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Mueen Ali Obaid
College of Physical Education and Sports Sciences, University of Kirkuk, Iraq

Corresponding Author:
Mueen Ali Obaid
College of Physical Education and Sports Sciences, University of Kirkuk, Iraq

A short-term neural activation program and its effect on improving reaction time, block clearance, and early acceleration among sprint runners in Kirkuk

Mueen Ali Obaid

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Abstract
The purpose of the current study is to establish the impact of a temporary neural stimulation program (Neural Priming) on the enhancement of certain motor performance indicators in sprint runners in Kirkuk in terms of reaction time, block clearance, and early acceleration (0-10 m). The method the researcher used is a quasi-experimental design with two-group design (experimental and control) and pre- and post-tests.
The sample of the research entailed short distance runners (100 meters and 200 meters) in Kirkuk. The experimental group was subjected to a training program which was founded on short-term neural activation strategies, whereas the control group proceeded with its usual training program. Reaction time measurements were done using precise electronic timing instruments, block clearance time measurements were done using starting block devices and photocell gates were used to measure early acceleration over a (0-10 m) distance.
The findings indicated that there were statistically different values in the favor of experimental group in all the studied variables, which has proven the effectiveness of the short-term neural activation program in building neuromuscular capacities and enhancing sprint performance. The researcher suggests that Neural Priming training should be incorporated into the current training in athletics of short-distance runners.

Keywords: Neural activation, reaction time, block start, early acceleration, sprint runners, neuromuscular capacities, physical performance

1. Introduction

1.1 Introduction and Significance of the Study

Sprints in sporting activities are regarded as one of the hardest and most accurate fields because of the direct dependence on the combination of neuromuscular abilities and technical expertise, especially in the start and acceleration stage which is the crucial one in deciding the results of the race (Bezodis, Salo, & Willwacher, 2019, p. 1348-1354) [10].

Report that the process of muscular strength development is a conclusive determinant in enhancing the technical performance because it helps the athletes to perform lifting skills and surmount high loads more effectively (Allawi & Hasan, 2024, p. 1) [6].

Also validated the fact that maximal physical strength is one of the most basic factors in the sport performance, and that scientific expenditure in the biomechanical factors is one of the most important factors in the attainment of sporting success (Maneaa & Hasan, 2024, p. 4) [24].

Among the most critical elements affecting performance in sprints, reaction time and block clearance (starting block) should be mentioned because even a minor delay in this point can result in the loss of the victory in the high-level competition (Ross, Leveritt, & Riek, 2001, pp. 409-412) [21]. Consequently, recent research efforts have focused on identifying modern training strategies that contribute to the development of neural response speed, the quality of the start, and the achievement of maximum possible speed during the initial meters of the race.

The concept of short-term neural activation (Neural Priming) is considered one of the contemporary training approaches, as it is based on the use of brief neuromuscular stimuli prior to the main performance. This increases the preparedness of the nervous and muscular systems and efficiency of the neural transmission, thus raising the level of motor performances (Ali & Al-Fadhli, 2023, p. 1-2) [7].

According to the recent literature, this type of training can positively influence the reaction time, starting speed, and early acceleration of athletes. Nonetheless, the area is yet to undergo more practical research especially in the local training settings of sprint runners (Pino-Mulero *et al*., 2025, p. 59-66) [20].

Indicates that the sports activities are found to be effective in developing the perceptual and cognitive skills of the students, their ability to react to the stimuli more swiftly and effectively. These factors are essentially linked to the enhancement of reaction time of sprint runners (Mohammed *et al*., 2025, p. 1063) [18].

Made it clear that kinematic examination and systematic training play a role in forming athletic performance through establishment of motor knowledge base, which as a result promotes the development of the learner in terms of skill development, hence increasing the chances of successful learning and application in sports activities (Maneaa & Hasan, 2024, pp. 1-3) [24].

According to published in Series on Biomechanics, it was suggested that the kinematic analysis is one of the basic foundations of generating athletic performance as it gives a scientific method of studying and enhancing motor skills and helps to stimulate effective learning and training among students and sportsmen. The authors also stressed that sports activities create an educational environment that could build physical and thinking skills, which contributes to the citizenship development programs by inculcating a sense of discipline, teamwork and dedication to desirable practices (Maneaa & Hasan, 2024, pp. 1-4) [24].

