FITNESS, PERFORMANCE AND HEALTH JOURNAL
2024; 3(1): 1-5
Published online 02 18 2024 (https://todoxpublisher.com/index.php/fphj/index)
doi: https://doi.org/10.53797/fphj.v3i1.1.2024
e-ISSN 2821-3785

A Comparative Study of Some Types of Muscular Strength Among Middle-Distance Runner Athletes

Mohammed Nahed Obaid[1], Ahmed Fadhil Mohammed[1], Raghda Ahmed Shihab Fahmi[1*]

[1] College of Physical Education and Sport Science, University of Baghdad, Karrada district, IRAQ

*Corresponding author: Raghda.A@cope.uobaghdad.edu.iq

To Cite This Article: Obaid, M. N., Mohammed, A. F.., & Ahmed Shihab Fahmi, R. . A Comparative Study of Some Types of Muscular Strength Among Middle-Distance Runner Athletes. *Fitness, Performance and Health Journal*, *3*(1), 1–5. https://doi.org/10.53797/fphj.v3i1.1.2024

ABSTRACT The research aims to conduct a comparative study between the events (800) m and (1500) m track in the types of muscular strength and to identify the differences between them among Iraqi sports club players. The sample represented the players participating in the Iraqi Athletics Championship for the period between (02/11/2023) and (04 /11/2023), and their number was (16) players (8) for each event, as the selection was made intentionally. The researchers used the descriptive approach to achieve the goal of the research and used the statistical package (SPSS) to process the data statistically. According to the results collected, it was found that there was superiority among the intermediate track players (800) m in explosive power and the speed characteristic of the leg muscles, and there was a superiority among the intermediate track players (1500) m in force endurance of the leg muscles. The researchers recommended focusing on developing these important qualities and conducting more research on other participants, subjects, levels and other events.

Keywords: Muscular strength, Track & Field, Athletics.

1. INTRODUCTION

Track and field is one of the important sports, it is the queen of sports because it contains various and diverse activities, including the events of sprint, middle and long-distance running, long jump, high jump, throwing and many others that require many physical and skill qualities, which the quality of muscular strength is a priority, as strength is a basic requirement in all athletics events including the strength of the upper limbs of the body, the torso, and lower limbs. As for running events, they require high strength in the lower part of the body, and this does not mean that the upper limbs are neglected in these events training, rather, they require intense training in order to achieve optimal goals, explosive strength power and strength endurance of the leg muscles which has an important influence on these events and exercises. The research aims to conduct a comparative study between the events (800m - 1500m) in the types of muscular strength and to identify the differences between them among Iraqi sports club players, the research assumes the existence of statistically significant differences between these two events. One of the studies that examined with same variables as our own is (Hussein, A. K., Znad, B. M., & Ismail, K. S. 2020) which aimed to conduct a study comparing explosive power and power among the teams of the Faculty of Physical Education and Sports Sciences - University of Baghdad in basketball and handball, and to identify the differences between them, the most important conclusions reached were the presence of superiority among basketball players over handball players in the explosive power of the muscles of the legs, and the superiority of handball players over basketball players in the power of the muscles of the arms. (Nima, H. A. Q., & Al-Taie, O. A. H. 2020) aimed to identify the effect of physical exercises in different methods to develop some types of strength for players of the National Center for Sports Talent Welfare in football aged (13-14) years, the most important conclusion was the presence of development in all types of strength, such as central strength, explosive strength, and power. The study (Yasser Ahmed Muhammad, & Hoda Abdul Hussien 2022) which aimed to identify the effect of using explosive power exercises in improving wheelchair basketball shooting for Iraqi national team players, the most important conclusions were the exercises

used in the research developed the explosive power of the arms which in turn improved the performance of the wheelchair basketball shooting skill. (Fatima Rahim Taher & Ahlam Al-Hassani. ، 2020) aimed to identify the effect of the exercises of a proposed training device to develop the explosive ability and flexibility of the muscles working in the rotation phase of hammer throwing for women. The most important conclusions reached are that the exercises that were used led to the development of the flexibility of the torso, shoulders, back muscles, spine, and explosive ability for the arms and legs. (Ammar Hussein Jabbar & Wasan Hanoun Ali ، 2022) the aim was to identify the effect of combined physical and skill exercises in developing the explosive power characteristic and some offensive skills for women's basketball players under the age of 18 years, it concluded to the presence of development in the explosive power of the arms, legs and offensive skills. The importance of that study was in conducting a survey of these activities in track and field.

