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The impact of visual tracking exercises on improving some basic handball skills among students at the college of physical education and sports sciences, Al-Mustansiriya University

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Abstract

The research explores how visual tracking exercises can improve basic handball skills among students at the College of Physical Education, Al-Mustansiriya University. The study used an experimental approach with two groups (experimental and control) to assess the impact of these exercises. Visual tracking exercises were integrated into regular training sessions, and improvements in various skills were evaluated. The exercises demonstrated significant enhancements in the ability to accurately follow the ball, improve hand-eye coordination, particularly under match pressure, shooting accuracy, and the estimation of distances and angles. Additionally, they led to quicker responses to changes in the ball's trajectory, enhancing both defensive and offensive performance. It is recommended that visual tracking exercises be continuously integrated into training programs, with modern technology such as virtual reality used to further develop these exercises. The research strengthens the current understanding of the importance of visual training and confirms its substantial benefit in improving the athletic performance of handball players.

Keywords: Visual tracking, exercises, handball, students

Introduction

In the context of ongoing developments in the field of sports training, there is growing interest in training techniques that enhance athletes' performance, especially in team sports like handball. Visual training, particularly visual tracking exercises, holds a central place in this field due to its significant importance in improving players' mental and visual abilities. These exercises enhance the ability to follow the ball and opponents efficiently, contributing to improved quick responses and predicting game progress—critical factors in handball matches. Visual tracking has been shown to not only improve the ability to accurately follow the ball and player movements but also enhance visual communication between players, which positively impacts team coordination and the development of effective play strategies [1].

At the preparatory stage, where the foundations of skill and athletic development are laid, these exercises become highly important for refining essential skills such as ball handling, shooting, and dribbling, which are key elements for success in matches. Research into visual training techniques indicates significant improvements in motor skills when these techniques are incorporated into training regimes [2]. Furthermore, the application of visual tracking exercises has been linked to enhanced focus and quick response times, critical components for success in dynamic and fast-paced sports like handball [3].

Through reviewing previous studies and conducting field experiments, this research is based on the hypothesis that integrating visual training into the training program for preparatory-level handball players can lead to tangible improvements in basic skills and overall player performance. Studies show that using specific visual training tools can have a profound impact on young players' abilities, especially in improving ball tracking and agility, which are crucial for success in handball [1].

Additionally, mental capacities such as focus and quick response, strengthened through visual training, are vital elements for exceptional performance in sports [3].

The research highlights the importance of investing in sports science and innovative training techniques to build a strong foundation for a promising future in handball.

Research Problem

The research problem revolves around the central question: What is the impact of training programs based on visual tracking in developing and improving the basic handball skills of students at the College of Physical Education and Sports Sciences? The importance of this problem arises from the need to understand how visual abilities, particularly visual tracking, affect the performance of specific sports skills, such as handball skills, including passing, receiving, and shooting accuracy at the goal, within the educational and training context of the college students.

Research Objectives

- To determine the impact of visual tracking exercises on improving some basic handball skills among students at the College of Physical Education and Sports Sciences.
- To understand how visual training contributes to enhancing quick and accurate responses during matches.
- To develop innovative training programs that integrate visual tracking exercises to improve the overall performance of students.

Research Method

The researcher used the experimental method, as it is considered "one of the best and most appropriate methods for obtaining optimal results because it deals with the influencing phenomenon and its causes, and because it addresses facts by comparing the control group with the experimental group."

Research Population and Sample

The researcher's objectives and the procedures used in the research determine the nature of the sample to be chosen." Accordingly, the research sample was determined through random selection, where the researcher identified the original population as fourth-year students from the College of Physical Education and Sports Sciences at Al-Mustansiriya University. A lottery was conducted to select the main experiment sample, excluding students who are members of clubs or national teams to ensure all participants started from the same baseline. Therefore, the total number of students in the experimental group was 10, and the control group also consisted of 10 students.

Tests Used in the Research

Shooting Accuracy Test

Purpose: To measure shooting accuracy in handball.

Procedure: A handball goal is drawn on a front wall, shaped as two posts and a crossbar (2×3 meters), with the posts touching the intersection of the wall and the ground. The goal is divided into nine rectangles to measure shooting accuracy, with a line drawn on the ground 9 meters away. The player shoots from behind the line using a pivot step. If the ball hits rectangles 1, 3, 7, or 9 (representing the four corners of the goal, each measuring 60×100 cm), the player earns the maximum score of 4 points. If the ball hits rectangles 2 or 8 (above the goalkeeper's head and between their legs, each measuring 60×100 cm), the player earns 3 points. If the ball hits rectangles 4 or 8 (representing the

range of the goalkeeper's arms, measuring 80×100 cm), the player earns 2 points. If the ball hits the middle rectangle (representing the goalkeeper's chest and torso, measuring 80×100 cm), the player earns 1 point. If the ball misses the goal, the player scores zero. Each player attempts ten shots.

