

THE EFFECT OF PREVENTIVE AND REHABILITATIVE EXERCISES FOR THE ANKLE JOINT ACCORDING TO SOME BIOMOTOR ABILITIES OF YOUNG HANDBALL PLAYER

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ABSTRACT

Sports training and sports medicine are considered important and specialized basic sciences, in which medical sciences are used and applied from a preventive and rehabilitative perspective, as these sciences have contributed to developing and codifying training loads to be more appropriate to the body's endurance capacity and to benefit from the positive effects of the body's functional condition. The importance of the research lies in providing preventive and rehabilitative exercises that contribute to reducing the possibility of players suffering from injuries to the joint itself in advanced age stages, through their impact on some of the abilities of the ankle joint by strengthening the muscles working on it. The problem of the research was the following questions: What is the reality of the biomotor capabilities of young handball players and how to avoid joint sprain injuries and weakness of the working muscles and ligaments on the joint (muscle imbalance). The objectives of the research were: preparing preventive exercises for the ankle joint according to the biomotor capabilities of young handball players and identifying... The effect of preventive exercises on the ankle joint. The researcher assumed that there were statistically significant differences between the results of the pre- and post-tests for the ankle joint according to bio-motor abilities. The researcher used the experimental approach by designing the two equal groups, the control and the experimental, to suit the nature and problem of the research. The research sample was made up of young players belonging to the Samawa Sports Club, numbering 16 players, and they were divided. It was divided into two experimental and control groups, where the number of each group was 8 players. The researcher concluded that preventive exercises have a positive effect on reducing the incidence of injuries to the ankle joint (sprain, minor tear, and muscle weakness). There is a positive effect of preventive exercises on the biokinetic capabilities of the muscle group working on the ankle joint. The researcher recommended using special preventive exercises for the lateral ligaments of the knee joint to prevent injuries (sprains, minor tears, and muscle weakness), preparing special preventive exercises and the necessity of the trainer and physical therapist participating due to the importance of determining the type of muscle weakness that needs to be strengthened or the type of exercises required, their intensity, repetitions, and duration of rest.

Keywords: preventive exercises, rehabilitative exercises, ankle joint, biomotor abilities

INTRODUCTION

Introduction and the importance of the research:

The game of handball is characterized by high performance, characterized by speed and accuracy, as it consists of various offensive and defensive skills through which the legs and hands are used in a coordinated manner. The game of handball depends largely on the movements of the legs and hands, especially with a large proportion on the foot (ankle joint) to shoot and score goals. Therefore, it is exposed to many physical pressures and to various types of influential forces that cause great damage to its ligaments, tendons, muscles, and structure, "because this joint, through the foot, transfers the weight of the body to the ground, and this requires that the joint and its structure be in functional stability for the continuity of its work" (24: 9), therefore it is necessary to prevent these injuries and know how to avoid and prevent injury, as the athlete always seeks to continue the activity without injuries to achieve a higher level of achievement, and sports medicine and sports training are among the important and specialized basic sciences, in which medical sciences are used and applied by the body. Preventive and therapeutic, as these sciences have contributed to developing and codifying training loads to be more appropriate to the body's endurance capacity and benefiting from the positive effects of the body's functional condition to provide the correct methods and programs to prevent or avoid sports injuries. The importance of the research lies in providing preventive exercises that contribute to reducing the possibility of players suffering from injuries to the joint itself in advanced age stages, through their impact on some of the special abilities of the ankle joint by strengthening the muscles working on it.

Research problem:

- 1- What is the reality of the biomotor capabilities of young handball players?
- 2- How to avoid joint sprains and weak working muscles and ligaments on the joint (muscle imbalance).

Research objectives:

- 1- Preparing joint preventive exercises according to the biokinetic templates for young basketball players
- 2- Identify the effect of preventive exercises for the ankle joint according to the biomotor capabilities of young handball players

Research hypotheses:

There are differences with statistical evidence between the results of the pre- and post-tests of the ankle joint according to the bio-motor abilities among young handball players.

areas of research:

- Human field: young players belonging to Samawa Club
- Time range: from 12/2/2024 until 4/2/2024.
- Spatial area: Hall of the late Alwan Salman

Research methodology and field procedures:**Research methodology:**

The researcher used the experimental method by designing two equal groups, the control and the experimental, to suit the nature and problem of the research and the experimental method

Research sample:

The researcher defined the research population as young players belonging to the Samawa Sports Club, who numbered 16 players, and they were divided into two experimental and control groups, where the number of each group was 8 players.