2. METHODOLOGY AND EQUIPMENT

The sample represented the players participating in the Iraqi Athletics Championship for the period between (11/02/2023) and (11/04/2023) and their number was (16) players (8) for each event. The selection was made intentionally, and the researchers used the descriptive approach to achieve the goal.

The researchers used the following tests:

1- Broad jump test (Krishnan, et al 2017) to measure the explosive strength of leg muscles.

2- One leg running test for the maximum distance within (10) seconds (Muhammad Sada & Dhia Abboud ، 2023، p 270) to measure the power of the leg muscles.

3- Semi-squat test (Liu, et al 2023) to measure the force endurance of the leg muscles.

Researchers also used the statistical package (SPSS) to process the data statistically:

1- Mean.

2- Standard deviation.

3- T-test for independent variables.

3. RESULTS

Table (1) shows the means, standard deviations, T-test value, level of error, and the significance of the differences between the two research groups.

Variables	Measuring unit	800m		1500m		t-test value	Sig.
		Mean	Std. Deviation	Mean	Std. Deviation		
Legs muscles explosive power	cm	262.63	3.292	252.13	2.949	6.719	0.000
Legs muscles power	cm/m	33.965	0.475	33.347	0.449	2.668	0.018
Legs muscles endurance	times	41.25	1.282	4.25	1.389	4.490	0.001

Table (1)

*Degrees of Freedom (14=8+8-2)
*Significant level error (0.05) if the error is less or equal to (0.05).

Legs muscles explosive power (measured in centimeters):
Table 1 compares the explosive power of leg muscles in 800m and 1500m middle-distance runners. The average explosive power for 800m runners is 262.63 cm with a standard deviation of 3.292, while for 1500m runners it is 252.13 cm with a standard deviation of 2.949. The t-test result is 6.719, and the significance level (Sig.) is 0.000, showing a statistically significant difference in explosive power between the two groups.

Legs muscles power (measured in cm/m):
In comparing the strength of leg muscles to the distance covered by 800m and 1500m middle-distance runners, The average power for 800m runners is 33.965 cm/m with a standard deviation of 0.475, while for 1500m runners it is 33.347 cm/m with a standard deviation of 0.449. The t-test score is 2.668, with a significant value (Sig.) of 0.018, suggesting a statistically significant difference in power relative to the distance traversed between the two groups.

Legs muscles endurance (measured in times):
This row compares the endurance of leg muscles in 800m and 1500m middle-distance runners. The average endurance for 800m runners is 41.25 times, with a standard deviation of 1.282, while for 1500m runners, it is 42.25 times, with a standard deviation of 1.389. The t-test result is 4.490, and the significance level (Sig.) is 0.001, showing a statistically significant difference in muscular endurance between the two groups.

Overall, the findings indicate that there are considerable variations in explosive power, power per distance covered, and muscular endurance between 800m and 1500m middle-distance runners.

