Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

The Impact of Mechanical Training in Accordance with Regulating the Optimal Stride Length in the First and Second Straight Phases on the Achievement of 400 Meter Events for Men

Eman Sabeeh Hussein Al-Saadi[1], Maher Jaafar Ameen Shalsh[2]

DOI: https://doi.org/10.37359/JOPE.V36(1)2024.2032

1 University of Baghdad, College of Physical Education and Sport Sciences for Women
2 University of Baghdad, currently affiliated with the General Directorate of Education in Najaf Al-Ashraf / Najaf
Article history: Received 2/march/2024 Accepted 21/march/2024 Available online 28/march/2024.

Abstract

The significance of this research is primarily anchored in the sustained interest in athletic achievements and the ongoing process of their development through the application of biomechanics and its integration into the science of sports training. The study aims to focus on the regulation of the optimal stride length according to the runner's height, necessitating specialized mechanical training tailored to specific distances when sprinting in both the first and second straight sections of the 400-meter event. This is proposed through the suggestion of six interval distances (90, 80, 70, 60, 50, 40 meters).

The research problem delves into the importance of training 400-meter sprinters by leveraging the first and second straight sprints with an ideal stride length, calculated as the runner's height × 1.22 according to James Hay's equation, and utilizing this to compensate for the deficit incurred during curve running due to changes in running mechanics to overcome centrifugal force.

In light of their research objectives, the authors hypothesized that there would be no significant statistical differences between the pre-test and post-test measurements of male 400-meter sprinters. The researchers employed an experimental method with a single group to suit the nature of the research problem. The sample consisted of six athletes representing (Army, Police, Militia) clubs. The training program included 24 training units over eight weeks, with an average of three training units per week. The researchers concluded several key findings, notably that the designed training had a significant impact on the sample group, as evidenced by the significant differences observed. In light of the results, the researchers recommend the application of these training methods according to the special equation for calculating the optimal stride length in other activities to enhance performance towards better outcomes.

Keywords: Mechanical training, Optimal stride length, 400-meter event.

[1] Assistant Professor Dr. Eman Sabeeh Hussein Al-Saadi, Ph.D. in Physical Education, University of Baghdad, College of Physical Education and Sport Sciences for Women. Email: eman@copew.uobaghdad.edu.iq . Phone: +9647707903350.

[2] Dr. Maher Jaafar Ameen Shalsh, Ph.D. in Physical Education, University of Baghdad, currently affiliated with the General Directorate of Education in Najaf Al-Ashraf / Najaf Al-Ashraf High School for Distinguished Students. Email: Maher.jaafar1104a@cope.uobaghdad.edu.iq . Phone: +9647812393040.

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Introduction:

The realm of sports constitutes one of the pivotal arenas in the lives of nations, hence the continuous focus on athletic movements to achieve the highest levels of performance. This is achieved through the employment of both theoretical and applied sports sciences. Among the foremost reasons for attaining sports achievement is the fulfillment of all general and specific requirements and means for an athlete's success. It is recognized that one of the crucial means and requirements is the science of biomechanics and the utilization of mechanical indicators in diagnosis firstly, and treatment secondly, through the application of equations and laws specific to the science of movement, which the researchers consider theoretical sciences that can be applied in practical reality.

The 400 meters event, like other sprinting events in athletics, fundamentally relies on physical elements, particularly stride length and frequency, which are significant factors in achieving success in the race.

Maximum speed is one of the most important of these physical elements, along with other primary elements that must be present in an athlete, where stride length and frequency are crucial variables in achieving victory and performance.

Upon reviewing most of the existing literature and previous research, the researchers found that stride length and frequency are among the most prominent variables that should be focused on. Numerous studies on the 400 meters event have addressed important topics related to mechanical indicators, especially the variables of stride length and frequency, which are among the most important determinants in performance improvement, warranting a brief mention of the most significant among them.

The study by Mohammed and Al-Shamaa (2021) aimed to prepare functional strength training with relative weights to develop special capabilities and performance in the 400 meters sprint for men, and to understand the impact of functional strength training with relative weights on developing these special capabilities and performance in the event. The significance of the research lies in preparing functional strength training with relative weights to body parts of the athlete without adversely affecting motor performance. The research problem involves preparing training with relative weights for each part of the athlete's body for the muscles working during the 400 meters event to develop the special capabilities for this event. The researchers employed an experimental method with equivalent groups to solve the research problem, making experimental and control groups similar in all variables except the independent variable. The researchers selected their sample intentionally from elite athletes specializing in the 400 meters sprint in Iraq for men (ages above 20 years), then divided them into two equivalent groups, each containing 4 players. The researchers concluded that there was a significant improvement in the level of specific physical capabilities for the 400 meters event as a result of using functional strength training with relative weighting, and there was a clear interaction in the experimental research sample with training by relative weighting compared to other strength training methods. The researchers recommended the use of functional training to develop muscular strength in all sports events in general and the 400 meters event in particular, and to conduct future research using relative weighting and focusing

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

on using practical weights first, and the possibility of easily changing their weights with the capability of placing most of the heavy weights in particular.

The study by Ajil and Al-Fadhli (2020) aimed to prepare special training according to the centrifugal law on some physical capabilities for the second curve and the performance of running 400 meters, and to understand the impact of special training according to the centrifugal law on these physical capabilities and performance. The researchers relied on the experimental method with a single group pre-test and post-test design, and the research sample was intentionally selected for the availability of conditions and ease of implementing field procedures, consisting of 6 runners for the 400 meters hurdles within the Sports Talent Center in Baghdad. The researchers measured the performance of running 400 meters and the speed rate for the second curve during the first and second tests and a 300 meters run from a high start. The researchers concluded that training according to the centrifugal law had a significant effect on improving the performance of running 400 meters.