Devices, tools, and means of collecting information used in the research:

The researcher used the following devices, tools, and methods to include the information that helped complete the research:

First: Devices used in the research:

- A video recording device with a SONY camera.
- Dell laptop computer. (made in china).
- Manual calculator (CASIO).
- Stop watch, Mar Times type (made in China).
- A device for measuring the strength of the body's muscles working on the ankle joint
- A device to measure weight and height.

Second: Tools used in the research:

- Weighted iron bar (5 kg to 10 kg).
- Rubber tape.(12)
- Signs number.(20)
- Platforms for performing jumping exercises.
- Measuring tape/sticky paper.
- Whistle.
- A piece of wood measuring (50 x 50) cm.
- Drawing paper measuring (40 x 40) cm.

Third: Means of collecting information

- Arab and foreign sources and references
- Tests used.
- Observation and experimentation.
- The World Wide Web (the Internet).

Tests used in the research:

Tests for special abilities of the ankle joint:**First: standing tests on the balls of the feet:**

Purpose of the test: Static balance is measured while the person being tested is standing on his or her feet.

Tools required: Stopwatch.

Performance Description: The tester assumes a one-leg standing position as shown in Figure (1), preferably by raising the foot of one leg, then placing the free foot of the other leg on the inside of the knee of his leg. He also stood with his hands in the middle.

When the signal was given, the experimenter lifted the obstacle off the ground and maintained balance for as long as possible without moving the toes from their position or touching the heel to the ground.

Calculating scores: The best time for three attempts is calculated, which is the time that begins from the moment the heel is lifted off the ground until some performance errors are committed and balance is lost(137:10) .

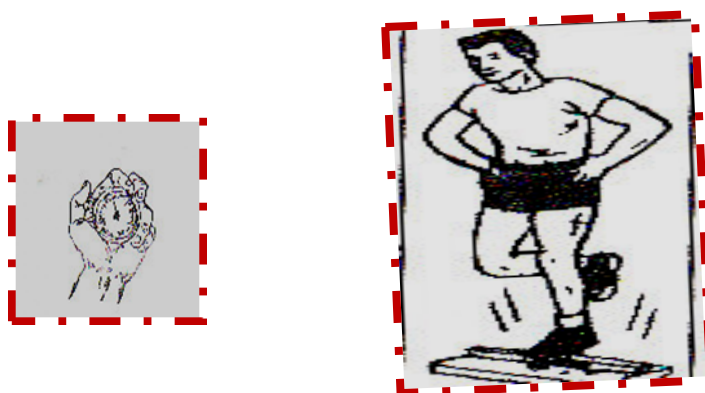


Figure (1) shows the static balance test (standing on the comb)

Second: Vertical jump test from a standstill (Lasar Ghent):

Purpose of the test: To measure the explosive ability of the legs in the vertical jump to the top.

Necessary tools: A wooden board (blackboard) with a width of (0.5) meters and a length of (1.5) meters, with lines drawn on it, and the distance between each line is 2 cm.

- The walls are smooth, and their height from the ground is not less than (3.60) meters.
- A colored pen, a piece of cloth to erase markings.

Procedures: Mount the plate or block on the wall so that its lower edge is at a height that allows the shortest tester to perform the test. A 30 cm long line is drawn on the floor perpendicular to the floor.

Performance Description: The tester draws a piece of chalk at least 2 cm long, then stands facing the board, extends his arms as high as possible, and makes a mark with the chalk, keeping both heels close to the floor. The tester stands facing one side of the board. Place his feet on a straight line at a distance of 30 cm, as shown in Figure(2)

The tester moves the arms down and back while bending the torso forward and down, with only the knees bent at a right angle position.

Extend your knees and jump up, bringing your feet together while swinging your arms forward and up forcefully to reach as high as possible. He marked the highest point he had reached with chalk

Calculating scores: The laboratory fraction is the number of centimeters between the line reached from a standing position and the fraction reached while jumping.

Each tester performs (two attempts and takes his or her best attempt)(88:10).

Third: agility test

Test name: Barrow's ZigZag Run

- Test purpose: to measure agility
- Tools: Build a rectangular running track on solid ground, 10 x 16 feet long, a stopwatch, 5 legs, and at least 30 cm long, as shown in the picture.(3) .

Description of the performance: Four signs are installed vertically in the corners of the rectangle, and a fifth sign is in the middle of the rectangle. The fighter stands in a ready position from the high start next to the first sign behind the starting line, and upon hearing the start signal, he moves back and forth between the five posts and then returns to the start.

- Log (unit of measurement): Record the time it takes the tester to travel the distance from start to finish.

