

The effect of functional strength training according to gradually increasing load in developing some physical abilities and achievement for men's 100-meter competition runners

Fahim Abdel Wahed Issa¹, Saleh Mahdi Mohaif², Ghadah Muayad Shihab³,
Mohammad Jawad Kadhim⁴

DOI: [https://doi.org/10.37359/JOPE.V36\(2\)2024.2158](https://doi.org/10.37359/JOPE.V36(2)2024.2158)
<https://creativecommons.org/licenses/by/4.0>

^{1,2,3,4}College of Physical Education and Sports Sciences - University of Baghdad / Iraq

Article history: Received 27/May/2024 Accepted 10/June/2024 Available online 28/June/2024

Abstract:

Functional strength is one of the most important elements of physical preparation and an important physical characteristic in our daily life in general and sports training in particular, as it is the most influential characteristic in all sporting events, which the athlete must possess in order to reach the highest levels and achieve the best results. The research aimed to prepare functional strength training exercises according to the gradual increase in load in the development of some physical abilities and achievement for men's 100 meter competition runners, and to identify the effect of functional strength training according to the gradual increase in load in developing some physical abilities and achievement for men's 100-meter competition runners. Hence the importance of research is evident: preparing functional strength training exercises according to the gradual increase in load by providing successful solutions in an economical manner in terms of time and effort and knowing their positive impact in bringing about the required development and improving the level of players in a better way. The problem of the research is that the achievement of the players in this event does not rise to acceptable levels, as a result of the weakness of some of their physical abilities. It has become impossible for them to develop except through training according to a coordinated training curriculum. The researchers used the experimental method with pre- and post-testing for the experimental and control groups. The research population was identified as players in the 100-meter competition for men for the open category for ages over 20 years in the 2021 sports season, and they numbered (10 players). The sample was divided into two groups: the experimental group and the control group, with (5 players) for each. Group, the researchers concluded that functional strength training according to the gradual increase in load has a positive effect on developing some physical abilities and achievement for men's 100-meter runners. The researchers recommended interest in functional strength according to the gradual increase in load has a positive impact on developing some physical abilities and achievement for men's 100 meter competition runners. Conduct similar studies and research on different age groups.

keywords: Functional strength training, physical abilities, 100-meter competition

¹ University of Baghdad, College of Physical Education and Sports Sciences, Fahim.abdulwahid@cope.uobaghdad.edu.iq

² University of Baghdad, College of Physical Education and Sports Sciences, Saleh.Mahdi@cope.uobaghdad.edu.iq

³ University of Baghdad, College of Physical Education and Sports Sciences, dr.ghada@cope.uobaghdad.edu.iq

⁴ University of Baghdad, College of Physical Education and Sports Sciences, dr.muhammed.juad@cope.uobaghdad.edu.iq

Introduction

Sports training constitutes a basic pillar and an important necessity in the training process, so raising the sports level must be based on sound scientific foundations.(F. A. W. Easa et al., 2022) Therefore, those in charge of the training process must develop training plans and curricula based on scientific foundations to improve the training process, and develop the elements of sports training, which are elements interconnected and integrated,(Mahmood et al., 2023) as the athlete cannot reach advanced positions if there is no integration of physical abilities. Hence, it can be said or indicated that we focus on the elements of sports training through physical preparation,(HalahAtiyah et al., 2024) which is a key stage for reaching the highest levels. (Sakran & Shehab, 2023) Functional strength is one of the most important elements. Physical preparation is one of the important physical qualities in our daily lives in general and sports training in particular, as it is the most influential characteristic in all sporting events, which the athlete must possess in order to reach the highest levels and achieve the best results. Athletics is one of those sports in which the activities vary from Throwing, running,(Mousa, A. M., & Kadhim, 2023) and jumping, each of which has special functional requirements, which have a direct impact on the functional aspect according to the specificity of its performance, distance, time, and energy systems. Among the short running competitions is the 100-meter running competition,(Ahmed Fadhil Farhan Mohammed Jawad Kadhim, 2016) where each running distance has its own training requirements from both the physical and functional aspects and the training methods that suit the nature of the race. Its performance and timing and the physical capabilities used in training to suit the intensity of their performance and rationing the periods of rest between exercises according to the goal of the training and the amount and direction of the load to suit the nature of the training. Age group: These exercises aim to prepare a standardized training program and identify the effect of gradual exercises to increase the load according to functional strength in developing some physical abilities and achievement for men's 100-meter competition runners.(Salih, I. H., Yaseen, A. M., Naseer, K. J., Attieh, A., & Kadhim, 2024)