The study by Ali Lefta (2010) aimed to prepare exercises using distances shorter than the race distance to develop special speed endurance and performance in running 400 meters for youth athletes. The research also sought to understand the impact of these exercises on developing special speed endurance and performance in the 400 meters event for youth. The researcher used the experimental method suitable for the nature of the research, and the sample consisted of 12 runners training on the Rusafa side in the centers of Al-Shaab Stadium, Hay Ur Center, and Al-Kashafa Stadium, fitting the research conditions in terms of age, regularity, and training continuity, with their ages ranging between 14–16 years. The researcher chose a 300 meters run speed endurance test to measure the special speed endurance capability for the 400 meters event and a 400 meters performance test. The researcher concluded that using exercises shorter than the race distance helps to develop special speed endurance for running 400 meters as well as its performance. The specificity of training quality from testing an appropriate training load and specific distances similar to the actual performance of the race itself and physical capabilities associated with running 400 meters have a positive effect on developing the performance level of the players. The researcher recommended using exercises with distances shorter than the race distance to develop special speed endurance and performance in running 400 meters, focusing on shorter distances, conducting similar research on middle distances (800 and 1500 meters) and 400 meters hurdles, and using appropriate time duration and high intensity in developing special speed endurance. Emphasizing that as the race approaches, it is preferable to use distances shorter than the race distance for the specificity of the 400 meters event.

Following this review of the most significant previous studies related to the research topic, it is essential to present the logical reasons for benefiting from these studies. In the first study, it was indicated that preparing functional strength training with relative weights aims to develop special capabilities and performance in the 400 meters sprint for men. The second study highlighted the preparation of special training according to the centrifugal law for some physical capabilities for the second curve and the achievement in running 400 meters. The third study focused on preparing exercises using distances shorter than the race distance to develop special speed endurance and performance in running 400 meters for youth. The researchers leveraged previous studies in determining the sample and conducting tests, exploring what is new and unstudied in previous studies, specifically the optimal stride length in the first and second straight sections, one of the reasons for undertaking the current study is the possibility of identifying the optimal stride length for each runner relative to their height through James Hay's equation, and the researchers' belief that stride length and frequency are decisive in achieving victory in the race, necessitating the employment of all feasible methods for this purpose, including ABC training and inclines with a gradient of (5-20) degrees for ascending and descending to develop muscular strength (the mechanical action of the working muscles).

Procedures:

The researchers employed an experimental design with a single group (Al-Kazemi, 2012), and the research population was selected intentionally, consisting of 400-meter runners totaling 12 individuals. The research sample represented 50% of the research population, amounting to 6 athletes who participated in the Central Iraqi Union Championships for the year 2023.

A preliminary experiment was conducted on the research sample on Friday, August 25, 2023, at the Najaf Al-Ashraf International Stadium for Athletics, involving two runners outside the sample group. The purpose of conducting the preliminary experiment by the researchers was to ascertain the following:

- The suitability of the location for the main experiment.
- The appropriateness of the devices and tools used in the tests.
- Determining the responsibilities of the support team.
- Establishing the placement, height, and distance from the running field for the cameras, specifically in the second straight section.
- Identifying potential difficulties that the researchers might face during the main experiment.

Observations from this preliminary test were noted for the purpose of addressing them during the main experiment.

Subsequently, the main experiment was conducted on Friday and Saturday, September 1 and 2, 2023, at the Najaf Al-Ashraf International Stadium for Athletics on the research sample by conducting three tests: a 50-meter flying start test, a 300-meter seated start test, and an individual performance test for runners (IAAF2019), to allow motion analysis cameras to accurately measure stride length. Two (CASIO FH13.5) motion analysis cameras were set at a speed of 120 frames per second and a height of 1.3 meters, orthogonal to the last 40 meters of both the first and second straights, and placed 13 meters away from the second running field. Every 20 meters was filmed by a camera to analyze the stride length in the last 40 meters of each straight, and then a suitable training program was developed for each runner based on the motion analysis data for stride length and compared with James Hay's equation. On the first

Journal of Physical Education
Volume 36 – Issue (1) – 2024 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

day, a 50-meter flying start test and a 300-meter seated start test were conducted, whereas on the second day, a 400-meter seated start test was carried out as follows:

First Test/ 50 Meter Flying Start Test: (Al-Hakeem, 2004, p. 113)

- **Purpose of the test:** To measure maximum speed and analyze the stride length for the last forty meters.
- **Equipment used:** A straight running track measuring 65 meters in compliance with regulatory requirements, three stopwatches (for timekeepers), and a clearly visible pink marker indicating the end of 15 meters and the beginning of 50 meters.
- **Performance method:** The test starts from a standing ready position, and upon the start signal, the participant accelerates towards the start line, ending at (15) meters, where the first assistant signals with a quick gesture from the wrist and an extended hand holding a red flag. At this point, the timekeepers start the stopwatches, and when the participant crosses the finish line of the (50) meters, the stopwatch is stopped.
- **Measurement method:** The time is recorded to the nearest 0.01 second using three stopwatches, with the median timing taken.

Figure (1) illustrates the procedure for initiating the 50-meter test from a flying start position on the straight track.

Second Test/ 300 Meter Run from a Seated Start: (Ajil & Al-Fadhli, 2020)

- **Purpose of the test**: To measure the performance of running (300) meters, starting from the 1500 meters race start line, for the purpose of analyzing stride length on the first and second straights.

- **Equipment used:** A running track measuring 300m in compliance with regulatory requirements, and three stopwatches (for timekeepers).
- **Performance method:** The test begins immediately after the warm-up process, with the participant positioned at the start line in a seated start position. The starter then gives the signal to commence, at which moment the timekeepers activate the stopwatches. When the participant crosses the finish line, the stopwatches are stopped.
- **Measurement method:** Time is recorded to the nearest 0.01 second using three stopwatches, with the median time being taken.

Figure (2) demonstrates the method for conducting the 300-meter test from a seated position at the 1500-meter start mark.

Third Test/ 400 Meter Run from a Seated Start: (International Association of Athletics Federations IAAF, 2019)

- **Purpose of the test:** To measure the performance of running (400) meters and analyze the stride length on the first and second straights for the last forty meters of each.
- **Equipment used:** A running track measuring 400m in accordance with regulatory requirements, and three stopwatches (for timekeepers).
- **Performance method:** The test begins immediately after completing the warm-up process, with the participant being signaled at the start line. The participant then assumes a seated start position. Following this, the starter gives the signal to begin, and at this moment, the timekeepers activate the stopwatches. When the participant reaches the finish line, the stopwatches are stopped.

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

- **Measurement method:** Time is recorded to the nearest 0.01 second using three stopwatches, with the median time being taken. Additionally, Figure (3) illustrates how to commence the race, and Figure (4) shows the placement of cameras on the first and second straights.