Significance of the Study

1. This research is suitable to add to the scientific literature due to the modern investigation of the use of a modern method and its impact on neuromuscular performance measures in sprint runners.
2. It contributes to new knowledge that is formed through the inclusion of reaction time, block clearance and initial acceleration as a set of variables that are mutually dependent on influencing the success of the start and the overall performance of the race.
3. It offers coaches with a feasible training plan, which may be incorporated into the training programs of the short-distance runners.
4. It provides practical recommendations on how to narrow the gap between national performance of sprint runners in Kirkuk and international standards by enhancing the performance of starts and acceleration.
5. It improves the chances of creating the competitive performance of the athletes in both local and international championships, which can be seen as the main cornerstone upon which the modern training program which combines the traditional training regime with the short-term neural stimulation can be based.

1.2 Research Problem

The outcome of short distance events in athletics indicates that the difference between winning and losing is within fractions of seconds and hence the start and early acceleration stages are crucial elements in the eventual attainment of performance. Although coaches tend to use multiple training programs to build the physical and technical abilities of sprint runners, the consideration of such an aspect as short-term neural activation (Neural Priming) has not been given enough coverage in local training settings, despite the fact that it is one of the contemporary approaches that help to facilitate the effect of neuromuscular responses and promote quick conversion of preparedness into actual performance.

It is also noted that the sprint runners in Kirkuk experience problems pertaining to slow reaction time and inability to reach optimal block clearance, which adversely impacts their capability to achieve the early acceleration, necessary to reach performance levels that are advanced. As a consequence, the research problem arises in the question below:

The question is: Does a short-term neural activation program (Neural Priming) help in enhancing the reaction time, block clearance, and early acceleration in sprint runners in Kirkuk?

1.3 Research Objectives

1. To identify the effect of a short-term neural activation program (Neural Priming) on improving reaction time, block clearance, and early acceleration among sprint runners in Kirkuk.
2. To measure the effect of the short-term neural activation program on reaction time in sprint runners.
3. To examine the effect of the program on achieving faster and more effective block starts.
4. To evaluate the impact of the program on early acceleration (0-10 m) and improving athletes' ability to reach higher speed during the initial meters of the race.
5. To compare the performance of the experimental group with that of the control group in order to determine the effectiveness of the training program in improving neuromuscular indicators associated with sprinting.

1.4 Scope of the Study

1.4.1 Human Scope

The study population consisted of youth national team athletes aged 15-18 years who specialize in short-distance events (100 m and 200 m) from Kirkuk Governorate for the 2024-2025 season. They were selected purposively to represent the research population.

1.4.2 Temporal Scope

The researcher conducted the research procedures and implemented the program during the period from 13/2/2025 to 20/4/2025, divided as follows:

- **Pilot study:** 13/2/2025 to 14/2/2025.
- **Pre-test measurements:** 15/2/2025 to 16/2/2025.
- **Main experiment:** 18/2/2025 to 18/4/2025.
- **Post-test measurements:** 19/4/2025 to 20/4/2025.

1.4.3 Spatial Scope

The study was conducted at the fields and indoor facilities of North Gas Sports Club in Kirkuk.

2. Chapter Two: Theoretical Framework and Previous Studies

2.1 Concept of Neural Activation

Neural activation refers to a set of exercises and training methods aimed at stimulating the central and peripheral nervous systems to enhance an athlete's ability to respond rapidly and execute movements with greater accuracy and speed. This includes improving the speed of neural signal transmission, muscular contraction, and increasing motor coordination among different muscle groups (Suchomel, Sophia, Christopher, & Michael, 2018, p. 768).

2.2 Importance of Reaction Time in Sprint Runners
Reaction time is the time interval between a motor signal (such as the starting gun) and the initiation of the runner's actual movement. This factor is considered critical in short sprint events, as a difference of a fraction of a second can determine the final outcome and directly affect block clearance and early acceleration in sprint races (Hammami, Duncan, Nebigh, Werfelli, & Rebai, 2022, p. 958) [15].

2.3 Block Clearance and Early Acceleration
- **Block Clearance:** The first phase of the race, which begins at the start from the starting blocks and depends on explosive muscular strength and neural coordination (Newton, 2006, p. 42) [19].
- **Early Acceleration:** The phase that follows block clearance, during which the runner must reach maximal speed rapidly. Neural activation is considered an influential factor in improving this phase (Bompa & Haff, 2009, p. 135) [13].

