

# THE EFFECT OF NEURAL CONTROL EXERCISES IN IMPROVING MOTOR PERFORMANCE IN HANDBALL PLAYERS

**Dr. Nasreen Hassan Naji<sup>1</sup>, Dr. Naseer Ahmed Kamil<sup>2</sup>**

<sup>1</sup>*University of Kufa / College of Education for Girls / Department of Physical Education and Sports Sciences/Iraq.*

<sup>2</sup>*Al-Furat Al-Awsat Technical University/Iraq.*

**Corresponding Author:**

[nisreenh.aljibory@uokufa.edu.iq](mailto:nisreenh.aljibory@uokufa.edu.iq)

**To Cite This Article:** Naji, N. H., & Kamil, N. A. (2025). THE EFFECT OF NEURAL CONTROL EXERCISES IN IMPROVING MOTOR PERFORMANCE IN HANDBALL PLAYERS. International Journal of Advance Research in Education & Literature (ISSN 2208-2441), 11(2), 74-77. <https://doi.org/10.61841/15p5g408>

## ABSTRACT

*Some handball players suffer from a defect in the ability to perform passes smoothly and with controlled movement with directed balance when executing skills, due to weakness in movement control, which causes a defect in their performance in matches. The aim of the research was to identify the effect of neural control exercises in improving motor performance in handball players. The researchers used the single-group experimental method to suit the nature of the research procedures. The sample included (12) players who represented the University of Kufa handball team for the academic year (2024-2025). After applying the tests under study, the data was collected, processed statistically, displayed and analyzed, and the most important conclusions were reached:*

- 1. The results showed that the neural control exercises enhanced the variables under study in handball players, through improving their motor performance.*
- 2. The results showed that the neural control exercises improved the players' performance in the skills of passing and shooting in handball players.*

**Keywords:** *Neural, control, exercises and motor performance.*

## INTRODUCTION

Handball is a team game that requires high physical and motor abilities, including balance, neuromuscular coordination, agility, speed and accuracy in motor performance. Advanced athletic performance requires a high level of neurological control in its movements, which gives great importance to neurological control exercises and considers them one of the important factors in developing motor performance.

Achieving advanced athletic performance requires developing the neurological and motor aspects in addition to developing physical abilities, as the interaction between the nervous and muscular systems is important in performing sports skills with high efficiency. Improving motor response is linked to nervous control, which leads to reducing errors when performing basic handball skills. Combining traditional exercises with nervous control exercises contributes to efficient performance and achieving the best results, which in turn contributes to building the motor duty for good performance.<sup>1</sup>

The player's ability to act quickly and make the right decision in the game requires a high ability in nervous control, which in turn reflects positively on the performance of the team as a whole.<sup>2</sup> The introduction of nervous control exercises has a positive effect on the development of basic skills in handball such as passing, shooting, and dribbling, which reflects positively on the performance of the players. Therefore, the importance of the research lies in introducing nervous control exercises in the performance of the players to improve their motor performance.

## RESEARCH PROBLEM

Some handball players suffer from a defect in the ability to perform passes smoothly and with controlled movement with directed balance when executing skills. This is due to a weakness in movement control, which causes a defect in their performance in matches.

## RESEARCH OBJECTIVES

1. Identifying the neural control exercises related to improving motor performance in handball players.
2. Identifying the effect of neural control exercises in improving motor performance in handball players.

## RESEARCH HYPOTHESES

- There are positively significant differences between the pre- and post-tests of the variables under study, in favor of the post-tests.

## RESEARCH FIELD

- **Human field:** University of Kufa handball team.
- **Time field:** From 1-8-2024 to 4-2-2025.
- **Spatial field:** The closed hall at the University of Kufa - College of Physical Education and Sports Sciences.

## RESEARCH METHODOLOGY

The researchers used the single-group experimental method with pre- and post-test, to suit the nature of the research procedures.

