THE EFFECT OF PREVENTIVE EXERCISES ON SOME BIO-KINETIC ABILITIES ASSOCIATED WITH OVERLOAD INJURIES FOR YOUNG BASKETBALL PLAYERS

Fawziya Kadhum Mohsen1
1Department of Physical Education and Sports Sciences /Al-Kut University College, Iraq.
fawzkadhum4@gmail.com

ABSTRACT

The purpose of this paper is to preparing preventive exercises to develop the most important bio-kinetic capabilities of basketball players overload injuries, as well as identifying the effect of preventive exercises in developing some of the bio-kinetic abilities of basketball players. The researcher used the experimental approach with the design of two equal groups with a pre and post-test, which is the most appropriate for the research objectives and hypotheses, while the research community was represented by the players of the Youth Basketball Premier League for the middle Euphrates region, for the sports season 2020-2021, as their number reached (70) players, representing clubs (Kerbala, Al-Rafidain, Al-Hilla, Al-yakidha, and Al-Tadhamun), and the main research sample was selected from the players of the (Kerbala) club in a simple random way (the lottery), and their number was (14) players, and they were distributed into two groups (control - experimental) equally by random method, To achieve the purposes and objectives of the research, a post-test was conducted, and data was collected and analyzed statistically using the statistical package (SPSS). And the researcher reached a set of conclusions, the most important of which are Preventive exercises have a positive effect on the development of the most important bio-kinetic capabilities (strength with speed, endurance of force, moving balance, agility) in the experimental research group, for preventive exercises, for preventive exercises without any injury to the experimental research group.

I. INTRODUCTION:

The world is witnessing development in various fields of life as a result of the growth of scientific knowledge and reliance on various sciences and benefitting from the results of studies and research, especially in the sports field, which is currently witnessing our development and progress in the achieved achievements, both at the level of Olympic and international championships and even Arab championships and for various events and games, and after the countries of the world developed The company has great potentials to raise the level of sports through advanced scientific methods, through which the technical and physical capabilities of all players can be invested, which made them reach the highest levels, achieve high achievements and obtain medals. This was not improvisation but came as a result of using modern scientific means and methods in training with the help of medical sciences and preventive and rehabilitative methods. Attention to the various interrelated sciences in physical education sciences, especially at the higher levels, has become one of the requirements for development in this field by entering competitions in all its forms. A number of injuries and damages despite all the precautionary measures currently used in the sports field to prevent and reduce injuries, whether during training or competitions, we note a continuously high rate of these injuries as a result of overloading in the repetition of movements that require medium or high stress with high repetition during training or competitions, as well as the excessive enthusiasm to try to reach the best levels and achieve the most wonderful sporting victories, and these things made the players in a state of constant competition, as this competition created great opportunities to expose players to repeated injuries more than others to the extent that these sports injuries became a phenomenon in sports stadiums that occur daily. Injuries often occur in the joints, muscles, ligaments, synovial capsules and muscular tendons, which are the main tool implementing the requirements of sports activity. There is no doubt that these injuries will be an obstacle to the progress of players who aspire to develop their levels, and then their negative impact appears on the general level. Overload injury is a common and important injury. The aggravation of which leads to an increase in their pain a certain extent We prevent them from practicing sports, so the importance of research lies in developing preventive exercises in developing the most important bio-kinetic
capabilities of basketball players for the purpose of preparing them well so that they can practice their sports activities.

Research problem:
The research problem was represented in neglecting the preventive aspect of the player and focusing on the aspects of achievement, while prevention is no less important than the aspects of achievement and as a result of the lack of our sports medical institutions to modern and advanced prevention methods that are given to players before injury occurs, as well as the lack of research-based on modern scientific foundations related to the prevention of injuries. Overloading, and the lack of interest of some coaches and players in the preventive aspect of this injury and the lack of medical staff with teams in training and competitions, especially basketball, increased the rate of this injury in the sports field.

Research objective:
- Preparing preventive exercises to develop some bio-kinetic abilities with overload injuries for basketball players,
- To identify the effect of preventive exercises in developing some of the bio-kinetic abilities of basketball players.