Many studies have been discussed, including the study (Ahmed Fadel Muhammad, 2021), which aimed to prepare functional strength training exercises with relative weights, while preparing metered doses of creatine added to the athlete's body, aiming to develop special abilities and achieve the effectiveness of running 400 meters for men, as well as identifying the effect of strength training.(Kadhim, M. J., Shihab, G. M., & Zaqair, 2021) Functional exercises with relative weights and doses of creatine in developing special abilities and achieving the effectiveness of running 400 meters for men. The experimental method was used to achieve the objectives of the study.(Salman et al., 2022) The researcher chose his sample in an intentional manner from elite athletes who effectively ran 400 meters in Iraq and for the category of men (open ages over 20 years), after that The researcher divided them into two equal groups, each group containing 4 athletes. As for the study, the study aimed to prepare Functional strength exercises in developing some of the capabilities of the muscles working in the sport of artistic gymnastics for young players, and identifying the effect of functional strength exercises in developing some of the capabilities of the muscles working in the sport of artistic gymnastics for young players, (Kadhim, 2024b) and the experimental method was used to achieve the research objectives, and the research sample included six

players from the national team National Gymnastics.(Mahmood et al., 2023) and (Kazim, M. J., Zughair, A. L. A. A., & Shihab, 2019)

The importance of the research lies in preparing graded exercises to increase the load according to functional strength in developing some of the physical abilities and achievement of men's 100-meter competition runners by providing successful solutions in an economical manner in terms of time and effort and knowing their positive impact in bringing about the required development and improving the level of players in a better way.(Eisa & Qasim, 2024)

Method and tools

The researchers used the experimental approach with an experimental design with a pre- and post-test for two equal groups (experimental and control) to suit the nature of the research. The research population was identified as players in the men's 100-meter competition for ages over 20 years old for the 2023 sports season, and they numbered (10 players), and the sample was divided into two groups. Experimental and control group (5 players) for each group , The researchers homogenized the sample As shown in Table (1).

Table (1) Homogeneity of the research sample members

Torsion coefficient	standard deviation	Mediator	Arithmetic mean	measruing unit	Variables
0.222	1.675	170.000	172.110	Meter	height
0.153	1.376	74.000	74.264	kg	Bloc
0.349	1.654	26.000	26.138	year	the age

The value of the skewness coefficient is limited to ± 3 , which indicates a moderate distribution of the population

The researchers also extracted parity between the two groups, as shown in Table (2).

Statistical significance	Error level	Calculated t value	Control group		Experimental group		Variables
			A	s	A	s	
Not a sign	0.891	0.783	0.284	6.432	0.174	6.210	Maximum speed: 50 metres
Not a sign	0.662	0.982	1.455	2.532	2.458	2.604	The explosive power of the two men He jumped from stability with both legs
Not a sign	0.345	1.453	2.863	19.001	1.897	18.011	Withstand strength Run and jump 100 metres
Not a sign	0.786	1.934	3.562	18.854	2.567	18.143	Endurance speed Run 150 meters standing

Not a sign	0.434	0.459	2.457	11.654	6.339	11.001	Achievement 100 metres
------------	-------	-------	-------	--------	-------	--------	-------------------------------

Significant below a significance level ≤ 0.05 and below 8 degrees of freedom

For the study variables, a group of specialized professors and coaches in athletics were consulted, and the physical capabilities for the 100-meter event were determined as follows:

- Maximum speed: 50 metres.
- The explosive power of the legs, jumping from a standstill with both legs together.
- Endurance, running, jumping, 100 metres.
- Speed endurance, running 150 meters from standing.
- Achievement: 100 meter sprint.

These tests were carried out for two consecutive days corresponding to 15-16/7/2023 at the stadium of the Specialized School for Talent Care in the Ministry of Youth and Sports / Baghdad Governorate

The sample began implementing training on 7/19/2023 until 8/20/2023. •

Duration of the training program: (8) weeks. •

Number of total training units: (24) training units. •

Number of weekly training units: (3) units. •

Weekly training days: (Saturday - Monday - Wednesday). •

The training method used: high-intensity interval training. And iterative •

Training intensity used: (80 - 100%). •

After implementing the training programThe researchers conducted post-tests for two consecutive days on August 23-24, 2023, in the stadium of the Specialized School for Talent Care in the Ministry of Youth and Sports / Baghdad Governorate.