## RESEARCH COMMUNITY AND SAMPLE

The research community included the players of the University of Kufa team for the academic year (2024-2025), numbering (20) players. (12) players were chosen to represent them and to be a sample for the research after the sample was homogenized in the variables of height, weight and age, as shown in Table (1).

**Table 1.** Show homogenized in the variables of height, weight and age

|                |       | Age   | Length  | Weight |
|----------------|-------|-------|---------|--------|
| N              | Valid | 12    | 12      | 12     |
|                | Units | Year  | Cm      | Kg     |
| Mean           |       | 21.33 | 176.5   | 74.83  |
| Median         |       | 21    | 176.5   | 73     |
| Mode           |       | 21    | 173     | 72     |
| Std. Deviation |       | 0.65  | 4.44154 | 3.35   |
| Skewness       |       | -0.44 | 0.168   | 0.59   |

It is clear that the value of the skewness coefficient is between  $\pm 1$ , which indicates the homogeneity of the research sample.

## TESTS USED IN THE RESEARCH

Balance, neuromuscular coordination, motor speed, shooting and passing tests were used to measure motor performance.

## NEUROLOGICAL CONTROL EXERCISES

Neurological control exercises included neurological coordination exercises, motor and static balance exercises, and special exercises to improve motor response and motor reaction. The exercises continued for a period of 2 weeks, with four educational doses per week, for a total of 24 educational doses.

## STATISTICAL METHODS

The statistical bag (SPSS) was used to process the data and extract the results.

## RESULTS AND DISCUSSIONS

**Table 2.** Show descriptive statistics show the variables under study

| Variables                   | Units       | Tests    | Mean   | N  | Std. Deviation | Std. Error Mean |
|-----------------------------|-------------|----------|--------|----|----------------|-----------------|
| Kinetic speed               | Second      | Pretest  | 7.167  | 12 | 0.835          | 0.24            |
|                             |             | Posttest | 4.583  | 12 | 0.793          | 0.23            |
| Balance                     | Degree      | Pretest  | 4.58   | 12 | 0.67           | 0.19            |
|                             |             | Posttest | 5.917  | 12 | 0.90           | 0.26            |
| Reaction time               | Millisecond | Pretest  | 272.08 | 12 | 5.265          | 1.52            |
|                             |             | Posttest | 228.83 | 12 | 5.357          | 1.55            |
| Passing accuracy            | %           | Pretest  | 65.81  | 12 | 2.95           | 0.85            |
|                             |             | Posttest | 80.167 | 12 | 2.04           | 0.59            |
| Shooting accuracy           | %           | Pretest  | 68.42  | 12 | 2.503          | 0.72            |
|                             |             | Posttest | 85.083 | 12 | 2.07           | 0.59            |
| Ability to change direction | Degree      | Pretest  | 3.175  | 12 | 0.191          | 0.055           |
|                             |             | Posttest | 4.9    | 12 | 0.202          | 0.06            |

**Table 3.** Shows the difference in arithmetic means and the significance of the differences between the pre- and post-tests in the variables under study

| Variables                   | Units              | Paired Differences |                |                 | t       | df | Sig.  |
|-----------------------------|--------------------|--------------------|----------------|-----------------|---------|----|-------|
|                             |                    | Mean               | Std. Deviation | Std. Error Mean |         |    |       |
| Kinetic speed               | Pretest - Posttest | 2.58               | 0.90           | 0.26            | 9.940   | 11 | 0.000 |
| Balance                     | Pretest - Posttest | -1.33              | 1.303          | 0.38            | -3.546  | 11 | 0.005 |
| Reaction time               | Pretest - Posttest | 43.25              | 7.375          | 2.129           | 20.316  | 11 | 0.000 |
| Passing accuracy            | Pretest - Posttest | -14.3              | 2.498          | 0.72            | -19.87  | 11 | 0.000 |
| Shooting accuracy           | Pretest - Posttest | -16.67             | 3.68           | 1.06            | -15.705 | 11 | 0.000 |
| Ability to change direction | Pretest - Posttest | -1.658             | 0.211          | 0.06088         | -27.24  | 11 | 0.000 |

The results presented in Table (2 and 3) show that there are differences in the values of the arithmetic means, standard deviations and the value of (t), and the differences appear in favor of the post-tests, which indicates that the neuromotor control exercises have positively affected the research results, which indicates their importance in improving the level of performance among the research sample members.