Research hypotheses:
- There is an effect of preventive exercises in the development of some bio-kinetic abilities with overload injuries for basketball players.

Research fields:
- Human field: Represented by the young basketball players of the middle Euphrates region, for the sports season 2020-2021, as their number reached (70) players, representing the clubs (Kerbala, Al-Rafidain, Al-Hilla, Al-yakidha, and Al-Tadhamun)
- Time field: From 5/2/2021 to 7/14/2021
- Spatial domain: indoor sports hall of Kerbala Sports Club.

II. RESEARCH METHODOLOGY AND FIELD PROCEDURES:

Research Methodology:
The researcher used the experimental method because it fits with the nature of the research problem, and by designing the method of the two equal groups (experimental and control) with two tests, the pre and post-tests.

Community and sample research:
The research community was represented by the players of the Youth Basketball Premier League for the middle Euphrates region, for the sports season 2020-2021, as their number reached (70) players, representing the (Kerbala, Al-Rafidain, Al-Hilla, Al-yakidha, and Al-Tadhamun), and the main research sample was selected from the players of the club (Kerbala) in a simple random way (the lottery) and the number of (14) players, and they were distributed into two groups (control - experimental) equally in a random way.

Field research procedures:
The injuries that are commensurate with the nature of the work were identified as follows:
- Muscular tension.
- Muscular contraction.
- Muscular fatigue.
- Muscle rupture.
• The ligaments and the surrounding sheaths are torn.
• Injury to muscle tendons and ligaments.
• Rupture of cartilage inside the joints.

Bio-kinetic abilities and their tests: (strength with speed, endurance of force, moving balance, agility)

The first test: Pull up \(^{(1)}\)

• The purpose of the test: to measure the endurance of the muscles of the arms and shoulders.
• Necessary tools: a bar or an alternative tool.
• Description of performance: From the position of attachment (catch from the top), the tester bends the arms until the chin reaches the highest level of the hanging beam, then extends it, and repeats this work as many as possible.
• conditions:
  • Body swings should be avoided during the performance.
  • The arms should be fully extended after bending.
  • The chin should reach the height of the bar in case of bending.
  • Each laboratory has one attempt.
• Recording: It records the number of valid attempts made by the sample

The second test: the vertical jump from standing with the knees bent and half bent \(^{(1)}\)

• The purpose of the test: to measure the endurance of the muscles of the legs.
• Necessary tools: two posts connected by a rubber rope (the rope is parallel to the ground) 50 cm high and placed behind the laboratory during the performance.
• Description of performance: From a standing position, palms intertwined behind the neck and knees bent half-bent, the tester jumps high until parallel to the horizontal rope with the feet, then descends in half and bends the knees in half until it parallels the horizontal rope in the pelvis, repeating this work as many times as possible.
• conditions:
  • The jumping level must reach the level of the feet parallel to the horizontal rope.
  • The level of the knees should reach the pelvis parallel to the horizontal rope.
  • The body must be completely straightened when jumping high.
  • The jump is in the vertical direction.
  • Each sample has one attempt.
• Recording: The sample records the number of valid attempts it has made.

The third test: bend the arms and extend them from the prone position for (10) seconds \(^{(2)}\)

• The purpose of the test: to measure the speed characteristic of the two arms.
• Necessary tools: stopwatch, whistle.
• Performance description: From the prone position, bend the arms and extend them as many as possible within 10 seconds.

• conditions:
  • The body took the correct inclined prone position.
  • Take into account the touch of the chest to the ground while bending the arms and then fully extending them.
  • Recording: The sample records the number of times the bending and stretching are performed within (10) seconds.

The fourth test: the side jump test from above the platform (10) seconds (3)

• The purpose of the test: to measure the speed characteristic of the muscles of the legs.

• Necessary tools: a bench, height (50) cm, an electronic stopwatch.

• Description of performance: The laboratory stands next to the bench in a position of readiness to jump sideways from above it. At the start signal, the laboratory performs a side jump over the bench and returns by jumping also to the place, as the laboratory continues to repeat the jumping process for a period of (10) seconds.

