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## Designing and rationing a test for the strength of the arms for weightlifters in the national Paralympic weightlifting sport

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## Abstract

The importance of the research comes through the design and standardization of a special test for the muscular strength of the arms for people with physical disabilities in order for the specialists and those working with this segment to be able to make the correct scientific measurement that is commensurate with the condition and the special situation of the disability and the performance of their sport and stand on the training situation and that the lack of a special test measures this strength which prompted the researcher to do this scientific experiment. The aim of the research is to design and standardize a test for the strength of the arms for the lifters in the national Paralympic weightlifting sport. The researcher used the descriptive approach, the method of correlational relations, and the research sample is Baghdad clubs, which represent people with physical disabilities in the sport of Paralympic weightlifting. The total number is (52), and (12) lifters are excluded in order to complete the exploratory experiment, test requirements, and the sample study (40) lifters. The researcher concludes that the special strength test reaches (the strength characteristic of the speed of the arms for people with disabilities in lifting weights) and that the design of the test has the scientific specifications of validity, stability and objectivity. The standard and modified grades and the percentage weight of the raw grades for the performance of the research sample are reached, and the researcher reached the use of the test designed in the special strength test (the strength characteristic of the speed of the arms for people with disabilities in lifting weights) and the use of the standard grades and levels shown by the results of the research in evaluating the lifters with disabilities in the sport of lifting Paralympic weightlifting.

**Keywords:** Muscular strength, Arms, Physical disabilities, Special test, Standardization, Paralympic weightlifting, Lifters

## Introduction

### 1-1 Introduction and the importance of research

Scientific development and progress, which include all areas of life, including the mathematical field, is the result of the use of correct scientific tools that reflect the true reality of each case or phenomenon which is real for each case or work and gives the scientific description programmed on the field results and evaluating the existing work.

The tests have great importance, since they give a result to the individual for the action or behavior that he performs in addition, it contributes to the speed of obtaining results. The muscles of the arms are one of the muscle groups that play a large and very important role in the required performance of people with physical disabilities in the sport of Paralympic weightlifting, this important segment of society and that the specificity of the sport they practice and the specificity of the performance of the bench press lift is the responsibility of the specialists in research and continuous work in developing and finding scientific methods and means in order to achieve the true measurement of the weightlifters.

The work on designing a special strength test for people with a physical disability in the national Paralympic weightlifting sport is of great importance to this important segment in evaluating the level of the weightlifter, especially since the specificity of this sport bears the responsibility of determining special tests for the sport that they practice, and through the test the development of the weightlifter is determined.

## 1-2 Research problem

The researcher read many studies related to the sport of weightlifting for people with physical disabilities, and the fact that the researcher is specialized in the sport of people with physical disabilities in the sport of weightlifting and through personal interviews, the researcher notice that there is no special test of the strength characteristic of the speed of the arms for people with disabilities in lifting weights.

## 1-3 Research objective

-Designing and rationing a test for the strength of the arms for weightlifters in the national Paralympic weightlifting sport

## 1-4 areas of research

**1-4-1 The human field:** lifters with physical disabilities in the national Paralympic weightlifting sport in Baghdad.

**1-4-2 Time range:** for the period from 12-22-2022 to 3-1-2023

**1-4-3 Spatial field:** National Paralympic Weightlifting Hall - Headquarters of the National Paralympic Committee - Albnouk.

## 1-6 Defining terms

1-6-1 Mobility disability: Every individual loses part or all of his physical abilities or loses part of his limbs due to an innate or acquired reason that leads to a loss of movement (Iman Abdel-Amir: 2012: p. 4)

## 3- Research methodology and field procedures:

### 3-1 Research Methodology:

The nature of the problem to be studied is what determines the methodology used in the research. The researcher used the descriptive method in the survey method and expresses the survey method "is the accurate perception of the mutual relations between society, trends, tendencies, desires and development so that it gives the research a picture of the reality of life, setting indicators and building future predictions" (Dhafer Al-Kazemi, 2013, p. 106).