Statistical methods used in the research:The researchers used the statistical package (SPSS) to find appropriate statistical treatments.

Results

Presenting and analyzing the results of the differences between the two research groups (experimental and control) for the variables under study

Table (3)

It shows the results of the pre- and post-tests of the experimental group on the research variables Analyze and discuss it

Physical variables	measuring unit	Pretest		Posttest		A F	Calculated t value	Error level	Statistical significance
		s	A	s	A				
Maximum speed: 50 metres	Sa	6.210	0.238	6.051	0.668	0.334	8.554	0.001	Dal
Explosive force He jumped from stability with both legs	right	2.604	0.675	2.751	0.456	0.654	5.897	0.004	Dal
Withstand strength Run and jump 100 metres	Sa	18.011	0.433	17.022	1.567	1.876	3.875	0.002	Dal
Endurance speed Run 150 meters standing	Sa	18.143	1.892	17.432	2.870	2.567	4.789	0.001	Dal
Achievement 100 metres	Sa	11.001	4.667	10.901	0.432	0.784	8.445	0.003	Dal

Significant below a significance level ≤ 0.05 and below 4 degrees of freedom

Presenting, analyzing and discussing the results of the pre- and post-tests of the research variables in the control group

Table (4)

It shows the results of the pre- and post-tests for the control group on the research variables

Physical variables	measuring unit	Pretest		Posttest		A F	Calculated t value	Error level	Statistical significance
		s	A	s	A				
Maximum speed: 50 metres	Sa	6.432	0.2341	6.203	0.657	0.556	7.078	0.001	Dal
The explosive power of the legs, a jump from stability with both legs together	right	2.532	0.765	2.672	0.887	0.562	5.667	0.000	Dal
Withstand strength Run and jump 100 metres	Sa	19.001	1.349	18.022	0.326	1.934	4.871	0.003	Dal
Endurance speed Run 150 meters standing	Sa	18.854	2.238	18.001	1.764	1.576	7.321	0.002	Dal
Achievement 5000 metres	Sa	11.654	0.334	11.301	0.443	0.235	8.789	0.000	Dal

Significant below a significance level ≤ 0.05 and below 4 degrees of freedom

Presentation, analysis and discussion of the results of the post-tests on the research variables for the control and experimental groups

Table (5)

It shows the results of the post-tests on the research variables for the control and experimental groups

Physical variables	measuring unit	Experimental group		Control group		Calculated t value	Error level	Statistical significance
		s	A	s	A			
Top speed enemy 50 meters	Sa	5.901	0.1356	6.052	0.236	7.675	0.001	Dal
The explosive power of the legs, a jump from stability with both legs together	right	2.954	0.5677	2.802	0.765	4.876	0.002	Dal
Withstand strength Run and jump 100 metres	Sa	16.031	1.654	17.076	0.348	3.786	0.001	Dal
Endurance speed Run 150 meters standing	Sa	16.011	0.812	17.210	1.876	6.321	0.003	Dal
Achievement 100 metres	Sa	10.753	0.1237	11.012	0.653	8.432	0.000	Dal

Significant below a significance level ≤ 0.05 and below 8 degrees of freedom

Discussion of results:

Tables of pre- and post-tests show the results of the variables investigated for the research sample. The results showed that there were significant differences in the post-test in favor of the two groups. , The researchers attribute that functional strength training according to the gradual increase in load in developing some physical abilities and achievement for men’s 100-meter runners, the importance of regulating the training load used so that it suits the level of the athletes first and the goal of the training second (Hamdy Abdel Moneim and Mohamed Abdel Mughni. 1999), as it was done Relying on