• conditions:
  • It is not allowed to stop during the performance.
  • The tester is allowed to perform a simple iteration before the test.
  • The tester is allowed to move forward and backwards during the performance.
  • Recording: The sample records the number of correct repetitions within (10) seconds.

Fifth test: Challenge tablet test (4)

• The purpose of the test: to measure kinetic balance.

• Necessary tools: a flat field in the inner hall on which a challenge disk device is placed, which is connected to a calculator (laptop).

• Performance description: The player climbs on the device after determining the level at which the device will operate, following a red dot that rotates and moves randomly in the calculator screen. The player tries to press with both feet to catch up with this circle and try to collect points by continuing to stay inside the red dot.

• Conditions:
  • The conditions stated in the performance specifications must be followed.
  • Each sample has one attempt.
  • Registration: The program gives nine levels for period of (3.26) minutes. The program displays an interface with ten variables related to the player who made the attempt. One attempt is given to each player after the warm-up procedure.

Sixth test: Shuttle running in the form (8) (5)

• The purpose of the test: To measure general agility.
• Necessary tools: a handball court, a stopwatch, 5 cones. A rectangle is drawn on the playing field with dimensions (6 m x 3 m) and a funnel is installed in each corner and at the intersection of the rectangle, the fifth cone is fixed.

• Performance description: When the start signal is heard, the tester runs in the form of (8), and the time is calculated through manual timing.

• Conditions:
  • The conditions stated in the performance specifications must be followed.
  • Each sample has one attempt.
  • Recording: records the time from start to finish line, unit of measurement (seconds).

Main experiences:

Pre-tests:

The researcher applied the main experiment by applying tests to the research community. The pre-tests were conducted on 12/15/2021, as the tests were.

Preparing and implementing preventive exercises:

The researcher prepared and organized preventive exercises, which serve to strengthen and protect the main muscles, the antagonist muscles, the stabilizer muscles, the directing muscles, the auxiliary muscles, and the strengthening of ligaments and tendons related to technical performance. The preventive exercises began to be applied to the experimental group on 22/2/2021 taking into account the components of the training load, and it was legalized. The researcher uses preventive exercises on a scientific physiological basis, as well as the physical ability of the research sample, the tools used and the training method, to be able to develop some of the biokinetic capabilities associated with overload injuries to achieve the purposes and objectives of the training process.

Preventive exercise details:

• The total number of training units for preventive exercises is (24) units.
• The number of weekly training units is (3) units for a period of (8) weeks.
• The time of preventive exercises in one training unit (45-60) minutes (from the main section only).
• Training days during the week (Saturday, Monday, Wednesday).
• The goal of preventive exercises is to develop some biokinetic abilities (strength characterized by speed, the endurance of force, mobile balance, agility) associated with high load injuries.
• Take into account the exchange of work between muscle groups.
• The dynamics of the training load for preventive exercises during the daily units per week is (2-1).
• Applying preventive exercises using appropriate training methods according to the training objectives and the appropriate components of a pregnancy.
• Intensity of training for preventive exercises from 60% - 100%.
• The training intensity was calculated by the best achievement of the exercise.

Post-tests:

The researchers, with the help of the assistant work staff, conducted the post-tests of the research sample after the completion of the application of the preventive exercises, and that was on 1/5/2021 and in the same...
sequence of the tribal tests, as the researcher took into account the same conditions in which the pre-tests were conducted.

**Statistical methods:**

The search data was processed through the Statistical Package for the Social Sciences (SPSS).

**III. PRESENTATION, ANALYSIS AND DISCUSSION OF THE RESULTS:**

Presentation and discussion of the results of the pre and post-tests of the control and experimental groups for the variables under study.

Presentation of the results of the pre and post-tests of the control group for the variables investigated.