### 3-2 The research community and its sample:

The research community is choose by the intentional method, "the part that represents the community of origin or the expression of the model on which the researcher conducts the entirety of his work" (Dhafer Al-Kazemi, 2013, p. 84). The sample was chosen by the intentional method, and the sample included (40) lifters with physical disabilities in the sport of Paralympic weightlifting, the parent population was (52) lifters, and (12) lifters are excluded for the sake of the exploratory experiment, and the percentage was (76.92%) of the parent population.

#### 3-2-1 Homogeneity of the sample:

In order to obtain homogeneity among the members of the research sample and to prevent influences that may affect the results of the experiment in terms of individual differences found among the players in age and weight, the researcher found the torsion coefficient, and the measurements indicated that the equinox curve was achieved, which shows that it ranges between ( $\pm 3$ ) Which indicates the homogeneity of the sample and the table below shows that.

Table 1  
Sample homogeneity in age and weight

variants	measuring unit	Arithmetic mean	standard deviation	torsion modulus
Age	Year	20,55	0,922	0.499
Weight	Kg	84,62	0,471	0.579

Table (1) shows that the values of the torsion coefficient are limited to ( $\pm 3$ ), which indicates the homogeneity of the research sample in these variables, i.e. the moderation of their normal distribution.

### 3-3 The means of collecting information, devices and tools used in the research:

#### 3-3-1 Means of collecting information:

- International Information Network (Internet).
- Local, Arab and international scientific sources.

Tests and scale used in the research.

#### 3-3-2 Equipment and tools used in the research:

(1) Dell laptop.

- A scale for measuring weight (1) made in China.

### 3-4 Field Research Procedures:

#### 3-4-1 Test design:

After reviewing the test and measurement literature, the test was written and the test was presented to specialists \*\*.

##### 3-4-1-1 The designed test

Test Name: Special Strength Test

The purpose (objectives) of the test: Measuring the strength of the arms (the strength distinguished by the special speed in performance for people with disabilities by lifting weights).

- Used equipments :-
  - Special bench (Smooth + Fixed Shift) - Iron discs of different weights (0.5 kg up to 25 kg) - Stopwatch.
  - Performance description (application for the lifter): - The lifter with disabilities lies on the bench with the belt attached, i.e. fixing the thighs with a special belt, and he holds the weight at a legal distance between the arms (81) cm, and he works to hold the lip, bend the arms to the chest area, and extend the arms completely to the top, where the intensity is (75%) of the maximum intensity of the lifter method laboratory

Recording method: The number of repetitions is calculated for the quadrant with a disability for a period of (15) seconds.

Terms of application:

- It should go down to chest level.
- The ascent should be with weight until the arms are fully extended.
- The distance between the two fists should not exceed (81) cm.

### 3-5 Exploratory experience

Conducting the main experiment, the researcher must conduct some important and recognized basic scientific contexts when applying physical tests to the members of the researched sample, and among these contexts is conducting the exploratory experiment. (Dhafer Hashim: 2012:95)

1. Positives.
  2. Negatives .
  3. Work flow.
  4. Know the difficulties and obstacles.
  5. Identify the time period for carrying out the experiment.
  6. Ensure the efficiency of the work team.
  7. Testing the validity of tools and devices.
  8. The suitability of the sample and its response to the experiment and the tests.
- The exploratory experiment conducts on Saturday corresponding to 1/21/2023 at 10:30 a.m. The designed test was applied to the exploratory sample of (12) weightlifters with physical disabilities by lifting national Paralympic weights.