Figure (3) illustrates the procedure for initiating the 400-meter test from a seated start position.

Journal of Physical Education
Volume 36 – Issue (1) – 2024 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

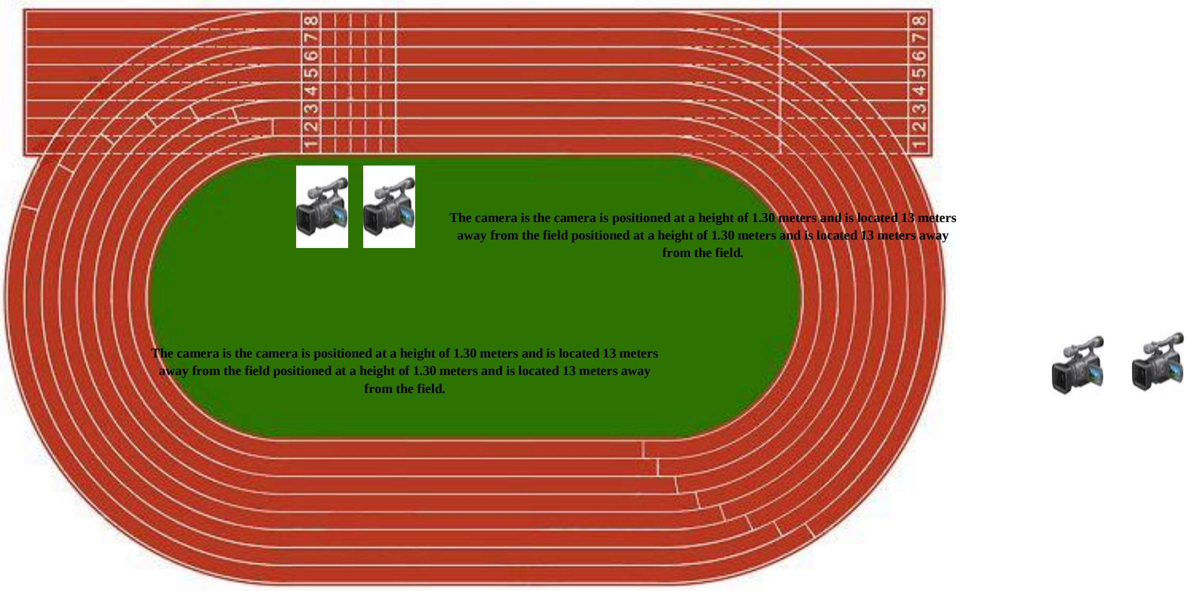

Figure (4) demonstrates the placement of cameras for all three tests.

Regarding the method for measuring stride length, measurement is conducted using the Kenova motion analysis software, as illustrated in Figures (5), (6), and (7).

The figure (5) illustrates the method of measuring step length in a 50-meter sprint test.

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Figure (6) illustrates the method of measuring step length in a 300-meter seated test.

Figure (7) illustrates the method for measuring stride length in the second straight section of the 400-meter test.

Upon completing the designated training from September 3, 2023, to October 26, 2023, post-test assessments were conducted on Saturday and Sunday, October 28 and 29, 2023, following the same procedures and conditions as the pre-test. Subsequently, the results were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 24 for statistical processing, including mean, standard deviation, skewness coefficient, and the T-test value for paired samples, along with the significance value (sig).

Results:

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Table (1)

Displays the mean, standard deviation, and skewness coefficient for the research sample in the studied variables.

Variable	Unit of Measurement	Mean	Median	Standard Deviation	Skewness
Height	cm	1.756	1.755	0.0175	-0.248
Mass	kg	76.33	76	2.9439	-0.206
Chronological Age	years	27.16	27.5	2.3166	-0.300
Training Age	years	7	6.5	1.2649	0.889

This table encapsulates the statistical analysis of four different variables: Height, Mass, Chronological Age, and Training Age. Each variable is quantitatively described by its mean, median, standard deviation, and skewness metrics, with units of measurement appropriately assigned.

Table number (1) presents the mean values, standard deviations, and skewness coefficients for the research variables. The mean values are greater than the standard deviations, indicating a lack of dispersion among the sample members. The skewness values ranged between (0.889 and -0.300), which are confined within (± 1), suggesting that they fall within the normal distribution range.

Table (2) Displays the differences between the pre-test and post-test for variables related to stride length and performance in (400, 300, 50) meters.

Test	Unit	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post-Test SD	t-Value	Sig. Value	Significance
50 Meter Test	seconds	5.47	0.287	5.35	0.281	13.37	0.000	Significant
Stride Length	meters	2.18	0.015	2.21	0.020	-3.13	0.026	Significant
300 Meter Test	seconds	38.27	0.747	37.46	0.315	3.199	0.024	Significant
Stride Length in the First Straight	meters	2.17	0.012	2.18	0.013	-2.236	0.076	Not Significant
Stride Length in the Second Straight	meters	2.21	0.013	2.24	0.014	-4.341	0.007	Significant
400 Meter Test	seconds	49.55	0.791	48.45	0.583	3.122	0.026	Significant
Stride Length in	meters	2.08	0.013	2.11	0.017	-6.708	0.001	Significant

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

the First Straight								
Stride Length in the Second Straight	meters	2.13	0.016	2.15	0.011	-3.114	0.027	Significan
Degrees of Freedom (df) = n-1 = 5... Significant at (Sig) < 0.050.								

Discussion of Results:

The results presented in Table (2) show significant statistical differences in all the studied variables except for one, which is the stride length in the first straight of the 300-meter performance test. The researchers attribute this to the specifically designed training based on mechanical principles through ABC exercises aimed at developing the regulation of stride length, as well as slope and interval distance exercises through step regulation exercises suitable for each runner's height according to James Hay's equation during maximum speed phase or maintaining maximum speed when running in the straight section.

From both practical experience and theoretical background in biomechanics and sports training (movement sciences), the researchers realize that one of the most challenging aspects of speed training in general is controlling stride parameters (stride length and frequency) and the dialectical inverse relationship between these two variables.

An important issue to address is when to increase stride length and when to increase its frequency. The available answer to this two-part question involves analyzing the entire race distance, identifying key strengths and weaknesses, and how to control the race based on each athlete's capabilities.