The main experiment:

Pretests: The pretests were conducted on a group of individuals from the experimental research sample on Sunday.(2023/10/12)

Preventive exercises:

The researcher used some principles when conducting prevention exercises:

- 1- The goal of preventive exercises is to strengthen the ligaments, tendons, and muscles working on the ankle joint and improve the range of motion of the joint angles to prevent injury.
- 2- The researcher took into account the types of preventive and rehabilitative exercises when preparing and applying the exercises, as the exercises included exercises to strengthen the muscles supporting the ankle joint with balance, power exercises (lyometrics), exercises to stretch the muscles and flexibility in performing joint movements. At a rate of three preventive units, two for muscular strength and one for ability (plyometrics), per week.

Posttests:

Post-tests for the research sample were conducted on Sunday, 3/10/2024.

Statistical methods:

To process the results, the researcher adopted statistical methods (Spss)

Show results

Presentation of the results of the t-tests for the study variables and for the control and experimental groups for the vertical jump test (for Sargent) in the pre- and post-tests and their analysis:

Table (1)

| Development rate% | Type of difference | The real moral | T Calculated | F h | f | Pre-test | | post-test | | Variables |
|-------------------|--------------------|----------------|--------------|-------|-------|----------|--------|-----------|-------|----------------|
| | | | | | | a | s cm | a | s cm | |
| %15.03 | moral | 0.000 | 8.367 | 0.558 | 4.680 | 2.77 | 34.61 | 2.10 | 30.60 | Female officer |
| %35.05 | moral | 0.000 | 16.899 | 0.549 | 9.169 | 3.980 | 35.328 | 3.99 | 26.18 | Experimental |

moral (0.05) ≥ At a degree of freedom (5)

Presenting the test results for the study variables for the control and experimental groups in the standing on the balls of the feet test in the pre- and post-tests and analyzing them:

Table (2)

| Development rate% | Type of difference | The real moral | T Calculated | F h | f | Pre-test | | post-test | | Variables |
|-------------------|--------------------|----------------|--------------|-------|--------|----------|----------|-----------|----------|----------------|
| | | | | | | a | s second | a | s second | |
| %14.19 | random | 0.440 | 0.811 | 2.644 | 2.188 | 10.81 | 17.69 | 5.58 | 15.3 | Female officer |
| % 142.6 | moral | 0.005 | 4.523 | 3.123 | 14.157 | 13.28 | 24.27 | 6.54 | 9.82 | Experimental |

moral (0.05) ≥ At a degree of freedom (5)

Presentation of test results for the study variables for the control and experimental groups in the Zigzag running test using the (Power) method in the pre- and post-tests and analyzing them.

Table (3)

| Development rate% | Type of difference | The real moral | T Calculated | F h | f | Pre-test | | post-test | | Variables |
|-------------------|--------------------|----------------|--------------|-------|-------|----------|----------|-----------|----------|----------------|
| | | | | | | a | s second | a | s second | |
| %3.17 | moral | 0.009 | 4.153 | 0.190 | 0.744 | 1.116 | 23.9 | 1.484 | 23.2 | Female officer |
| % 2.21 | moral | 0.022 | 3.294 | 0.167 | 0.518 | 0.980 | 23.077 | 0.864 | 23.590 | Experimental |

moral (0.05) ≥ At a degree of freedom (5)

Presentation of the results of the t-test. The table shows the variables of the study and the experimental and control groups for the vertical jump test (Lasar Gents) in the post-test and their analysis:

It shows the results of the arithmetic means, standard deviations, and the calculated T value for the post-test for the control and experimental research groups in the vertical jump test (LSAR GENT).

Table (4)

| Type of difference | The moral truth | Calculated T value | Experimental | | Female officer | | measruing unit |
|--------------------|-----------------|--------------------|--------------|--------|----------------|--------|----------------|
| | | | a - | s - | a - | s - | |
| random | 0.869 | 0.169 | 3.973 | 35.387 | 2.738 | 35.633 | cm |

moral (0.05) ≥ At a degree of freedom (5)

Presenting the results of the t-test for the study variables and for the control and experimental groups in the standing on the balls of the feet test in the post-test and analyzing them:

Table (5)

| Type of difference | The moral truth | Calculated T value | Experimental | | Female officer | | measruing unit |
|--------------------|-----------------|--------------------|--------------|--------|----------------|--------|----------------|
| | | | a - | s - | a - | s - | |
| random | 0.923 | 0.378 | 13.231 | 24.051 | 10.812 | 17.632 | second |

moral (0.05) ≥ At a degree of freedom (5)