### 3-6 Scientific foundations

#### 3-6-1 Honesty:

The proposed test was presented to a number of specialists who agreed on its validity, the test in measuring the strength of the speed characteristic of lifters with disabilities and the specificity of performance and measurement. The validity of the arbitrators was found, and this procedure is considered the validity of the test that measures what is set to be measured efficiently (Raysan Kharibet: 1999:32) In addition, the subjective validity of the test was found, which is the stability coefficient under the square root, and it was found to be equal to (089), which indicates the validity of the test to be true if the validity coefficient was (0.75) or more (Wadih Yassin and Hassan Muhammad: 1999: 238).

#### 2-6-2 stability

The stability of "the test means stability, that is, if the same test was re-applied to one individual, it would give some stability in the results" (Muhammad Sobhi Hassanein: 1995:193) The stability coefficient for the proposed test finds by using the re-test method on a group of (12) weightlifters with physical disabilities in the national Paralympic weightlifting sport. The first test was conducted on Saturday 1/21/2023 the test is re-applied on the same sample after (7) days on Monday corresponding to 1/30/2023. The correlation coefficient is calculates between the test results for the first and second time, and it was found to be equal to (087), and this indicates that the tests have a high degree of stability ,as the test that obtains a stability coefficient score of (0.75) or higher has a high degree of stability (Aziz et al., 1989, 120).

Table 2

Statistical parameters of the speed-strength tests for the arms for the first time and return it to the stability sample

Statistical parameters the test	First test		Second test		Correlation coefficient value
	-s	$\pm A$	-s	$\pm A$	
Special strength test (the strength characteristic of the speed of the arms for people with disabilities in weightlifting)	8,99	0,57	8,83	0,59	0,94

### 2-6-3 Objectivity:

Objectivity means the extent to which it is possible to reach a correct score when more than one arbitrator applies the test to the same sample and gives the same score, and it expresses it "if two or more arbitrators perform and use the same devices and procedures and it is possible to obtain similar results" (Marwan Abdul Majid: 154:1999) The researcher used arbitrators \* who are specialized in lifting weights for people with physical disabilities, if the simple correlation coefficient (Pearson) was calculated, as the results showed that the value of the correlation was (0.983), which indicates the objectivity of the designed test.

### 3-7 Test validity

#### 3-7-1 The discriminatory ability of the designed test:

The researcher use the type of validity distinguishing between the two high-level and low-level groups to identify the efficiency of the test in terms of the measured aspects of the ability, urging the "ability to show the differences between the characteristic that the test measures in a sample of opposing or divergent groups" (Tayseer Mufleh: 116:2005) Where the researcher adopted the descending order in the raw scores, and the researcher used (extremist groups) if he adopted the percentage (27%) the researcher used the law (F) for the independent samples, as the value for the test reached (21,162), which is greater than the tabular value of (2.66).

#### 3-7-2 Coefficient of ease and difficulty of the designed test:

This is an important step that must be "the more the test is far from complex and characterized by ease in performance, the more it accommodates a number of the total number of testers" (Muhammad Al-Yasiri: 63: 2010). The coefficient of ease and difficulty was extracted and reached (0.37).

### 3-8 The main experience:

After completing the requirements, scientific transactions, and the validity of the designed test, the main experiment was conducted on Saturday, 2/18/2023.

### 3-9 Statistical means:

The SPSS package was used to extract the means

## 4- Presentation, analysis and discussion of results

## 4-1 Presentation and analysis of the test results of the studied research sample

Table 3

Statistical parameters Test	-s	+A	highest value	less value	vein	torsion modulus	Result
Special strength test (the strength characteristic of the speed of the arms for people with disabilities in weightlifting)	8,55	0,89	8,99	7,98	8,54	+0,45	natural positive

4-2

3-2-1 Presentation of standard grades:

Table 4

The raw, standard and modified scores and the percentage weight of the research sample, the special strength test (the strength characteristic of the speed of the arms for people with disabilities in lifting weights)