Through this research and previous studies, it is observed that 400-meter runners often attempt to divide the race distance mostly in terms of energy expenditure and distribution.

It is evident that their effort distribution focuses on four main areas representing the basic distance of the race, comprising two curves and two straights. Most runners increase their speed on each straight, with a preference for the first straight over the second due to fatigue accumulation at the end of the race. At the same time, speed moderation is noticed on curves due to mechanical factors including centrifugal force and attempts to change body mechanics and effort distribution during the race.

The researchers structured their training around three axes. The first involved exercises specific to step technique for a distance of 40 meters, including a set of ABC exercises aimed at developing specific coordination for the legs and arms, thus regulating stride length parameters.

The second axis involved interval distance exercises (90, 80, 70, 60, 50, 40 meters) with specific markers placed at the last 40 meters for foot placement and flight of both feet, using small training hurdles for step regulation.

The third and very important axis involved running on slopes with an incline of (5-20) degrees for both ascending and descending, aimed at increasing stride length (resistance) during ascent and stride frequency (assistance) during descent as a primary objective. (See Appendix 1 for the content of exercises designed according to the targeted objectives.)

Regarding the first axis, the researchers agree with Adel and Sofyan that running basics can be addressed through ABC exercises to improve acceleration, balance, coordination, and speed capabilities, thereby enhancing running techniques if performed with correct movement. These exercises are determined by the type of event and thus have mutual effects on performance such as muscle strength, reaction speed, contraction speed, and their coordination (Tangkudung & A., 2018, p. 31).

The researchers believe these exercises have a clear impact on improving stride length for the targeted interval distance, especially since these exercises were given at the beginning of the training unit, making their effect more potent due to the restfulness of the neuromuscular system and readiness for activity.

Through mentioned findings, it is found that such exercises serve multiple purposes and develop capabilities related to agility and coordination in addition to strength and speed. In most research, there are mutual relationships between these capabilities and performance speed or achievement time, legitimizing the training of runners with exercises that bear these capabilities to develop their performance, which was implemented using ABC exercises within the interval distances. Hence, Ritdorf and Syafruddin note the mutual effects in performing ABC exercises such as muscle strength, reaction speed, contraction speed, and coordination (Ritdorf, 2009; Syafruddin, 2011).

The researchers agree with Priyono and Giartama that the relatively required physical component for running is speed, which according to the concept of sprinting means running as fast as possible, achieved through practicing exercises for acceleration, balance, and coordination, possible through ABC exercises. A study showed significant effects of these exercises in improving sprint results for (100) m, (200) m, and (400) m distances, finding an increase in running speed for short distances closely associated with basic movement training of ABC (Priyono, 2019, p. 3; Giartama, 2018, p. 13).

Regarding the second axis, the researchers agree with Maher et al. that interval distances in training according to race distance segmentation have a significant effect on developing relative times and performance techniques, thereby improving achievement levels (Shlash, Al-Amiri, Al-Awadi, & Al-Fadhli, 2023, pages 543-554).

Thus, the effect of the designed exercises became evident through the significance of the differences, noting that in one of the variables, there were no significant differences in stride length in the first straight of the 300-meter performance due to the statistical insensitivity of differences caused by the small sample size. However, differences between means were noted in favor of the post-test mean. Regardless, the specificity of the distance and the runners' accustomed practice of dividing the race distance remain the most significant factor in determining the required execution.

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

The researchers distributed the optimal stride length for each runner according to the runner's height (see Appendix 2) using James Hay's equation for adjusting the optimal stride length (Hay, translated by Al-Ankari, 2009, page 225).

Regarding the third axis, slope training, the researchers dealt with this mechanical characteristic as a main part of each training unit in the three weekly sessions. Running on slopes is considered running over natural and artificial inclines, both ascending and descending at various angles to develop physical capabilities including strength and speed for different distances appropriate to the event type and athlete's capabilities. Slope training ascending provides a type of resistance effective on the thigh muscles (anterior-posterior) and calf muscles physiologically, while mechanically, it provides kinetic momentum to the runner, exerting a doubled stride length than that during normal running on flat ground.

Previous research confirmed that stride length and frequency success through increased muscle group strength associated with running, resulting from increased external resistance applied to these muscles, aligns with the researchers' goal of improving stride length and frequency through slope training.

Inclined training is a form of training aimed at developing physical qualities related to the type of sport, including speed, strength characterized by speed, explosive strength, and speed endurance, among other special qualities for runners in general and 400-meter event runners in particular.

The researchers believe that downhill training on slopes provides a type of assistance aimed at speed development, emphasizing that natural speed with control over arm action and free leg movement (flying) should be maintained, focusing on the natural stride length as in running on flat ground.

The researchers, in agreement with Maher and others, in addition to the biomechanical benefits of stride length and frequency from slope training, view it as foundational in developing a range of physical qualities including muscular strength, explosive power, muscular flexibility, and developing body posture (body angles) and the effective use of the upper body part and physical effort regulation (Shlash, Al-Mashhadani, & Al-Ruwaishdi, 2022, pages 295-315).

The main part of the unit begins with basic movement ABC exercises, followed by a series of special exercises according to defined interval distances, targeting the last 40 meters with distinctive markers to accustom the runner to touch those markers with each step or cross the small training hurdles in an attempt to create adaptations for the runners as much as possible, then proceeding to slope exercises with an incline of (5-20) degrees ascending and descending. (See Appendix 3 for the model of a training unit prepared within the general curriculum).

The researchers, in agreement with Bruce and Thier, believe that slopes are the best method for developing instantaneous strength or special quick strength related to the type of skill, contributing to increased recruitment and stimulation of muscle fibers to participate in muscular work and enhancing their neuromuscular coordination within and between muscles (Gradfwnts & Gambettes, 1983, p. 91).

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

The researchers worked on training load fluctuation at a ratio of (1:2) within the general curriculum, with Sunday and Tuesday being high intensity days, whereas Thursday being a low-intensity day (see Appendix 4 for the training fluctuation schedule).

Conclusions:

1. ABC exercises play a crucial role in improving performance technique (stride length and frequency) for the first and second straights of the 400m sprint.
2. Exercises based on segmenting the race distance have a clear effect on regulating stride length and frequency for 400-meter event runners.
3. Slope exercises have a clear impact on improving stride length during ascent and stride frequency during descent due to resistances and assistances.