Table (1) shows the arithmetic means, standard deviations, the calculated (t) value for the correlated samples, the test significance level, and the significance of the difference for the pre and post-tests of the control group for the variables investigated.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measuring unit</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>( T ) value</th>
<th>level</th>
<th>Sig type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>standard deviation</td>
<td>Mean</td>
<td>standard deviation</td>
<td></td>
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<tr>
<td>Moving balance</td>
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<td>10.96</td>
<td>416.40</td>
<td>15.61</td>
<td>2.33</td>
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<tr>
<td>Agility</td>
<td>Second</td>
<td>15.31</td>
<td>0.39</td>
<td>14.72</td>
<td>0.53</td>
<td>2.58</td>
</tr>
<tr>
<td>Endurance force</td>
<td>Count</td>
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<td>0.96</td>
<td>9.40</td>
<td>0.51</td>
<td>9.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endurance</td>
<td>Count</td>
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<td>1.49</td>
<td>14.00</td>
<td>1.05</td>
<td>5.12</td>
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<tr>
<td>Speed</td>
<td>Count</td>
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<td>1.08</td>
<td>10.50</td>
<td>1.26</td>
<td>13.41</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>Count</td>
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<td>1.44</td>
<td>12.00</td>
<td>1.15</td>
<td>7.58</td>
</tr>
<tr>
<td>(two legs)</td>
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<td></td>
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</tr>
</tbody>
</table>

Significance level (0.05) and degree of freedom (6)

Presentation of the results of the pre and post-tests of the experimental group for the variables investigated:

Table (2) shows the arithmetic means, standard deviations, the calculated (t) value for the interconnected samples, the level of test significance, and the significance of the difference for the pre and post-tests of the experimental group for the variables investigated.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measuring unit</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>( T ) value</th>
<th>level</th>
<th>Sig type</th>
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</thead>
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<tr>
<td></td>
<td></td>
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<td>standard deviation</td>
<td>Mean</td>
<td>standard deviation</td>
<td></td>
</tr>
<tr>
<td>Moving balance</td>
<td>Degree</td>
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<td>0.41</td>
<td>14.51</td>
<td>0.46</td>
<td>4.73</td>
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<tr>
<td>Variables</td>
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<td>experimental</td>
<td>T value</td>
<td>level Sig</td>
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<tr>
<td></td>
<td>Mean</td>
<td>standard deviation</td>
<td>Mean</td>
<td>standard deviation</td>
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</tr>
<tr>
<td>Moving balance</td>
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<td>466.70</td>
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<tr>
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<td>14.51</td>
<td>0.46</td>
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</tr>
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<td>0.51</td>
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<td>15.90</td>
<td>1.19</td>
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<tr>
<td>Speed (two legs)</td>
<td>Count</td>
<td>12.00</td>
<td>1.15</td>
<td>16.20</td>
<td>1.22</td>
<td>15.11</td>
</tr>
</tbody>
</table>

Significance level (0.05) and degree of freedom (6)

Presentation of the results of the tests (post-test, post-test) for the two experimental and control groups for the variables investigated.

Table (3) shows the value of (t) calculated for the independent samples, the level of test significance, and the significance of the differences between the test results (post-test, post-test) for the two experimental and control groups for the studied variables.

IV. DISCUSS THE RESULTS:

The results presented in Tables (1) and (2) that show the results of the pre and post-tests for the two research groups (the control and experimental) in the bio-kinetic aptitude tests showed that there were significant differences between the pre and post measurements in favor of the post-tests for the two research groups despite the different exercises used in search aggregate.

As for the control group, the researcher attributes the differences in favor of the special post-tests in the most important bio-kinetic abilities due to the exercises followed by the trainer. Another aspect is the players' commitment and their continuity of training as well as their regularity in training, which had a clear role in the training process.

As for the experimental group, the researcher attributes the differences in the special dimensional tests in the most important bio-kinetic abilities to several things, the most important of which are.