2.4 The Relationship between Neural Activation and Physical Performance
Studies have shown that short-term neural activation programs lead to:
1. An increase in motor response speed.
2. Improved coordination of the muscles involved during the start phase.
3. Enhanced explosive strength of the muscles responsible for acceleration (Suchomel *et al*., 2018, p. 770; Hammami *et al*., 2022, p. 960) [15].

2.2 Previous Studies
2.2.1 International Studies
1. The study by Hammami *et al*. (2022) [15] demonstrated that short-duration neural activation programs (4-6 weeks) improved reaction time and increased the ability to achieve early acceleration after the start among sprint athletes (Hammami *et al*., 2022, p. 961) [15].
2. Newton (2006) [19] confirmed that explosive strength training associated with neural activation contributes to improving block clearance and reaching maximal speed in the shortest possible time (Newton, 2006, p. 43) [19].
3. Bompa and Haff (2009) [13] indicated that optimal performance in short sprinting is associated with ideal coordination between the nervous system and muscles, and that it can be enhanced through brief stimulatory exercises prior to competitions (Bompa & Haff, 2009, p. 136) [13].

2.2.2 Arab Studies
1. The study by Allawi and Hasan (2024) [6] conducted in Iraq showed that enhancing muscular strength and neural coordination among athletes contributes to improving reaction time and block clearance (Allawi & Hasan, 2024, p. 38) [6].
2. A study at the University of Kirkuk by Mohammed *et al*. (2025) [18] indicated that regular sports activities, including stimulatory exercises, enhance performance speed and the ability to accelerate among students of the College of Physical Education (Mohammed *et al*., 2025, p. 1068) [18].
3. The study by Moafaq Saeed Ahmed Saeed (2024), titled The Effect of Speed-Specific Strength Exercises on Certain Physical Capacities and 100-Meter Sprint Performance of Youth Athletes, applied a speed-specific strength program to youth athletes, resulting in improvements in 30 m and 100 m sprint performance and explosive capacity. This experimental study used a single experimental group with a purposive sample of 26 athletes from Bartella Youth Club, Athletics Team. It is relevant to our research as it supports short, focused programs on speed and strength that enhance early acceleration and can be linked to the concept of Neural Priming as a neural preparation tool that improves rate of force development (RFD) and sprint start performance.
4. The study by Abdullah Shnata Faraj (2020), named The Effect of Maximal Speed Training under Increased External Resistance on Start Speed and 100-Meter Sprint Performance, which concluded that maximal speed training with external resistance enhances start speed and sprint performance at the 100 m, advised to include it in preparation programs. This study is important to our study since it concerns the block clearance variable and offers practical comparison of the approach of resistance and the neural priming methods on comparison.

3. Research Procedures
3.1 Research Methods
Since the study is qualitative by nature and has objectives that are to investigate the impact of a short-term neural activation program (Neural Priming) to enhance reaction time, block clearance, and early acceleration of sprint runners, the researcher used pre- and post-test experimental method with a quasi-experimental design with two groups (experimental and control). This approach is viewed as the best in educational and sports research studies, which seek to find out the impact of dependent variables, because of its accuracy and objectivity in the analysis of phenomena.

3.2 Research Population and Sample
The research population consisted of short-distance runners (100 m - 200 m) from the Kirkuk Governorate national team for the 2024-2025 season. The population was selected purposively (Purposive Sample), including 17 youth athletes aged 16-18 years.
The main research sample was randomly selected and divided into two equal and equivalent groups as follows, with a total of 12 youth athletes:
- **Experimental group (6 athletes):** Subjected to the Neural Priming training program.
- **Control group (6 athletes):** Continued the regular training program approved by the coaches.

Additionally:
- Three youth athletes from the original population were used for the pilot study.
- Two individuals were excluded (due to injury or repeated absence) to ensure sample homogeneity.

3.3 Equipment and Tools Used
The researcher utilized a set of scientific tools and instruments to collect all required data, including:

1. Field Instruments

- Electronic timing device (Start Timing System) to measure reaction time.
- Standard starting block platform (Start Blocks).
- Instantaneous speed measurement device (Speed Gates) to measure early acceleration (0-10 m).
- Measuring tape and other auxiliary tools.