Recommendations:

1. The researchers recommend applying these exercises to other categories and runners of other events due to their utmost importance for them.
2. The researchers recommend adopting James Hay's equation (runner's height × 1.22) for adjusting the optimal stride length for sprinters.

References

Abdulhassan, G. A., Shnawa, T. F., & Qaddoori, Y. W. (2022). the Effect of Katsu Exercises on Some Abilities of Strength and Achievement of Advanced Weight Lifters, Baghdad Clubs. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(6), 416–418.

Ahmed, M. (2020). Special exercises using the strength training balanced rate according to some kinematic variables and their impact in the muscular balance and pull young weightlifters. International Journal of Psychosocial Rehabilitation, 24(01), 7612–7617.

Ajil, A. N., & Al-Fadhli, S. A. K. (April 28, 2020). Special training according to the law of centrifugal force in some physical abilities for the second curve and 400 m running achievement. Journal of Physical Education. Retrieved from https://jcope.uobaghdad.edu.iq/index.php/jcope/article/view/973.

Al-fatlawi, A. H. A., Al-, P. A. M., & Abd, P. H. (2023). The Effect of Using Adhesive Tapes (Kenzo Tape) in Rehabilitating the Shoulder Muscles of Throwing Players in Paralympic Athletics Events. Pakistan Heart Journal, 56(02).

Al-Hakim, A. S. J. (2004). Tests, measurements, and statistics in the sports field. Al-Qadisiyah University: Al-Taif for Printing.

Ali, H. H., Hussain, D. Y. N., & Al-Talib, D. T. N. (2020). the Relationship of the Learning Level According To Different Educational Strategies With Some of the Kinematic Variables of Back Swimming for Students. International Journal of Research in Social Sciences and Humanities, 10(2), 375–380. https://doi.org/10.37648/ijrssh.v10i02.037

Ali, N. K., Amish, S. R., & Kamil, W. S. (2022). an Analytical Study of the Offensive Aspect of the Iraqi National Team Players in the 2015 Arabian Gulf Championships and the 2018 Asian Nations in Football. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(4), 221–223.

Ali, Y., Abdulhussein, A., & Jassim, A. (2023). EMPLOYMENT OF RESISTANCE EXERCISE IN ACCORDANCE TO VARIABLE BIOMECHANICAL MARKERS TO DEVELOP THE STRENGTH AND THE SPEED OF ARM MUSCLES OF WATER POLO PLAYERS. International Development Planning Review, 22(2`), 589–605.

Al-Kazemi, Z. H. (2012). Practical applications for writing educational and psychological dissertations and theses. Baghdad: University of Baghdad Printing.

Dhahi, N. M., Hani, A. T., & Khudhair, M. O. (2022). a Study of Mental Perception and Sports Confidence and Their Relationship To the Motivation of Sports Achievement for the Players of the Iraqi Premier League Football Clubs. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(6), 391–395.

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.

Fadhil, S. A., & Khalaf, S. Q. (2023). A treatment strategy for recurrent (ankle injuries) in Muay Thai athletes. Eximia, 12(1), 486–495. https://doi.org/10.47577/eximia.v12i1.394

Fahem, L., & Wahid Easa, A. (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 R.S.C.B., 25(6), 10008–10013. http://annalsofrscb.ro

Fathi, M. K. (2022). Design and Rationing of a Test To Measure the Accuracy of Shooting By Jumping Forward From the Goal Area Line As a Result of the Quick Attack of Handball Players. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(5), 294–298.

Ghafoor, Q. H. A., Salman, A. D., & Ali, S. A. S. (2022). Effect of Proposed Exercises Using the Sponge Mat in the Performance of the Skill of Court Defence in Sitting Volleyball. Special Education, 1(43), 2135–2144. https://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=159789847&site=ehost-live

Giartama. (2018). ABC running training for 100-meter running speed results on extracurricular activities. Journal of Sports and Health Sciences, 13.

Gradfwnts, P., & Gambettes, T. U. (1983). Track technique annual. Los Altos: Tafnews Press, 91-92.

Gree, R. A. A., & Attiyah, A. A. (2022). the Effect of the Hiit Training Curriculum on Developing Some of the Kinetic Capabilities and Combat Adequacy of Iraqi Special Forces Fighters. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(4), 224–227.

Hamed, A., Alethawi, H., Prof, A., Makki, A., & Almayyah, M. (2023). The Role of Strategic Thinking of Administrative Bodies in Enhancing Organizational Loyalty among Coaches of Sports Clubs in Baghdad. Pakistan Heart Journal, 56(02), 537–545.

Hameed, A. S. A., Sabhan, M. H., & Kamil, W. S. (2021). Special Exercises for Offensive Tactical Skills and Their Impact on Developing the Speed and Accuracy of Some Basic Skills in Youth Football. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 16(4), 69–72.

Hameed, D. I. R. (2020). Strength Training and its Effect in Some Biochemical Variables in the High Jumping of Advanced Players. International Journal of Psychosocial Rehabilitation, 24(5), 6178–6184. https://doi.org/10.37200/ijpr/v24i5/pr2020595

Hamza Muhammad Al-Bahadli, S. A.-Z., & Ali Al-Tamimi, P. D. A. F. (2022). The effect of a rehabilitation program for rhomboid muscles (shoulder) and fibrous strain on young and advanced wrestlers (Free and Roman). International Journal of Research in Social Sciences & Humanities, 12(02), 150–176. https://doi.org/10.37648/ijrssh.v12i02.010

Hamza, J. S., Zahraa, S. A., & Wahed, A. A. (2020). The history of rhythmic gymnastics for women. International Journal of Psychosocial Rehabilitation, 24(03), 6605–6612.

Hani, A. T., Abdulhameed, A. S., & ... (2020). Psychological pressures and their relationship to the competitive orientation of football players in the Iraqi Premier League for the 2018-2019 season. International Journal of …, 24(02), 6839–6847. https://www.researchgate.net/profile/Ali-Saad-14/publication/350040911_aldghwt_alnfsyt_wlaqtha_baltwjh_altnafsy_llaby_krt_alqdm_fy_aldwry_alraqy_almmtaz_llmwsm_2018-2019_Psychological_pressures_and_their_relationship_to_the_competitive_orientation_of_foot

Hani, A. T., Khudhair, M. O., & Jasim, H. T. (2022). Aggressive Behavior and Its Relationship To the Phenomenon of Bullying Among Young Football Players Aged (17-19) Years. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(6), 399–401.