Passing and Receiving from a Distance of 3 Meters

Purpose: To measure coordination and the accuracy of passing and receiving, as well as to assess the efficiency of linking these two skills and the speed of movement.

Procedure: The tester stands 3 meters away from the wall and passes the ball to the wall as many times as possible within a specified time of 30 seconds. The number of passes is counted, and the test records how many successful passes the player makes without the ball dropping to the ground.

Pilot Study

The exploratory experiment is "an initial experimental study conducted by the researcher on a small sample before carrying out the main research, aiming to test the research methods and tools." Accordingly, the researcher conducted the exploratory experiment on Sunday, February 4, 2024, on a sample of 5 students from the same fourth-year students of the college, who were not part of the main experiment. This experiment was conducted to achieve the following:

- Test some exercises from the educational curriculum to ensure they can be performed by the sample.
- Ensure the validity of the tests and their suitability for the sample, as well as the functionality of the devices and tools used in the research.
- Assess the readiness of the subjects to undergo the tests.
- Confirm the suitability of the time and place for each test.
- The experiment was repeated after 5 days to establish reliability.

Pre-Test

The researcher conducted the pre-tests on the research sample with the assistance of the supporting staff on Tuesday, February 12, 2024, at the beginning of the lesson for both the control and experimental groups. The tests were carried out in two groups, one after the other, and the following steps were taken:

- All necessary equipment for the tests, including tools, balls, and goals, were prepared.
- Before conducting the skill tests, the procedures for the tests were explained, including how each test would be scored and the number of attempts.
- A sufficient rest period was provided between each test for the sample participants.
- Data and test results were recorded on a specially prepared form.

Main Experiment

The main experiment was conducted on Tuesday, February 13, 2023, with the experimental group participating in the research experiment, while the control group followed the traditional program (verbal explanation and practical demonstrations). The experimental method was applied for a duration of 8 weeks (two months), with two educational units per week. Each educational unit lasted 45 minutes, with the practical part of the researcher's educational program lasting approximately 20 minutes. The training program was structured as follows:

Weeks 1-2: Basics and Familiarization

Focus: Develop basic visual abilities and begin improving passing and receiving skills.

Exercises:

- Simple ball tracking exercises.
- Passing and receiving drills in pairs, focusing on following the ball with the eyes.
- Shooting drills from close distances, focusing on accuracy.

Weeks 3-4: Skill Development

Focus: Improve hand-eye coordination and increase the accuracy of passing and receiving.

Exercises:

- Complex visual tracking drills using more than one ball.
- Peripheral vision drills to enhance field awareness.
- Shooting drills from medium distances, focusing on quick responses.

Weeks 5-6: Challenge and Application

Focus: Integrate visual skills into realistic and complex game situations.

Exercises:

- Game simulation drills focusing on passing and receiving under pressure.
- Shooting drills from long distances and difficult angles.
- Quick reaction drills and improving visual tracking of the ball at high speeds.

Weeks 7-8: Repetition and Improvement

Focus: Reinforce learned skills and continue improving.

Exercises:

- High-intensity repetition drills for passing and receiving with changes in game speed.
- Shooting drills under changing conditions to improve accuracy and adaptability.
- Review sessions with the coach to analyze performance.

Post-Test

After implementing the educational curriculum using the proposed method, the post-tests for both the control and experimental groups were scheduled for the morning of Thursday, March 28, 2024. These tests were conducted in the same manner as the pre-tests. The researcher made every effort to replicate the conditions of the pre-tests in terms of time, location, equipment, and support staff to avoid any environmental variables that could affect the post-tests.

Statistical Methods

The researcher used the Statistical Package for the Social Sciences (SPSS) and selected the appropriate statistical tools.

Results

Table 1: Values of pre- and post-test t-test for the control group in the used tests

| Test Used | Mean (Pre) | Mean (Post) | Standard Error | Calculated T-Value | Significance Level |
|-------------------------------------|------------|-------------|----------------|--------------------|--------------------|
| Shooting Accuracy | 5.698 | 6.998 | 0.471 | 2.76 | Significant |
| Passing and Receiving from 3 Meters | 5.697 | 7.056 | 0.598 | 2.272 | Significant |

Table 2: Values of pre- and post-test t-test for the experimental group in the used tests

| Test Used | Mean (Pre) | Mean (Post) | Standard Error | Calculated T-Value | Significance Level |
|-------------------------------------|------------|-------------|----------------|--------------------|--------------------|
| Shooting Accuracy | 5.574 | 8.125 | 0.789 | 3.233 | Significant |
| Passing and Receiving from 3 Meters | 5.668 | 9.123 | 0.912 | 3.788 | Significant |

Table 3: Values of post-test t-test between control and experimental groups in the used tests

| Test Used | Control Group (Mean) | Control Group (SD) | Experimental Group (Mean) | Experimental Group (SD) | Calculated T-Value | Significance Level |
|-------------------------------------|----------------------|--------------------|---------------------------|-------------------------|--------------------|--------------------|
| Shooting Accuracy | 6.998 | 0.853 | 8.125 | 0.923 | 2.696 | Significant |
| Passing and Receiving from 3 Meters | 7.056 | 0.895 | 9.123 | 0.992 | 4.644 | Significant |

The results of the study reveal significant improvements in both the control and experimental groups across the tests conducted. For the control group, the pre- and post-test results indicate an increase in shooting accuracy from a mean score of 5.698 to 6.998, with a calculated T-value of 2.76, showing a significant improvement. Similarly, the passing and receiving from 3 meters test showed a rise in the mean score from 5.697 to 7.056, with a T-value of 2.272, also reflecting significant progress.