The combination of motor and neurological exercises is important in developing the variables under study and improving the players' response during performance, especially among handball players.<sup>4</sup>

Neuromuscular control exercises work to enhance neuromuscular coordination, which in turn improves the players' reaction speed, balance and accuracy in motor performance, so these exercises have greatly helped in improving the motor performance of handball players as it was reflected well in their motor efficiency.<sup>5</sup>

The results indicate that the players' balance became more positive through the differences that appeared between the pre- and post-results,<sup>6</sup> and this is due to strengthening the muscles related to stability and increasing stability, which played a major role in increasing balance and the ability to change direction in different playing situations, and this is due to organizing nerve signals and muscle reactions that play a clear role in defensive and offensive situations.<sup>7</sup> Increasing the players' ability to achieve harmony between the different body parts related to motor performance smoothly requires precise exercises to implement effective motor duties, as these exercises enhance the harmony between the central nervous system and the upper and lower limbs of the body that are directly related to motor performance, which in turn led to achieving great accuracy in implementing the basic handball skills and the skills under study.<sup>8</sup>

## CONCLUSIONS

1. The results showed that the neural control exercises enhanced the variables under study in handball players, through improving their motor performance.
2. The results showed that the neural control exercises improved the players' performance in the skills of passing and shooting in handball players.
3. The neural control exercises developed muscle strength, especially those concerned with stability, balance and the ability to change direction in different playing situations.

## RECOMMENDATIONS

1. The necessity of combining neurological control exercises with physical exercises due to their significant role in improving motor performance in players, especially handball players.
2. Adopting other exercises related to increasing motor interaction, to enhance the speed of response and the ability to change in different playing situations.
3. Researchers recommend the necessity of combining neurological control exercises with special educational exercises for handball players.

## REFERENCES

- [1] Hänggi, J., Langer, N., Lutz, K., Birrer, K., Mérillat, S., & Jäncke, L. (2015). Structural brain correlates associated with professional handball playing. *PLoS One*, 10(4), e0124222.
- [2] Saeterbakken, A. H., Van den Tillaar, R., & Seiler, S. (2011). Effect of core stability training on throwing velocity in female handball players. *The Journal of Strength & Conditioning Research*, 25(3), 712-718.
- [3] Zech, A., Hübscher, M., Vogt, L., Banzer, W., Hänsel, F., & Pfeifer, K. (2010). Balance training for neuromuscular control and performance enhancement: a systematic review. *Journal of athletic training*, 45(4), 392-403.
- [4] Hermassi, S., Wollny, R., Schwesig, R., Shephard, R. J., & Chelly, M. S. (2019). Effects of in-season circuit training on physical abilities in male handball players. *The Journal of Strength & Conditioning Research*, 33(4), 944-957.
- [5] Spieszny, M., Wąsacz, W., Kamys, Z., Ambroży, T., Kasicki, K., Kapuściński, P., & Rydzik, Ł. (2024). The impact of coordination training on motor skills in adolescent handball players aged 14–15 years: A randomized controlled trial. *Baltic Journal of Health and Physical Activity*, 16(4), 10.
- [6] Athab, N. A. (2019). An analytical study of cervical spine pain according to the mechanical indicators of the administrative work staff. *Indian J. Public Health*, 10(5), 1349.
- [7] Athab, N. A., Hussein, W. R., & Ali, A. A. M. (2019). A Comparative Study for Movement of Sword Fencing Stabbed According to the Technical Programming in the Game of Fencing Wheelchairs Class B. *Indian Journal of Public Health*, 10(5), 1345.
- [8] Athab, N. A., & Alsayigh, H. A. (2021). Rehabilitation of the wrist joint injury accordance of kinesiology variables.