Hay, J., translated by Al-Ankari, A. R. S. (2009). Biomechanics of sports performance methods. Riyadh: Kingdom of Saudi Arabia.

Hussain, M. A., Almujamay, A. S. A., & khammas, R. khaleel. (2022). Comparison of Some Kinematic Variables of the Triple Jump Between the Two World Championships (Iaaf) (2017) and (2018). Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(5), 323–327.

Idrees, M. T., Yasir, A. M., & Rashied, J. M. (2022). Effect of resistance training on the biomechanics and accuracy of serve receiving skills in volleyball. Sport TK, 11, 1–8. https://doi.org/10.6018/sportk.517131

International Association of Athletics Federations (IAAF). (2019). Competition rules. Cairo: Translated by the Athletic Development Center in Cairo.

Ismaeil, K. S., Prof, A., Razzaq, B., Hamedd, P., & Kadhim, A. A. (2023). The effect of using electrical stimulation and massage within a suggested device to restore muscle lengthening for athletes with a moderate-intensity muscle tear in some posterior thigh muscles. Pakistan Heart Journal, 56(01), 262–267.

Jaafer, M. T., Luay, P., & Refat, S. (2023). Some Manifestations of Attention According to the HRP System and its Relationship to the Accuracy of the Shooting Performance from the Free Throw in Basketball for Junior Players. Pakistan Heart Journal, 56(02), 165–172.

Jeklin, A., Bustamante Farías, Ó., Saludables, P., Para, E., Menores, P. D. E., Violencia, V. D. E., Desde, I., Enfoque, E. L., En, C., Que, T., Obtener, P., Maestra, G. D. E., & Desarrollo, E. N. (2016). THE EFFECT OF A SUGGESTED REHABILITATION CURRICULUM IN THE TREATMENT OF PARTIAL RUPTURE OF THE GLUTEAL MUSCLES AND STRENGTHENING THE WORKING MUSCLES OF THE PELVIC JOINT IN FOOTBALL PLAYERS. Correspondencias & Análisis, 17(15018), 1–23.

Jumaah, A. H., & Ameen, B. A. M. (2023). The Effect of the Strategy of Differentiated Education According to the Auditory Learning Style by Using Assistance in Learning the Back Kick (T-Chagi) for the Young …. Pakistan Heart Journal, 56(01), 137–148. https://www.pkheartjournal.com/index.php/journal/article/view/1198

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

Kamil, W. S., & Sabhan, M. H. (2022). the Effect of Special Exercises for Some Physical and Compatibility Abilities and Their Relationship To Some Basic Skills of Female Football Futsal Players. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(5), 307–310.

Lefta, A. A. (September 28, 2010). Using exercises shorter than the race distance to develop special speed endurance and its effect on 400 meters running achievement for youth. Journal of Physical Education. Retrieved from https://jcope.uobaghdad.edu.iq/index.php/jcope/article/view/1695.

M. A. Student. Abdullah Jamal Sakran, P. D. G. M. S. (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), 97–114.

Mahde, M. A., Hamedd, P., Abdul, A., & Prof, A. (2023). The Effect of Dynamic Lactic Training According to the Target Time to Develop the Achievement of 800m Runners Under 20 Years Old. Pakistan Heart Journal, 2706(02), 317–323.

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

Mohammed Khalid Awad, Khulood Juma Qasim, & S. H. A. (2024). Using an educational method according to special exercises to perform the skill of bow and develop flexibility for cub wrestlers in Iraq. Eximia, 13(1), 38–50. https://doi.org/10.47577/eximia.v13i1.423

Mohammed, A. F., & Al-Shamaa, H. F. (2021). The effect of functional strength training using relative weights on some special physical abilities and achievement in 400 meters running for men. Journal of Physical Education, 9-19. https://doi.org/10.37359/JOPE.V33(4)2021.12074

Mohammed, M. A., Sabhan, M. H., & Abed, E. K. (2021). Special Cross-Sectional Exercises and their Impact on the Development of Some Physical Abilities and Performance of the Basic Skills of Football for Young Players. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 16(1), 11–14.

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.

Mondil, M. T., Prof, A., & Hussein, L. (2023). The Effect of Using an Innovative Device on Learning the Movement of the Feet and the Speed of Kinetic Response , and Some Badminton Skills for Female Students. Pakistan Heart Journal, 56(02), 156–164.

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.

Muhamed, B., Salam, K., & Kamal, A. (2023). The reality of the heroic graduate students from the College of Physical Education and Sports Sciences - University of Baghdad for the academic year 2022/2023. Journal of Physical Education, 35(3), 739–729. https://doi.org/10.37359/JOPE.V35(3)2023.1932

Muhsen, A. S. (2020). A study of some special physical characteristics and their relationship in developing rhythmic steps to achieve a javelin throwing activity for beginners. International Journal of Psychosocial Rehabilitation, 24(08), 14839–14855.

Munaf, S. M., Ali, A. A., & Dawood, M. S. (2022). Psychological Empowerment and Its Relationship To Organizational Citizenship Behavior for Workers in the Olympic Committee Sports Federations. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(4), 183–190.

N.K., A., & A.S.A., H. (2020). The effect of attacking tactical skill exercises in the skills of dribbling and shooting for youth football players. International Journal of Psychosocial Rehabilitation, 24(9), 4754–4761. https://www.psychosocial.com/wp-content/uploads/2020/09/PR290505.pdf%0Ahttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emca3&NEWS=N&AN=2005014581

Naif, A. S., & Hussein al-Maliki, D. M. A. (2020). the Effect Karplus Model in Cognitive Achievement and Learning Passing Skill in Soccer for Secondary School Students. International Journal of Research in Social Sciences and Humanities, 10(2), 385–394. https://doi.org/10.37648/ijrssh.v10i02.039

nbraz, younis, & Lazim, A. (2023). The effect of using aids manufactured to perform the maximum speed of the hands in learning the skill of hitting baseball for ages (under 12 years). Journal of Physical Education, 35(3), 628–619. https://doi.org/10.37359/JOPE.V35(3)2023.1526

Priyono. (2019). Effect of balance coordination running acceleration exercise on improving learning ou

rashed, mohamed, & Ghazi, A. W. (2023). The impact of an educational curriculum using delayed feedback according to different times in learning and retaining the skill of shooting at several goals distributed on the field during (30) for cross-ball players ages (13-15 years). Journal of Physical Education, 35(3), 703–694. https://doi.org/10.37359/JOPE.V35(3)2023.1527

Rija, T. H. (2023). THE ROLE OF ORGANIZATIONAL DEVELOPMENT IN IMPROVING THE REALITY OF THE WORK OF THE. Ibero-American Journal of Exercise and Sports Psychology, 18, 298–304.