In the experimental group, the improvements were even more pronounced. The shooting accuracy increased from 5.574 to 8.125, with a T-value of 3.233, demonstrating a significant enhancement in performance. Likewise, the passing and receiving from 3 meters test saw a substantial rise from 5.668 to 9.123, with a T-value of 3.788, further confirming significant improvement.

When comparing the post-test results between the control and experimental groups, the experimental group

outperformed the control group in both tests. The shooting accuracy of the experimental group (mean = 8.125) was significantly higher than that of the control group (mean = 6.998), with a T-value of 2.696. Similarly, the experimental group excelled in the passing and receiving from 3 meters test, scoring a mean of 9.123 compared to the control group's 7.056, with a T-value of 4.644, indicating a significant difference.

Overall, these results suggest that while both groups improved, the experimental group exhibited greater enhancements in shooting accuracy and passing/receiving skills, highlighting the superior effectiveness of the intervention program applied to this group.

Discussion

From observing the tables 1 2, it is clear that there are significant differences between the pre- and post-tests for both the control and experimental groups in the used tests,

in favor of the post-tests. This indicates that both groups experienced improvement in handball skills performance. The improvement in the control group can be attributed to the consistent method applied during the handball lessons, which was regularly followed by the learners, as well as the structured organization of the lesson by the instructor responsible for teaching the subject. As noted by ^[4], "The coach must provide varied practices for open skills, as diversity or branching in models is necessary to meet the changing needs of the skills." Additionally, as ^[5] pointed out, "The good organization of the lesson contributed to the students acquiring the ability to engage with the lesson, understand it, and adjust their behavior to adopt desirable behavioral standards."

Furthermore, from observing Table 3, it is evident that the experimental group outperformed the control group in skill performance in handball. This improvement is due to the fact that these exercises helped enhance performance by improving their ability to visually track the ball with speed and accuracy, enhancing their reactions, and improving hand-eye coordination, which directly translated into improved on-field performance ^[6].

The visual tracking exercises helped students enhance their ability to follow fast ball movements, leading to improved accuracy in passing and receiving. By focusing on the ball and its unpredictable trajectory, players can estimate the optimal receiving position and improve their timing for catching the ball efficiently ^[7]. Research has also shown that handball players who practice visual tracking exercises demonstrate significantly improved shooting accuracy. These exercises enhance the ability to gauge distances and shooting angles more accurately, allowing for quicker and more precise reactions during critical moments in the game ^[8].

Thus, visual tracking exercises play a crucial role in enhancing sports performance, especially in fast-paced sports like handball. Visual tracking is an important method for improving spatial visual abilities, enabling players to improve their passing, receiving, and shooting accuracy.

Conclusion

Recommendations and Conclusion

Conclusions

1. It is recommended to organize continuous training sessions that focus on visual tracking exercises, with regular evaluations of player progress.
2. Handball players at all levels, from beginner to advanced, should practice visual tracking exercises that are tailored to their current abilities and specific challenges.
3. Integrating these exercises with other physical handball activities is important to enhance overall benefits and achieve comprehensive improvement in players' skills.
4. Technological advancements, such as virtual reality, can be utilized to offer more complex and effective visual tracking exercises.
5. Coaches should receive proper training to teach and implement visual tracking exercises effectively, with a focus on the latest research and developments in this field.
6. Research indicates that visual tracking exercises provide a strong foundation for improving athletic performance in handball, and it is recommended that these exercises be incorporated into the sports programs

at Al-Mustansiriya University to achieve optimal results.

Recommendations

1. Visual tracking exercises are a crucial component of sports training in handball, significantly improving players' core skills. Studies conducted on students from the College of Physical Education and Sports Sciences at Al-Mustansiriya University have shown positive outcomes, highlighting the profound impact of these exercises in several areas:
2. Visual tracking enhances the ability to follow the ball more accurately in fast and changing spaces, enabling players to make better and quicker decisions.
3. It improves the efficiency of ball reception and passing under match pressure by enhancing hand-eye coordination.
4. Players who undergo visual tracking training demonstrate noticeable improvements in shooting skills, particularly in accurately judging distances and angles, increasing scoring chances.
5. These exercises help develop players' ability to respond to sudden changes in the ball's trajectory, improving both defensive and offensive performance.

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