4. DISCUSSIONS

According to Table (1) we notice that there are significant differences in the test of explosive power and the power of the leg muscles between the two events and in favor of the (800m) athletes. The researchers attribute the reason for this to the physical development that has occurred and the direction of this event and its tendency towards running of a fast nature, as it requires such qualities, especially at the end of races to achieve optimal goals. Explosive power is the exertion of maximum energy in a single explosive action (Jakovljević, et al 2018) and it ranks first among the rankings of physical abilities in various sports activities (Schopfer, et al 2016), researchers also emphasize developing it using different and specialized physical exercises and working to increase the ability of players in it to higher levels, as (Aksović, et al 2021) emphasizes that using special exercises leads to developing strength and explosive power of the leg muscles. (Farhan & Samer Abdel Reda2019 ،) mention that explosive power depends on many physical activities in general. (McGuigan, et al 2012) believe that speed means strength and strength is necessary to perform most sports skills, as you need a high level of Muscular strength, a high level of speed, and a high level of motor skill, which are the reason for the integration between strength and speed (Ji'lab Aladdin, 2015). Researchers also emphasize the use of weight training due to its critical need to develop the characteristic of power, and this is confirmed by (Al-Tamimi & Zaghir،2010). As for the strength endurance of the leg muscles, we find that (1500 m) runners excel in it. Researchers attribute the reason for this to the leg muscles bearing the burden placed on them during training and races and the tendency of this event to have a high tolerance to fatigue as it is the ability to continue relatively intense muscular work for a long period, that is, in the sense of the ability of the muscular resistance of a single muscle or a group of muscles against the factor of fatigue through many continuous contractions of the muscle (Al-Zayyoud , 2017).

5. CONCLUSIONS

Based on the results of the comparative research of muscle strength among middle-distance runners, it is clear that there are significant disparities in several elements of muscular strength between athletes who specialize in the 800m and 1500m distances. First, the study found a statistically significant difference in explosive power between the two groups. 800m runners have more explosive power than 1500m runners. This disparity might be attributable to the different physiological demands and racing strategy required for each distance.

Second, the examination of power compared to the distance traveled reveals a substantial difference between the two groups. While both groups of athletes have great muscular strength, the relationship between power production and distance traveled differs significantly. This shows that the runners' training regimens and biomechanical efficiency may vary depending on their event specialization.

The study of physical endurance reveals another important difference between the two groups. 800m runners have more leg muscular endurance than 1500m athletes. Given the high intensity of the 800m event, this study may imply that 800m specialists place a larger emphasis on endurance-focused training.

Finally, according to the results collected, it was found that there was superiority among the track athletes (800) m in explosive power and the speed characteristic of the leg muscles, and there was a superiority among the track athletes (1500) m in force endurance of the leg muscles. The researchers recommended focusing on developing these important qualities and conducting more research on other samples, levels and events.

REFERENCES

Hussein, A. K., Znad, B. M., & Ismail, K. S. (2020). Comparing Explosive Strength and Speed–Strength in College of Physical Education and Sport Sciences' Leagues of Basketball and Handball. *Journal of Physical Education*, *32*(4).

Nima, H. A. Q., & Al-Taie, O. A. H. (2020). The effect of physical exercises in various ways to develop some types of strength for the National Center for Sports Care for Football Talent with ages (13-14 years). *Journal of Physical Education*, *32*(1).

Yasser Ahmed Muhammad, & Hoda Hamid Abdel Hussien. (2022). Using explosive strength exercises to improve wheelchair basketball shooting for Iraqi national team players. Journal of Physical Education (20736452), 34(4).

ياسر احمد محمد، و هدى حميد عبدالحسين. (2022). استخدام تمرينات القوة الانفجارية في تحسين التصويب بكرة السلة على الكراسي المتحركة للاعبي المنتخب العراقي الوطني. مجلة التربية الرياضية، 4، الصفحات 582-590.

Fatima Rahim Taher, and Ahlam Shaghati Mohsen Al-Hassani. (2020). The effect of a proposed training device exercises to develop the explosive ability and flexibility of the muscles working in the rotation phase of the hammer throw for women. Journal of Physical Education, 2, pp. 50-55.

فاطمة رحيم طاهر، و احلام شغاتي محسن الحسني. (2020). اثر تمرينات جهاز تدريبي مقترح لتنمية القدرة الانفجارية والمرونة للعضلات العاملة في مرحلة الدوران لرمي المطرقة للنساء. مجلة التربية الرياضية، 2، الصفحات 50-55.