3.4 Homogeneity between the Groups before the Experiment (Physical Variables and Performance)

Table one

Variables	Experimental Group (n = 6)	Control Group (n = 6)	Calculated (T)	Tabulated t (0.05, df = 10)	Statistical Significance (Sig)	Statistical Interpretation
Reaction Time (seconds)	0.178±0.012	0.180±0.010	0.45	2.228	0.66	No statistically significant difference
Block Clearance (seconds)	1.21± 0.05	1.22± 0.06	0.39	2.228	0.70	No statistically significant difference
Early Acceleration (0-10 m)	1.85± 0.08	1.86± 0.09	0.31	2.228	0.76	No statistically significant difference

This formulation, along with the tabulated t value (2.228), indicates that all the main variables between the two groups were homogeneous before the experiment began.

- **Degrees of freedom (df)** = $n_1 + n_2 - 2 = 6 + 6 - 2 = 10$.
- At a significance level ($\alpha = 0.05$), the tabulated t value = 2.228 (from the t-distribution tables).
- **Interpretation:** If the calculated t ≤ tabulated t, there is no statistically significant difference.

Multiple Tests

- **Reaction Time Test:** Measured by the interval between the start signal and the actual initiation of movement.
- **Block Clearance Test:** Assessed by analyzing push-off time and take-off angle.
- **Early Acceleration Test (0-10 m):** Measured using speed measurement devices with photocells.

Training Program (Neural Priming)

- Included short-term units (15-20 minutes) before training sessions.
- The researcher employed techniques such as short plyometric exercises, electrical muscle stimulation (EMS), and low-volume, high-intensity weightlifting.

3.5 Pilot Study

The pilot study was conducted on three athletes outside the main sample from 13/2/2025 to 14/2/2025 for the following purposes:

- To verify the validity of the equipment and tools.
- To ensure the suitability and clarity of the training program.
- To address potential difficulties during implementation.

3.6 Main Study (Pre-test, Program Implementation, Post-test)

The main study and the application of the program were conducted on the primary research sample from 15/2/2025 to 20/4/2025, following these procedural steps:

3.7 Pre-tests

Physical performance and achievement tests for the relevant events were conducted for both groups according to approved conditions and standards to ensure reliability and validity of the results. The pre-tests were carried out from 15/2/2025 to 16/2/2025.

3.8 Main Experiment (Program Implementation)

The program was implemented on the research sample from 18/2/2025 to 18/4/2025, following these stages:

1. **Pre-tests:** Conducted for all tests (reaction time, block clearance, early acceleration).
2. **Training Program Implementation:** Conducted over 8 weeks with three training sessions per week.
3. **Post-tests:** Conducted after the completion of the program under the same conditions and using the same tools to ensure consistency.

3.9 Post-tests

To make a proper comparison of the results, the same tests that were performed during the pre-test phase were performed after the completion of the program under the same conditions and procedures.

3.10 Statistical Methods

Statistical analysis was done through SPSS after collection of the data. The methods the researcher used include the following:

- Arithmetic mean.
- Standard deviation.
- **Paired Sample t-test:** To compare pre-test and post-test results.
- **Independent Sample t-test:** To compare results between the two groups.
- **Percentage of Change** for each variable.

4. Chapter Four: Presentation, Analysis, and Discussion of Results

Table 4.1: Reaction Time Results Before and After the Training Program ($n = 6$, $\alpha = 0.05$)

Group	Pre-Test (s)	Post-Test (s)	Calculated t (T)	Tabulated t (df = 5)	Sig (Statistical Level)	Significance	Percentage of Improvement (%)
Experimental (n = 6)	0.012±0.178	0.010±0.164	6.12	2.571	0.001	Significant	8.0
Control (n = 6)	0.010±0.180	0.009±0.177	1,02	2.571	0.34	Not significant	1.7

To calculate the tabulated t value, the following must be determined:

1. **Significance level (α):** Usually 0.05 or 0.01.
2. **Degrees of freedom (df):**

For a paired-sample t-test:
df = n - 1 = 6 - 1 = 5

3. **Tabulated t value:** At a significance level of 0.05 and df = 5, the tabulated t = 2.57 (from t-distribution tables or statistical software).

Comparison

- If the calculated t ≥ tabulated t, the difference is statistically significant.
- If the calculated t < tabulated t, the difference is not statistically significant.

4.1 Analysis of Results

Table (4-1) shows that the experimental group recorded a significant improvement in reaction time of 8%, with a calculated t value of 6.12, which is greater than the tabulated t value of 2.571 at a significance level of 0.001 (Sig). This indicates statistically significant differences in favor of the post-test results.
In contrast, the control group did not show significant differences (Sig = 0.34, calculated t = 1.02 < tabulated t = 2.571).