Is that the preventive exercises were effective and effective through the use of scientific planning in preparing these exercises, as they were performed with a sufficient training volume and with an effective training intensity commensurate with the training objectives, taking into account the researcher's principle of repetition and the principle of diversification and complexity of training loads as well as taking into account the training loads according to the methods used that were Mention them and appropriate to the level of development of the sample.
members, as these exercises were built on a regular and scientific basis, taking into account the gradation in the training intensity and sufficient rest periods. (Mohammed Reda Ibrahim) that indicates: “All components of the training load must increase in proportion to the overall improvement achieved by the athlete, that is, the higher the level of improvement of the player, the more the need to increase the components of the training load. This is in line with the characteristics of the game and the capabilities of the players. The novelty of this program helped the players to perform preventive exercises with high efficiency, because it moved away from the traditional character, in addition, that, the organized training process for the experimental group had a role in making that difference, as well as continuing the training process with What is in line with the modernity of sports training from the components of the training load effectively contributed to the development of the most important bio-kinetic capabilities (under research), which depend on the strong and fast movements performed by the player from a physical point of view of an explosive nature. The exercises prepared by the researcher also contributed to increasing the amount of bio-kinetic capabilities, especially the muscular strength resulting from muscular contractions, whether central or decentralized and mobilizing the largest possible number of motor units for performance. Which led to an increase in the compatibility of performance requirements in the neuromuscular aspect, and this was confirmed by (Jamal Sabri) in the training of bio-kinetic abilities, “The special development of bio-kinetic abilities must be systematic, with a direct or indirect effect on other capabilities.”(7). The exercises that were prepared by the researcher for the experimental group were physical and functional preventive exercises, and in the researcher’s opinion it is necessary to rely on these exercises in the transitional phase and the general preparation phase because they help to develop motor capabilities and prevent overload injuries, which have been scientifically proven to improve levels of Physical fitness and its development, as well as having a positive impact on public health effects and avoiding injuries, increases the muscular ability and bodybuilding, in addition to that, the researcher is keen to perform exercises in the same kinetic direction used in the game. “The benefit of exercises lies in being directed and able to distribute kinetic effects. It is more than other exercises” (9). And that one of the main foundations for muscle development and development during training is that the muscles must work with a certain resistance in order to develop in order to confuse the muscle, and this means that users of the devices should go to the free weights section instead. While machines can be helpful in keeping your body from using weights incorrectly, they are also quite limiting if the only way you work your muscles and apply them is by using a variety of tools in performing these exercises. The use of tools of different weights, and in exercises that carry strength for the arms, medical handballs of different weights and other tools were used. On the other hand, the researcher was interested in codifying these exercises in terms of the appropriate repetitions for each physical ability with the repetitions in the training dose in line with the players’ level and abilities, as well as taking into account the gradation in difficulty that ensures the performance i.e. the performance of the players as a whole and this is confirmed by (Mufti Ibrahim, 1988) that “choice If the coach performs difficult exercises, the experience of some players will increase.” (9)

Therefore, it can be said that the proposed exercises have realistically translated into the possibility of maintaining the intensity of the training loads so high that the development of the maximum strength of the arms is a training precedent that revolves around the idea of prolonging the duration and repetition of the exercise with the participation of a large proportion of muscle fibers for a longer period than traditional exercises. The researcher believes that this type leads to a noticeable increase in strength as a result of training doses, and this is consistent with what “Hassanin” mentioned in that training the working and corresponding muscles and improving their level of compatibility is positively reflected on the development of strength of all kinds, as it is mentioned that “improving the level of compatibility between muscles or muscle groups is important It is important to determine a good level of compatibility until both the working and opposite muscles perform their duties better, which of course leads to an increase in the level of strength resulting from the work.” (10)