the principles of training in forming the training units used (Hussein, R. 2016), the intensity that was used was high, and ranged from (80-100%) with the training load that took (8) weeks, and it was sufficient to produce these effects, and the intensity The high level is proportional to the nature of the 100-meter running performance (Gajes. 2010). Correct planning, choosing the appropriate intensity,(L. D. F. A. W. Easa, 2021) and taking into account the principle of gradualism to develop the level of players (Kadhim, 2023b) because intensity is one of the basic components on which the training process is based, especially for events whose performance is characterized by intensity.,(Kadhim, 2023a) so the training load is considered the basis and foundation of the training, and in the maximum speed variable in the post-tests it indicates the extent The effectiveness of the exercises used in the training program in developing special physical abilities, which contributed to the development of special strength in the experimental group,(Mondher, H. A., & Khalaf, 2023) which affected the development of speed ability, given that strength is the main reason for the development of speed, and this is due to the effect of the exercises used and their diversity in the exercises used, (Al et al., 2022) and (Kadhim, 2024a) which led to the development of speed (Abdulhussein et al., 2024). Noticeably, by giving the runners a set of exercises that lead to developing speed ability, and these exercises focused on the muscles of the feet, legs, and thighs, the main muscles responsible for a runner's speed (Gambetta.2009), (Abdulhussein et al., 2024) to the exercises used that had a high correlation with the endurance of specific speed, which was linked to developing the target speed, (Yasir et al., 2020) as the exercises included various distances from the race distance and were performed in succession according to the intensity that changed with the change in distance and speed (Macardle, 2008), and the reason for Development is diversification and change in the method and style of training (Aljorani, A. 2023) , (Ali et al., 2020)

Conclusions

The results showed a noticeable superiority between the pre- and post-measurements of functional strength training according to the gradual increase in load in developing some physical abilities of the experimental group and in favor of the post-measurement.

The results showed a significant difference between the pre- and post-measurements For functional strength training according to the gradual increase in load to develop the 100-meter achievement for the experimental group and for the benefit of the post-measurement.

Paying attention to functional strength training according to the gradual increase in load in developing some physical abilities and achievement for men's 100 meter competition runners.

Conduct similar studies and research on different age groups.

The training model used

Week: First training unit: (1-2-3)

Intensity of training units: (80 - 100%) Training methods used (repetitive + high interval)

Training unit	Exercise vocabulary	Severity %	Duplicates	Totals	Rest in between		Repetition time	Exercise time	Total time
					Repetition	Totals			
Saturday	- Starting from sitting, running 30 metres	100 %	3	2	1 d	2d	4 Sa	8.24 d	28.64 d
	- Run 40 meters from the jumper position	100 %	3	2	1 d	2 d	5 sec	8.30 d	
	- Jumping in pairs on 3 boxes of different heights, the first box is 30cm, the second is 50cm, and the third is 70cm, and the distance between the boxes is 1m.	90 %	5	2	45 sec	90 sec	10 sec	12.10 d	
Monday	- Run 150 meters standing	80 %	5	2	90 sec	2 d	19 Sa	22.10 d	36.1 d
	- Double jumping over 8 hurdles with a height of 80 cm	90 %	5	2	1 d	2 d	12 sec	14 d	
Wednesday	- Run 200 meters standing	80 %	4	2	2 d	3 d	25 sec	25.20 d	34.6 d
	- Run by jumping 100 metres	80 %	3	2	1 d	2 d	17 Sa	9.40 d	

References

- Abdulhussein, A. A., Dheyab, A. S., Abdulkareem, O. W., mutar Albadri, E. H., Hammood, A. H., Musa, M. F. A. H., Kadhim, M. J., & AbdulMageed, T. S. (2024). AN ELECTRONIC SYSTEM ACCORDING TO THE COOPERATIVE METHOD AND ITS IMPACT ON DEFENSIVE MOVEMENTS IN YOUTH BASKETBALL. *International Development Planning Review*, 23(1), 1253–1266.
- Ahmed Fadhil Farhan Mohammed Jawad Kadhim, G. M. S. (2016). The effectiveness of injury prevention program on reducing the incidence of lower limb injuries in adolescent male soccer players. *Injury Prevention*, 22(Suppl 2), 346.
<https://www.proquest.com/openview/fd995719bc359d2e05fa6fe346bed0f6/1?pq-origsite=gscholar&cbl=2031963>
- Al, S., Bahadli, P., & Al-Tamimi, A. F. A. (2022). *The effect of a rehabilitation program for rhomboid muscles (shoulder) and fibrous strain on young and advanced wrestlers (Free and Roman)*.
- Ali, A. N., Easa, F. A., & AbdulRida, B. K. (2020). The Impact Of Exercises Strongly In The Atmosphere Of Competition In The Development Of Some Biomechanical Capabilities And Functional Indicators And The Completion Of The 1500-Meter Youth. *European Journal of Molecular & Clinical Medicine*, 7(06).
- Easa, F. A. W., Shihab, G. M., & Kadhim, M. J. (2022). the Effect of Training Network Training in Two Ways, High Interval Training and Repetition To Develop Speed Endurance Adapt Heart Rate and Achieve 5000 Meters Youth. *Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte*, 17(4), 239–241.
- Easa, L. D. F. A. W. (2021). The Effect of Lactic Endurance Training on Developing Speed Endurance, Lactic Acid Concentration, and Pulse after Effort and Achievement for 1500m Junior Runners. *Annals of the Romanian Society for Cell Biology*, 25(6),

10008–10013.