Discussion of Results

The significant reduction of the reaction time among the experimental group is accredited to the proficiency of the short-term neural activation program (Neural Priming) in hastening neural transmission and stimulating the central nervous system to react fast to stimuli. This is consistent with Williams and Ford (2019, p. 45) [23] stating that brief neural treatments enhance the speed of motor response by athletes.
Similarly, Beato *et al*. (2021, p. 4) [8] emphasized that interventions based on short neural stimulation enhance central nervous system efficiency, thereby reducing reaction time. Regionally, Al-Baldawi (2018, p. 212) [1] confirmed that short neural training contributes to improving reaction speed and start performance in sprint events.
Allawi and Hasan (2024, p. 4) [6] explained that events requiring very short time intervals such as the sprint start primarily depend on the speed of force generation rather than absolute strength.
The results of Mohammed *et al*. (2025, p. 106) [18] also suggest that sport activities have the potential to increase the neural-muscular system integration, which can justify that short-term neural stimulation programs can be effective in stimulating the speed of motor response.

Table 4.2: Results of Block Clearance Before and After the Training Program

Group	Pre-Test (s)	Post-Test (s)	Calculated (T)	Tabulated t (df = 5, 0.05)	Statistical Significance (Sig)	Significance	Percentage of Improvement (%)
Experimental (n = 6)	0.05±1.21	0.04±1.13	5.45	2.571	0.002	Significant	6.5
Control (n = 6)	0.06±1.22	0.05±1.20	0,88	2.571	0.41	Not significant	1.6

Analysis of Results

Table (4-2) shows that the experimental group demonstrated a significant improvement in block clearance by 6.5%, with statistically significant differences (calculated t = 5.45 > tabulated t = 2.571, Sig = 0.002). In contrast, the control group did not show statistically significant differences (Sig = 0.41, t = 0.88).

Discussion of Results

The enhanced block clearance time in the experimental group may be explained by the neural and muscular stimulation before the performance which assisted to enhance the force of push-off and take-off angle. Such results are also in line with those provided by Mero and Komi (1990, p. 78) [16] which showed that greater neural excitation prior to performance produces a positive effect on the start effectiveness. Similarly, Colyer *et al*. (2018, p. 13) [14] established that short neural programs improve block clearance time among short distance runners.
In Arab studies, Al-Shazly (2020, p. 144) [2] noted that neuromuscular interventions improve start quality and reduce errors during the block clearance phase.
Allawi and Hasan (2024, p. 1) [6] claimed that neuromuscular efficiency is directly correlated with the capacity to overcome high resistance within a short period of time and this is the key to attaining advanced levels of performance in sprinting events. Another point that they made was that maximal force output and speed to peak force during performance are directly linked, and force is a determinant of speed (Allawi and Hasan, 2024, p. 3) [6].
Moreover, Allawi and Hasan (2024, p.) 4) [6] stressed that high neuromuscular control athletes are able to perform movements with the least possible time with the most stability to improve the quality of technical performance in practice.

Table 4.3: Early Acceleration Results (0-10 m) Before and After the Training Program

Group	Pre-Test (s)	Post-Test (s)	Calculated (T)	Tabulated t (df = 5, 0.05)	Statistical Significance (Sig)	Significance	Percentage of Improvement (%)
Experimental (n = 6)	0.08±1.85	0.07±1.72	5.78	2.571	0.001	Significant	7.2
Control (n = 6)	0.09±1.86	0.08±1.83	1,11	2.571	0.31	Not significant	1.6

Analysis of Results

Table (4-3) shows that the experimental group improved their early acceleration performance by 7.2%, with statistically significant differences (Sig = 0.001, calculated t = 5.78 > tabulated t = 2.571). In contrast, the control group did not show significant differences (Sig = 0.31, calculated t = 1.11).

Discussion of Results: The findings suggest the short-term neural activation program helped in improving neural coordination of the neuromuscular process in the initial meters of the race resulting in increased neuromuscular acceleration rates at the beginning. These results are in line with those of Bosco (2007, p. 122) who described that brief neural interventions enhance the effectiveness of the initial ramp up.

Morin and Samozino (2016, p. 34) [17] also confirmed that improving push-off ability in the first 10 meters is a critical factor for the success of sprint athletes.