Ammar Hussein Jabbar and Wasan Hanoun Ali. (2022). The effect of combined physical and skill exercises on developing explosive power and some offensive skills for basketball players under 18 years of age. Journal of Physical Education, 4, pp. 513-521.

عمار حسين جبار، و وسن حنون علي. (2022). تأثير تمرينات بدنية ومهارية مركبة في تطوير صفة القوة الانفجارية وبعض المهارات الهجومية للاعبي كرة السلة بأعمار دون 18 سنة. مجلة التربية الرياضية، 4، الصفحات 513-521.

Muhammad Hashem Sada, and Dhia Naji Abboud. (2023). The effect of position-exchanging exercises according to the distances covered in developing strength characterized by speed and its relationship to scoring for young football players. Journal of Sports Education, 1, pp. 267-275.

محمد هاشم سادة، و ضياء ناجي عبود. (2023). تأثير تمرينات بأسلوب تبادل المراكز وفق المسافات المقطوعة في تطوير القوة المميزة بالسرعة وعلاقتها بالتهديف للاعبي كرة القدم الشباب. مجلة التربية الرياضة، 1، الصفحات 267-275.

Jakovljević, D. K., Eric, M., Jovanovic, G., Dimitric, G., Cupic, M. B., & Ponorac, N. (2018). Explosive muscle power assessment in elite athletes using wingate anaerobic test. *Revista Brasileira de Medicina do Esporte*, *24*, 107-111.

Aksović, N., Bjelica, B., Milanović, F., MİLANOVİC, L., & Jovanović, N. (2021). Development of explosive power in basketball players. Turkish Journal of Kinesiology, 7(1), 44-52.

Riyad Abdel Reda Farhan, and Samer Saadoun Abdel Reda. (2019). The explosive force of the arms and legs and its relationship to the motor path of pronation on the parallel bar. Journal of Sports Science, 44, pp. 178-184.

رياض عبدالرضا فرحان، و سامر سعدون عبد الرضا. (2019). القوة الانفجارية للذراعين والرجلين وعلاقتها بالمسار الحركي للطلوع بالكب على جهاز المتوازي. مجلة علوم الرياضة، 44، الصفحات 178-184.

McGuigan, M. R., Wright, G. A., & Fleck, S. J. (2012). Strength training for athletes: does it really help sports performance?. International journal of sports physiology and performance, 7(1), 2-5.

Ji'lab Aladdin. (2015). The effect of a proposed training program to develop the strength and speed of football players. Al-Msila: Institute of Science and Technology of Physical Activities and Sports.

جعلاب علاءالدين. (2015). أثر برنامج تدريبي مقترح لتنمية القوة المميزة بالسرعة لدى لاعبي كرة القدم. المسيلة: معهد علوم وتقنيات النشاطات البدنية والرياضية.

Ahmed Farhan Al-Tamimi, and Raed Mahoos Zaghir. (2010). The effect of training with sub-maximal strength using the circular method to develop some physical abilities and the level of performance of the forehand skill for third-year tennis (tennis) students. College of Physical Education Journal, 1, pages 94-

احمد فرحان التميمي، و رائد مهوس زغير. (2010). تأثير التدريب بالقوة دون القصوى بالاسلوب الدائري لتنمية بعض القدرات البدنية ومستوى اداء مهارة الضربة الامامية لطلبة المرحلة الثالثة بكرة المضرب (التنس). مجلة كلية التربية الرياضية، 1، الصفحات 94-108.

Ziad Falah Al-Zayyoud. (2017). Studying some mechanical variables and their relationship to explosive force in the first flight and jumping on a jumping horse in gymnastics.

زياد فلاح الزيود. (2017). دراسة بعض المتغيرات الميكانيكية وعلاقتها بالقوة الانفجارية في الطيران الأول والدخول على حصان القفز في رياضة الجمباز.