Displaying the results of the t-test for the study variables and for the control and experimental groups, the zigzag running test using the (Power) method in the post-test, and analyzing them: Presentation and analysis of test results for the variables of the study and for the experimental and control groups for the vertical jump test (LSAR GENT) in the post-test:

Table (6) shows

It shows the results of the arithmetic means, standard deviations, and the calculated T value for the post-test for the control and experimental research groups in the vertical jump test (Lasar Gent).

| Type of difference | The moral truth | Calculated T value | Experimental | | Female officer | | measruing unit |
|--------------------|-----------------|--------------------|--------------|--------|----------------|--------|----------------|
| | | | a - | s - | a - | s - | |
| random | 0.869 | 0.171 | 3.943 | 35.383 | 2.734 | 35.676 | cm |

Presentation of test results for the study variables and for the control and experimental groups in the standing on the balls of the feet test in the post-test and their analysis:

Table (7) shows the results of the arithmetic means, standard deviations, and the calculated value of the posttest for the control and experimental research groups in the standing test on the balls of the feet.

Table(7)

| Type of difference | The moral truth | Calculated T value | Experimental | | Female officer | | measruing unit |
|--------------------|-----------------|--------------------|--------------|--------|----------------|--------|----------------|
| | | | a - | s - | a - | s - | |
| random | 0.923 | 0.378 | 13.281 | 24.034 | 10.823 | 17.625 | second |

moral (0.05) ≥ At a degree of freedom (5)

Presentation of test results for the study variables and for the control and experimental groups, the zakzak running test using the (Power) method in the post-test and their analysis: Table (8) shows

Results of the arithmetic means, standard deviations, and T value calculated for the posttest for the control and experimental research groups in the zigzag running test using the (Power) method.

| Type of difference | The moral truth | Calculated T value | Experimental | | Female officer | | measruing unit |
|--------------------|-----------------|--------------------|----------------|----------------|----------------|----------------|----------------|
| | | | a ⁻ | s ⁻ | a ⁻ | s ⁻ | |
| random | 1.468 | 0.173 | 0.955 | 23.056 | 1.132 | 23.988 | second |

Discuss the results

Through the results obtained by the researcher in the post-tests, and as shown in the tables for the research variables, the randomness of the differences in the post-test between the experimental and control group is revealed. It is understood that the randomness of the differences is a negative case, but the results here were positive, as the experimental group excelled through the results of the arithmetic means and development rates. What happened between the pre- and post-tests was discussed in a previous section. This means that the research sample obtained a better speed through the arithmetic mean in the post-test. The shorter the time and the greater the consistency of the distance, the better the speed. The researcher attributes this development to the effectiveness of exercises through the preventive and rehabilitative program that the researcher used in developing some of the biomotor capabilities of the muscular group of the feet, which led to an improvement in muscle strength and the strength of the foot ligaments, especially the lateral ligaments on the medial and lateral sides, which gives an advantage to the individuals in the experimental group of emerging players while running and performing. Rotations are among the characteristics, and this is consistent with what was stated by (Bouma, 2000) that “developing the muscular strength of players of this age stage has a positive effect on improving their level of speed” (95:11), and here the researcher agrees with (Abdul Ali Nassif, 1978) that “using Exercises with a characteristic similar to the main movements enhance and develop strength characterized by speed according to performance and improve achievement (160:12), and this is consistent with what (Youssef Lazem Kamash, 2002) indicated that they “contribute to determining the correct direction for motor performance, as well as in complex movements that require It is up to the player to restore balance.(122:13) ”

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 1- Through presenting, analyzing and discussing the results, the researcher reached the following:
- 2- Preventive and rehabilitative exercises have a positive effect in reducing the incidence of injuries to the ankle joint (sprains, minor tears, and muscle weakness).

- 3- The results showed a positive effect of preventive and rehabilitative exercises on the biomotor capabilities of the muscle group working on the ankle joint.
- 4- The results showed a positive effect between the test results of the two groups through development rates, in favor of the experimental group.

Recommendations

In light of the conclusions of the current research, the researcher recommended the following:

- 1- Use special preventive and rehabilitative exercises for the lateral ligaments of the knee joint to prevent injuries (sprains, minor tears, and muscle weakness).
- 2- Preparing special preventive and rehabilitative exercises and the necessity of cooperation between the trainer and the physical therapist due to the importance of determining the type of muscle weakness that needs to be strengthened or the type of exercises required, their intensity, repetitions, and duration of rest.
- 3- It is necessary to conduct similar research on the same age group of players and choose another important and effective joint due to the importance of this in preventing future injuries (the knee joint or the hip joint) for its preventive purpose

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