	
	5,50	-Shooting (100) shots	1x100	
	6,60	-Handling performance with the wall (100)	1x100	

-An agreement was reached with the coach and players of the Maysan Wheelchair Basketball Committee to conduct the research
-Haider Abdul Razzaq Kazem / College of Physical Education and Sports Sciences University of Basra.

تأثير أسلوب التكرارات المرتفعة في تطوير تحمل القوة للذراعين وبعض المهارات الأساسية بكرة السلة على الكراسي المتحركة للشباب

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مستخلص البحث

تتجلى أهمية البحث في رفع مستوى تحمل القوة العضلية للذراعين للاعبين كرة السلة على الكراسي المتحركة لغرض تحقيق نتائج أفضل بالمباراة من خلال توفير المطلب البدني المهم والأساسي لهذه اللعبة، بالإضافة إلى إيصال معلومة علمية لمدرربي كرة السلة عن أسلوب تدريب التكرارات المرتفعة ودورها في تنمية تحمل القوة العضلية والأداء المهاري الهجومي بكرة السلة على الكراسي المتحركة. وكانت أهم أهداف البحث: التعرف على تأثير أسلوب التكرارات المرتفعة في تطوير تحمل القوة للذراعين وبعض المهارات الأساسية بكرة السلة على الكراسي المتحركة للشباب. منهج البحث: استخدام الباحث المنهج التجريبي ذو التصميم المجموعتين (ضابطة والتجريبية) لملائمته في حل مشكلة البحث وتحقيق أهدافه. مجتمع البحث وعينته: حدد مجتمع البحث المتمثل بلاعبين فريقي ميسان الرياضي للمعوقين للموسم الرياضي (2022-2023) والمشارك بالدوري الممتاز العراقي وبلغ عددهم (15 لاعب) وهم معتمدين ومسجلين في لائحة الاتحاد المركزي العراقي، وتم استبعاد (5) لاختلاف درجة عوقهم. ولهذا أصبحت عينة البحث (10) لاعب وتشكل نسبة (66.67%) من المجتمع الأصلي وتم تقسيمهم بالطريقة العشوائية (القرعة) إلى مجموعتين ضابطة وتجريبية وبلغ عدد كل مجموعة (5) لاعبين وتم استنتاج ما يلي: أسلوب التكرارات المرتفعة مهم في عملية تطوير تحمل القوة للذراعين وبعض المهارات الأساسية بكرة السلة على الكراسي المتحركة للشباب. وكانت التوصيات: اعتماد أسلوب التكرارات المرتفعة كونه مهم في عملية تطوير تحمل القوة للذراعين وبعض المهارات الأساسية بكرة السلة على الكراسي المتحركة للشباب. وهذا ما يحقق احد اهداف التنمية المستدامة للامم المتحدة في العراق (الصحة الجيدة).

التكرارات المرتفعة، تحمل القوة، المهارات الاساسية، كرة السلة على الكراسي.

الكلمات المفتاحية