Ritdorf, H. M. (2009). Run! Jump! Throw!. UK: Warners Midlands plc.

Saad, A., Fadhil, A., Rafid, A.-B., & Qaddoori, M. (2023). Rehabilitation Program For Treatment Tennis Elbow (Lateral Epicondylalgia) Suffered by The Players of Al-Rafidain Sports Club For Tennis League Three Players In Diyala Province. 13(2018).

Sabbar, O. S., Jawad, A. M., & Jabbar, M. A. (2023). the History of Clubs' Participation in the Iraqi Volleyball Premier League and Its Results for the Period From (1991 To 2022). Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 18(3), 288–290.

Sabhan, M. habeeb, Kamil, W. S., & Hameed, A. S. A. (2021). Special Exercises in the Hierarchical Opposing Training Method and Its Effect on Developing Physical Abilities and Accuracy of Soccer Scoring for Advanced Players. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 16(6), 20–22.

Saeed, T. A., Yasser, O. K., & Fenjan, F. H. (2020). The effect of various aerobic exercises on the endurance and some physiological variables among fitness training practitioners of at (30-35) years old. International Journal OfPsychosocial Rehabilitation, 24(03), 6083–6086.

Shlash, M. J., Al-Amiri, H. F., Al-Awadi, M. Y., & Al-Fadhli, S. A. K. (May 9, 2023). The contribution ratio of partial distances time (80, 60, 30) meters to the achievement of 100 meters sprint for elite runners. Journal of Basic Education College Researches, 19, 544-554.

Shlash, M. J., Al-Mashhadani, Z. A., & Al-Ruwaishdi, M. M. (March 10, 2022). Training with slope style, rubber bands, and medicine balls to improve explosive power, start speed, and the last step and achievement of advanced javelin throwers. Journal of Physical Education Sciences/ University of Babylon, 295-315.

Shukur, L. H., Jalal, A., & Zighair, R. M. (2022). the Effect of the Learning Model Together Using Auxiliary Tools in Developing the Accuracy of the Forehand Stroke in Table Tennis. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 17(1), 36–39.

Syafruddin. (2011). Science of sports coaching, theory and its application in sport coaching. Padang: UNP Press.

Tangkudung, A. A., & , A., S. H. (2018). The influence of speed, agility, coordination of foot, balance and motivation on the skill of playing football. Journal of Indonesian Physical Education and Sport, 4(1), 31.

Wesam Najeeb Asleawa, Naji Kadhim Ali, F. S. Y. (2020). The effect of physical training on the general endurance and fitness of “Beladi” club for advanced football players,. International Journal of Psychosocial Rehabilitation, 24(5), 1475–7192. https://doi.org/10.37200/IJPR/V24I1/PR202281

Yasir, A. M. (2020). The Effect of some Coordination Abilities on Developing kinematical Motor behavior and the Accuracy of Jump Spike Serve in volleyball players. International Journal of Psychosocial Rehabilitation, 24(04), 9142–9149.

Yasir, A. M., & Sikhe, H. S. (2020). The Effect of Special Weight Exercises Using Auditory Apparatus According to Kinematic Indicators For Developing Auditory Response and Accuracy of Spiking in Volleyball. International Journal of Psychosocial Rehabilitation, 24(04), 9684–9691.

Yousif, T. A., Almogami, A. H. B., & Khadim, W. I. (2023). ACCURATELY PREDICTING THE PERFORMANCE OF THE BLOCKING SKILL FROM THE CENTERS (2,4) IN TERMS OF SOME KINETIC INDICATORS OF VOLLEYBALL PLAYERS. REVISTA IBEROAMERICANA DE PSICOLOGÍA DEL EJERCICIO Y EL DEPORTE, 18(4), 371–374.

Yousif, T. A., Almogami, A. H. B., & Khadim, W. I. (2023). the Effect of Special Exercises Using the (Rebound Net) Device in Developing the Accuracy of Spike Diagonal Skill in Volleyball. Revista Iberoamericana de Psicologia Del Ejercicio y El Deporte, 18(2), 194–195.

Appendix (1)

The Fundamental ABC Technique Exercises

Code	Exercise Content	Training Objective	Mechanical Purpose
ABC 1	A-skips: Alternating high knee lifts for 40m	General preparation of the runner and technique adjustment	Path control through performance angles
ABC 2	B-skips: Alternating knee lifts with thrust for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 3	C-skips: Alternating knee lifts at a 45-degree angle for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 4	D-skips: Knee lifts with thrust using one leg for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 5	E-skips: Medium knee lifts with one leg for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 6	Happy Feet: Running on toes for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 7	1.2.3's: Three hops on the right then three on the left for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 8	Straight legs: Running with straight, level legs for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 9	Straight legs Bound: Running with straight, low legs	General preparation of the runner and technique adjustment	Path control through performance angles and stride frequency adjustment
ABC 10	Angling: Running on the ankles for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 11	Fast leg: Foot strike motion from a step for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment
ABC 12	Ready for accelerations: Various accelerations for 40m	General preparation of the runner and technique adjustment	Path control through performance angles and stride length adjustment

The Fundamental Running (RU) Exercises for Interval Distances (90, 80, 70, 60, 50, 40 meters)