Eisa, F. A. W., & Qasim, A. M. A. (2024). The effect of physical effort training on developing some physical and physiological abilities and achievement of men's 200m runners. *Modern Sport*, 212–221.

HalahAtiyah, M., Alhamayd, Q. A., QasimKhalaf, S., AmerAbdulhussein, A., JawadKadhim, M., KohChoonLian, D., HashimHammood, A., & YahyaFaris Mohsen, G. (2024). EXTRAPOLATION OF THE MACHINE AND ITS EFFICIENCY IN DEVELOPING THE SKILL PERFORMANCE AND ACCURACY OF DRIBBLING IN YOUTH FOOTBALL. *International Development Planning Review*, 23(1), 1037–1047.

Kadhim, M. J., Shihab, G. M., & Zaqair, A. L. A. A. (2021). The Effect of Using Fast And Direct Cooling after Physical Effort on Some Physiological Variables of Advanced Football Players. *Annals of the Romanian Society for Cell Biology*, 25(6), 10014–10020. <https://annalsofrscb.ro/index.php/journal/article/view/7336>

Kadhim, M. J. (2023a). Evaluation Of The Existence Of Gender Disparities In Iraq. *International Journal of Social Trends*, 1(1), 10–16.

Kadhim, M. J. (2023b). Examining The Relationship Between Social Classes And The Culture Of Poverty : A Case Study. *International Journal of Social Trends*, 1(1), 23–27.

Kadhim, M. J. (2024a). Digital Literacy and Its Importance in the Modern Workforce. *International Journal of Social Trends*, 2(2), 44–50.

Kadhim, M. J. (2024b). Social Networks' Place in Contemporary Political Movements. *International Journal of Social Trends*, 2(2), 51–59.

- Kazim, M. J., Zughair, A. L. A. A., & Shihab, G. M. (2019). The effect of zinc intake on the accumulation of lactic acid after cooper testing among football Premier league referees. *Sciences Journal Of Physical Education, 12*(5), 260–268.
- Mahmood, H. A., Mohammed, P., & Kadhim, J. (2023). Special exercises for some physical , kinetic and electrical abilities accompanied by symmetrical electrical stimulation in the rehabilitation of the muscles of the legs for patients with simple hemiplegic cerebral palsy. *Pakistan Heart Journal, 56*(01), 580–595.
<http://pkheartjournal.com/index.php/journal/article/view/1291>
- Mondher, H. A., & Khalaf, S. Q. (2023). The Effect of Compound Exercises with the Intense Method and the Training Mask on the Development of Some Physical Abilities and the Level of Skillful Performance of Futsal Players. *Pakistan Heart Journal, 56*(01), 310–323.
- Mousa, A. M., & Kadhim, M. J. (2023). Nmusing an innovative device to improve the efficiency of the anterior quadriceps muscle of the injured knee joint after surgical intervention of the anterior cruciate ligament in advanced soccer players. *Semiconductor Optoelectronics, 42*(1), 1504–1511.
- Sakran, M. A. S. A. J., & Shehab, G. M. (2023). The use of an auxiliary device and its impact in teaching the skill of Russian rotation on the pommel horse device for junior artistic gymnastics. *Wasit Journal Of Sports Sciences, 14*(2).
- Salih, I. H., Yaseen, A. M., Naseer, K. J., Attieh, A., & Kadhim, M. J. (2024). THE IMPACT OF COMPETITIVE SPEED EXERCISES ON JUNIOR BOXERS' EFFECTIVENESS OF SKILL PERFORMANCE AND COUNTERATTACK SPEED. *International Development Planning Review, 23*(1), 149–162.

Salman, S. M., KADHIM, M. J., & SHIHAB, G. M. (2022). The effect of special exercises in the rehabilitation of the shoulder muscle for the youth wrestling category.

International Journal of Early Childhood Special Education, 14(5).

Yasir, A. M., Hammood, H. S., & Sikhe, H. S. (2020). Special skill exercises to develop mechanical movement behavior and the accuracy of Setting skill performance for volleyball players. *International Journal of Psychosocial Rehabilitation, 24(05).*