No.	raw degree	Normative class	modified standard	Weight percent	No.	raw degree	Normative class	modified standard	Weight percent
1	6,30	3,02	80	100	21	8,67	0,60	56,98	82
2	6,33	2,99	78,0	99	22	8,72	0,52	55,52	81
3	6,65	2,89	77,42	98	23	8,72	0,44	54,43	82
4	6,76	2,77	76,98	97	24	8,81	0,36	53,62	81
5	6,88	2,69	75,08	96	25	8,85	0,28	52,81	80
6	6,89	2,65	74,09	95	26	8,89	0,20	52,12	79
7	6,90	2,59	73,92	94	27	8,93	0,12	51,32	78
8	6,96	2,49	72,74	93	28	8,98	0,04	50,44	77
9	7,09	2,47	71,69	92	29	9,00	-0,04	49,62	76
10	7,12	2,44	70,33	91	30	9,05	-0,12	48,81	75
11	7,15	2,39	69,76	90	31	9,09	-0,24	48,22	74
12	7,23	2,33	69,43	89	32	9,10	-0,28	48,27	73
13	7,25	2,04	67,34	88	33	9,20	-0,36	46,48	72
14	7,30	1,96	69,6	87	34	9,21	0,49	45,64	71
15	7,38	1,88	68,69	86	35	9,22	-0,53	44,65	70

16	7,49	1,80	68	85	36	9,33	-0,67	44,23	69
17	7,67	1,72	67,2	84	37	9,37	-0,69	43,76	68
18	7,73	1,64	66,4	83	38	9,42	-0,73	42,09	67
19	7,75	1,56	65,6	82	39	9,47	-0,82	41,54	66
20	7,87	1,48	64,8	81	40	9,51	-0,99	40,32	65

### 3-2-2 Finding standard levels

It is expressed as "standard levels that represent the purpose required to be achieved in relation to any characteristic and represent the level that individuals must reach in a specific test" (Ibrahim Salameh: 1979:46)

Table 5

The standard levels, categories and repetitions of the research sample in the test (the special strength test (the strength characteristic of the speed of the arms for people with disabilities in lifting weights))

No.	Levels	Types	Repetition
-1	excellent	18- and above	1
-2	very good	17-16	3
-3	good	15-14	13
-4	middle	13-12	18
-5	weak	11-10	4
-6	Very weak	9-8	1
	Total		40

Through the table above, it was found that the research sample studied obtained the highest percentage of the testers, weightlifters with physical disabilities, in the sport of weightlifting at the (intermediate) level, and the second level, which received an arrangement, is (good) and that the testers focused the lifters in two levels, this indicates that the test was easy for a number of lifters and somewhat difficult for the others of the tested lifters. Hence, specialists in sports training for people with physical disabilities in the sport of weightlifting must focus on training opposing muscles and also focus on working to increase training units to develop the special strength that the weightlifter needs to complete the legal lifting requirements. The importance of the distinctive strength of the arms in that it is "The ability of the neuromuscular system to produce rapid force, which requires a degree of compatibility in integrating strength and speed into one component" (Abu El-Ela Ahmed: 85:2022). The power that is distinguished by speed. The coach must ensure that there is a level of strength and speed before starting this type of training, and that the performance is done under extreme intensity with speed at the same time. The speed of mobilizing the largest number of muscle fibers at the beginning

of the movement is one of the important characteristics for developing strength that is distinguished by speed. Therefore, exercises with high resistance must be performed at the beginning of the movement, then reduce the resistance in the next stage. Ola Ahmed Abdel-Fattah: 134:1997)

#### 5- Recommendations

1. The special strength test (the strength distinguished by the speed of the arms for people with disabilities in weightlifting) has been designed and has the scientific specifications of validity, stability and objectivity.
2. The modified standard and standard scores and the percentage weight of the raw scores for the performance of the research sample in the special strength test (the strength characteristic of the speed of the arms for people with disabilities in lifting weights) were reached.
3. Most of the lifters with physical disabilities in the sport of weightlifting were in good and average level.
- 4- Using the test designed in the special strength test (the strength characteristic of the speed of the arms for people with disabilities in lifting weights).
- 5- The use of grades and standard levels shown by the results of the research in evaluating lifters with disabilities in the sport of Paralympic weightlifting.