While the researcher observed the arithmetic means in Table (3) in the post-Biokinetic aptitude tests and the (T) value calculated for the independent samples of the control and experimental groups, we find that there are significant differences between the two tests in favor of the experimental group, and the researcher believes that the reason for the emergence of moral differences is due to the nature of preventive exercises The method of high, low-intensity and repetitive interval training that the researcher prepared, according to the kinetic path of muscle work, which led to shedding a resistance commensurate with the potential of the muscle or muscles working in those angles and this has a positive impact on developing the maximum strength of the muscles by benefiting from the intensity of the resistance imposed on them so This intensity is not less or more than the ability of the working muscles. To develop strength for the muscles requires that the intensity of the training load be commensurate with the maximum that the muscle can withstand, and thus the muscles will be able to engage the largest number of muscle fibers during the exercise, which leads to contributing to an increase in the cross-
section of the muscle, which has an active role in the development of maximum strength, as “there is general agreement that there is a strong relationship between the cross-section of the muscle and its maximum strength level (11). The strength increases as the number of muscle fibers involved in the exercise increases, and this fact is confirmed by many scientists that the maximum force “increases in the case of the ability to excite all the fibers of one muscle or to stimulate the largest possible number of necessary muscle fibers, the higher the degree of intensity of the incentive (increased The degree of resistance, for example), the more this requires the participation of the largest number of muscle fibers and the increase in the force that the muscle can produce” (12). The other reason is the nature of the preventive exercises used in the training process, which are based on scientific foundations in terms of intensity, number of repetitions and rest periods, as well as determining the distances used in preparing these exercises and the degree of their similarity to a large extent to the nature of performance, including the physical nature of these exercises, which worked on the development of the ability to (maximum strength) This was confirmed by (Salman Ali Hassan), “The training process is a constructive process that works on developing and developing physical capabilities in order to achieve the best performance.” (13). (Mufti Ibrahim) states that "the closer the conditions of the exercise are to the conditions of the competition (the match), the more beneficial the exercise is for the player and achieves the goals of reaching the level of performance of the match." , The researcher believes that the development of strength characterized by speed (for arms and legs) requires exercises characterized by the synchronization of both strength and speed at the same time, and this can only be produced through exercises with rapid contraction and relaxation of the muscles to generate this strength, that is, by overcoming resistance using a high kinetic speed without a waiting period for the force to gather, and (Mufti Ibrahim) confirms this, he points out, "However, the development of force characterized by speed is done through the speed of muscle contraction by means of resistances that approach the average speed of appropriate performance to produce the best force characterized by speed. (9).the researcher also attributes to the training method adopted, which aims to develop the basic qualities in various exercises, which had a great impact on the development of speed-distinguishing strength. The size and frequency, of the functional preventive exercises according to the program (Muscle and Motion) were performed with maximum force with maximum speed, and this helped in developing the speed characteristic of the upper and lower extremities. "The athlete's ability to overcome resistance with rapid muscle contractions” (11) The researcher believes that endurance of strength and general endurance is one of the most important bio-kinetic capabilities that characterize performance in most games and sporting events and the game of handball in particular in terms of the amount and type of strength and the time range for its manifestation. The game of handball, as the player, cannot continue until the end of the match to perform the various skills unless there is (strength endurance) for the muscles involved in the performance, and (Ahmed Youssef) believes that the endurance of force is “the athlete’s ability to show a level of muscular strength appropriate for specialized performance resulting from fixed or mobile muscle contractions for the longest possible period,” (14) (Bastawisi) said, quoting (Ozulin). “General endurance is an important kinetic characteristic in which many muscle groups participate for the longest possible time and with moderate or less than average intensity.

V. CONCLUSIONS AND RECOMMENDATIONS:

Conclusions:
Based on the research results that were reached within the limits of the research community, the following conclusions were reached:

- The duration of the independent variable, represented by the number of training units, was appropriate in creating a change in the extent of the development of the experimental research group for some of the bio-kinetic capabilities.

- Preventive exercises have a positive impact on the development of the most important bio-kinetic capabilities strength with speed, endurance of force, moving balance, agility) in the experimental research group.

- Preventive exercises have a condition without any injury to the experimental research group.

Recommendations:
In light of the conclusions reached by the researcher, which proved the effectiveness of the use of preventive exercises, the researcher recommends several recommendations:
Relying on the results of the research in defining the vocabulary of functional preventive exercises in developing the most important bio-kinetic capabilities and programming them for young players.

Emphasis on the diversity of preventive exercises that is similar to the requirements of competition because of their positive impact on the prevention of high load injuries.

The necessity of using preventive exercises in developing the most important bio-kinetic capabilities in line with the level of players and their development, and linking them with the defensive and offensive formations in a manner consistent with the requirements of the match to prevent injuries.

Conducting studies and other research similar to preventive exercises for other age groups to build a broad base of capabilities among the young and young players in the initial preparation stage for them.

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