Regionally, Abdel Hamid (2017, p. 201) [3] noted that neuromuscular training helps improve athletes' initial acceleration efficiency.

According to Mohammed *et al*. (2025, p. 1063) [18], sports activities offer a learning environment to promote healthy behaviors, social interaction, and emotional control that are correlated to an improved motor performance and neuromuscular cohesion of swift skills execution, including block clearance and early acceleration.

Allawi and Hasan (2024, p. 2) [6] mentioned that muscle characteristics such as speed of contraction and efficiency of neural conduction are vital in the development of movements stages that need accuracy and speed thus playing central roles in physical development programs.

4.2 Comparison between the two groups in the post-test

Table 4.4: Comparison of reaction time after the training program

Group	Mean ± SD (s)	Calculated (T)	Tabulated t (df = 10, 0.05)	Statistical Significance (Sig)	Significance
Experimental (n = 6)	0.010±0.64	3.82	2.228	0.004	Significant
Control (n = 6)	0.009±0.177				

Table 4.5: Comparison of block clearance after the training program

Group	Mean ± SD (s)	Calculated t (T)	Tabulated t (df = 10, 0.05)	Statistical Significance (Sig)	Significance
Experimental (n = 6)	0.04±1.13	3.15	2.228	0.010	Significant
Control (n = 6)	0.05±1.20				

Table 4.6: Comparison of Early Acceleration (0-10 m) After the Training Program

Group	Mean ± SD (s)	Calculated t (T)	Tabulated t (df = 10, 0.05)	Statistical Significance (Sig)	Significance
Experimental (n = 6)	0.07±1.72	3.42	2.228	0.006	Significant
Control (n = 6)	0.08±1.83				

Analysis of the comparison between the two groups

- All calculated t values were greater than the tabulated t (2.228), indicating statistically significant differences in favor of the experimental group.
- This confirms that the short-term neural program (Neural Priming) played an effective role in improving performance compared to traditional training.
- The largest differences were observed in reaction time (P = 0.004), followed by early acceleration, and then block clearance.

Discussion

- The results indicate that the short-term neural program (Neural Priming) is a modern and effective tool for enhancing neuromuscular efficiency in sprint athletes.
- These findings are consistent with Seitz and Haff (2016, p. 391) [22], who noted that short neural interventions enhance explosive strength and acceleration.
- They are also supported by Blazevich and Babault (2019, p. 18) [11], who stated that pre-performance neural stimulation activates motor neurons, thereby improving reaction time and sprint start.
- Research also indicates that developing leg and trunk strength enhances the ability to produce greater propulsive force at the moment of take-off, leading to improved early acceleration speed (Allawi & Hasan, 2024, p. 2) [6].
- Mohammed *et al*. (2025, p. 1064) [15] stated that sports activities aid in lowering the requirements of inappropriate behavior and developing self-discipline, which aids the neuromuscular control of the athlete in the essential stage of block clearance.

5. Conclusion and Recommendations

5.1 Conclusion

The researcher came to the following conclusions, basing on the findings of the study, their analysis, and discussion:

1. The short-term neural activation program (Neural Priming) significantly influenced the improvement of reaction time in short-distance athletes (100 m -200 m) among the young population of Kirkuk with a positive and statistically significant impact.
2. Through the program, the block clearance was also improving and this had positive influence on the effectiveness of the start phase.
3. Significant progress was made in the early acceleration (0 10 m) in the experimental group than the control group, which validated the effectiveness of the program in the development of the initial stages of sprinting.
4. The experimental and control groups were found to experience differences in terms of post-tests in which the experimental group prevailed in all variables indicating that the gains could be attributed to the program.
5. The program shows that the short neural interventions could be implemented as a recent scientific tool in sports training to train the neuromuscular abilities of youth sprinters.

5.2 Recommendations

Based on the research findings, the researcher recommends the following:

1. Inclusivity of neural activation training (Neural Priming) in sprinter warm-up programs to improve reaction time and block clearance.

2. To test the effectiveness of the program, expand its use among other age groups and performance standards (youth -advanced).
3. Use the presence of modern techniques of measuring things (photocell timing system and speed video analysis) whenever observing reaction time, start and acceleration in order to be accurate.
4. Continue investigations on the impacts of short-term neural activation on additional track and field activities (400 m sprint and long jump) as well.
5. Prepare hands on training on the application of neural activation techniques as an auxiliary tool to coaches in Physical Education College and sport clubs.

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