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### Annex 1

Personal interviews conducted by the researcher with specialists and experts in the research problem

No.	Name	Specialization	Work place
-1	prof. Dr. Aqil Hamid Odeh	Weightlifting - disabled	President of the Iraqi National Paralympics - President of the Weightlifting Federation for People with Disabilities
-2	prof. Dr. Salem Najaf Elias	Weightlifting - disabled	Financial Secretary of the Weightlifting Federation for People with Disabilities
-3	prof. Dr. Kawthar Hussein Abdel Kassar	disabled	Secretary General of the Iraqi National Olympic Committee for People with Disabilities - Referee of the second degree, lifting weights for people with disabilities
-4	Rafid Kazem Majeed Al-Qaisi	weights	Coach of the National Weightlifting Team for People with Disabilities
-5	Hassan Reda Ali Al-Saadi	weights	Secretary of the Federation of Weightlifting for People with Disabilities - a former international player in weightlifting for people with disabilities
-6	Saad Awwad Mudan	weights	Coach of the national youth team to lift weights for people with disabilities
-7	Jabbar Tarish Jaber	weights	Member of the Weightlifting Federation for People with Disabilities - a former international player
-8	Ali Kashkool Thijeel	weights	Assistant coach for the weightlifting team for people with disabilities
-9	Mazhar Ghanem Oreibi	weights	An international referee in weightlifting for people with disabilities - an international player in weightlifting for people with disabilities

### Annex 2

The names of professors who are experts and specialists in the field of testing and measurement - weightlifting - people with disabilities who were offered the designed test

No.	Name	Specialization	Work place
1	Prof. Dr. Ali Salman Abd	Test and measure	College of Physical Education and Sports Sciences - Al-Mustansiriya University
2	Prof. Dr. Qahtan Khalil Jalil	Test and measure	College of Engineering - Al-Mustansiriya University
3	Prof. Dr. Hardan Aziz Salman	Test and measure	College of Physical Education and Sports Sciences - Al-Mustansiriya University.
4	Prof. Dr. Riad Mizher Khraibet	Test and measure	College of Physical Education and Sports Sciences - Al-Mustansiriya University.
5	prof. Dr. Aqil Hamid Odeh	Weightlifting - disabled	President of the Iraqi Paralympic Committee for People with Disabilities - President of the Lifting Federation for People with Disabilities - Former coach of the national team in weightlifting for people with disabilities
6	Prof. Dr. Salem Najaf Elias	Tests - disabled	Secretary of the Weightlifting Federation for People with Disabilities - Referee of the second degree
7	Rafid Kazem Majeed Al-Qaisi	weights	Coach of the weightlifting team for people with disabilities - Weightlifting Federation for People with Disabilities
8	Jabbar Mutashar Jabir	weights	Member of the Weightlifting Federation for People with Disabilities - an international weightlifting player for people with disabilities
9	Hassan Reda Ali Al-Saadi	weights	Secretary of the Weightlifting Federation for People with Disabilities - an international weightlifting player for people with disabilities
10	Saad Awwad Mudan	weights	Coach of the youth team, weightlifting for people with disabilities - an international player in weightlifting - the Federation of Weightlifting for People with Disabilities
11	Muhammed Ali Ghuloom	weights	Maysan youth coach, weightlifting for people with disabilities - international weightlifting player - second degree referee

### Appendix (3)

#### .referee

No.	Name	Work place
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1	Prof. Dr. Kawthar Hussein Abdel Kassar	Secretary General of the Iraqi National Olympic Committee for People with Disabilities - Referee of the second degree, lifting weights for people with disabilities
2	Mazhar Ghanem Oreibi	An international referee in weightlifting for people with disabilities - an international player in weightlifting for people with disabilities