Code	Exercise Content	Training Objective	Mechanical Purpose

Ru1	Sprint from starting blocks for 40m with step control markers	Develop reaction time, block clearance time, and acceleration onset	Control movement path through performance angles and stride frequency adjustment
Ru2	Sprint from starting blocks for 50m with step control markers	Develop reaction time, block clearance time, and acceleration onset	Control movement path through performance angles and stride frequency adjustment
Ru3	Sprint from starting blocks for 60m with step control markers	Develop reaction time, block clearance time, and specific speed	Control movement path through performance angles and stride length adjustment
Ru4	Sprint from a standing position for 70m with step control markers	Develop specific speed	Control movement path through performance angles and stride length adjustment
Ru5	Sprint from a standing position for 80m with step control markers	Develop specific speed and speed endurance	Control movement path through performance angles and stride length adjustment
Ru6	Sprint from a standing position for 90m with step control markers	Develop specific speed and speed endurance	Control overall path, stride length, and frequency
Ru7	Sprint from a standing position for 40m	Develop initial acceleration phase	Control acceleration path, stride length, and frequency
Ru8	Sprint from a standing position for 50m	Develop initial acceleration phase	Control acceleration path, stride length, and frequency
Ru9	Sprint from a standing position for 60m	Develop specific speed	Control maximum speed path, stride length, and frequency
Ru10	Sprint from a flying start for 40m	Develop maximum speed	Control acceleration path, stride length, and frequency
Ru11	Sprint from a flying start for 50m	Develop maximum speed	Control acceleration path, stride length, and frequency
Ru12	Sprint from a flying start for 60m	Develop maximum speed	Control maximum speed path, stride length, and frequency

The Fundamental Running (RUS) Exercises on Slopes Ascending and Descending from 5 to 20 Degrees

Code	**Incline Percentage**	**Exercise Content**	**Training Objective**	**Mechanical Purpose**
RUS1	20 degrees	Running 30-40m uphill	Develop initial acceleration	Stride length - Instantaneous push
RUS2	20 degrees	Running 30-40m downhill	Develop initial acceleration	Stride frequency - Instantaneous push
RUS3	15 degrees	Running 40-50m uphill	Develop initial acceleration	Stride length - Leg strength

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

RUS4	15 degrees	Running 40-50m downhill	Develop initial acceleration	Stride frequency - Leg strength
RUS5	10 degrees	Running 50-60m uphill	Develop secondary acceleration	Stride length - Power agility
RUS6	10 degrees	Running 50-60m downhill	Develop secondary acceleration	Stride frequency - Power agility
RUS7	10 degrees	Running 60-70m uphill	Develop maximum speed	Stride length - Specific coordination
RUS8	10 degrees	Running 60-70m downhill	Develop maximum speed	Stride frequency - Specific coordination
RUS9	5 degrees	Running 70-80m uphill	Develop special speed endurance	Stride length - Step rhythm
RUS10	5 degrees	Running 70-80m downhill	Develop special speed endurance	Stride frequency - Step rhythm
RUS11	5 degrees	Running 80-90m uphill	Develop special speed endurance	Stride length - Kinetic harmony
RUS12	5 degrees	Running 80-90m downhill	Develop special speed endurance	Stride frequency - Kinetic harmony

Appendix (2)

Adjusting the Optimal Stride Length According to James Hay's Equation

Runner's Height	**James Hay's Equation**	**Optimal Stride Length at Maximum Speed Phase**
1.75m	× 1.22m	2.14m
1.76m	× 1.22m	2.15m
1.73m	× 1.22m	2.11m
1.77m	× 1.22m	2.16m
1.78m	× 1.22m	2.17m
1.75m	× 1.22m	2.13m

Appendix (3)

Week Three, Training Unit Eight, Within the Prepared Curriculum

Tuesday, September 19, 2023 - Intensity: 90%, Duration: 97 minutes, Objective: Specific Speed, Special Speed Endurance									
Section and Duration	**Attributes and Elements**	**Intensity**	**Exercise Name**	**Work Time**	**Number of Repetitions**	**Rest Between Repetitions**	**Rest Between Exercises**	**Total Work and Rest Time**	**Notes**

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

35 min	Aerobic	-	800m + accelerations	270 sec	1	-	-	270 sec	General warm-up
	Flexibility	-	Dynamic	20 sec	3	60 sec	90 sec	270 sec	From jogging
	Skill	-	ABC 1	10 sec	3	120 sec	120 sec	390 sec	Stride length
	Skill	-	ABC 2	10 sec	3	120 sec	120 sec	390 sec	Stride frequency
	Skill	-	ABC 3	10 sec	3	120 sec	120 sec	390 sec	Knee lift
	Skill	-	ABC 4	10 sec	3	120 sec	120 sec	390 sec	Exchange
46.5 min	Acceleration	85%	Ru1	4 sec	2	90 sec	120 sec	220 sec	Unit volume 860 meters
	Acceleration	95%	Ru2	4 sec	2	120 sec	120 sec	250 sec	
	Stride Length	90%	Ru5	8 sec	2	180 sec	300 sec	500 sec	
	Stride Frequency	85%	Ru6	9 sec	2	180 sec	270 sec	470 sec	
	Speed Endurance	95%	RUS11	10 sec	2	180 sec	300 sec	500 sec	
	Speed Endurance	90%	RUS12	10 sec	2	180 sec	270 sec	470 sec	
	Educational	-	Explanation of the day's goal	390 sec	-	-	-	390 sec	
15.5 min	Flexibility	-	Static	20 sec	3	60 sec	90 sec	270 sec	From lying down
	Aerobic	-	800m	270 sec	1	-	-	270 sec	Only jogging
	Psychological	-	Encouragement and motivation	390 sec	-	-	-	390 sec	Relaxation

Appendix (4) The Schedule for the Prepared Curriculum and Periodization Across Weeks and Units

Weeks	Intensity Used	Sunday (Date)	Tuesday (Date)	Thursday (Date)
Week 1	80%	75% - 3/9	85% - 5/9	80% - 7/9
Week 2	90%	85% - 10/9	95% - 12/9	90% - 14/9
Week 3	85%	80% - 17/9	90% - 19/9	85% - 21/9
Week 4	90%	85% - 24/9	95% - 26/9	90% - 28/9
Week 5	100%	95% - 1/10	105% - 3/10	100% - 5/10
Week 6	95%	90% - 8/10	100% - 10/10	95% - 12/10

Journal of Physical Education

Volume 36 – Issue (1) – 2024 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Week 7	100%	95% - 15/10	105% - 17/10	100% - 19/10
Week 8	90%	85% - 22/10	95% - 24/10	90% - 26/10