The effect of muscle stretching exercises on some immunological blood indicators of the posterior connective muscle of footballers' thigh

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Abstract

The study aimed at the numbers of some positive and negative lengthening exercises and their effect on some immune blood variables of the posterior connective muscle of the thigh for soccer players in addition to exercises for muscle strength and therapeutic methods for working muscles to see their effect on increasing motor flexibility and response of working muscles in all corners of the joint, the study was conducted on the same It consists of ((16 players representing Al Diwaniyah Sports Club in football, they were chosen in an intentional manner, and the experimental method was used by (6) weeks at the rate of (2) training units per week and the time of the main part of the daily training unit ranges at the rate of (30-30 minutes) The researcher used statistical treatments in the SPSS statistical program and concluded the following:

1. Continuous stretching exercises reduce muscular tension, ease, speed of movement, reduce pressure on them during intense physical exertion, and increase blood circulation activity.

The most important recommendations:

2. The necessity of using this study to strengthen muscles and stimulate the blood circulation of the posterior and anterior connective muscle of football players.
3. The necessity of conducting similar studies for group and individual games.

Keywords: immune blood variables, footballer’s thigh, posterior connective muscle

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Introduction

The development of the football game is built through the diversity of modern methods and methods by which the potential and capabilities of players can be exploited and placed in a studied scientific framework through regular work and proper planning, and since football is one of the organized collective games that need to diversify the motor skills that are commensurate with The physical, skill, physical, and mental abilities that players enjoy in accordance with the framework of training for his method that are similar to the conditions of play in games and training units, and perhaps one of the most topics that need study and more careful is the subject of the reasons that lead to injury to the connective muscle Background are physical causes that affect the tissues of the human body in its various types (muscles, ligaments, bones) and incorrect performance of skill performance in training procedures and competitions that lead to a disability in these tissues that prevent the achievement of the highest level of performance and efficiency possible as a result of the accumulation of The extent of long training periods in which the coach does not take into account the levels of player load and the lack of an appropriate balance between the components of physical preparation as a basis for fitness[1].

In a manner consistent with the requirements of skill performance and maintaining the motor balance of the body that affects the biochemical variables. This is because injury to the joint weakens and reduces its defensive functions. Hence the importance of research in identifying the problem, as it deals with a topic, which is the extension or the extent to which the working joints and muscles, especially the posterior muscle, can move under the influence of an external force, and finding scientific treatments through the appropriate tools and devices through some lengthening exercises that are appropriate to the capabilities of the players[2,3].

**Research problem:**

There is no doubt that one of the most important problems in sports training is the sudden injuries suffered by players during the various stages of preparation during training periods, which lie by the random and accidental work of the coaches and their overlooks due to the importance of the characteristic of the working flexibility of the joints and the elasticity of the muscles, especially the posterior and anterior connective muscle, and the sufficiency of using various types of flexibility exercises during Warm-up operations without specific planning and organization. And the lack of knowledge of the trainer and the player about the details of the mechanical environment surrounding physical and skill performance and the different effects of the variables of this environment is one of the most important ingredients to avoid a large number of sports injuries, and thus the muscular effort became focused on one part without another, which has a negative effect in increasing the body’s load on the untrained parts that are not concentrated. It is required to perform exercises in the training units, which causes the occurrence of the muscle effort as a result of muscle weakness and the kinetic ability of the joint lessen and less.

And lead to a feeling of pain in the posterior connective muscle due to an imbalance between the strength of the connective and diverging muscle, and that the deficiency. Because of the elasticity of the connective muscle and between the tendons, we find that the lack of systematic distribution of exercises on different parts of the body leads to injury. Therefore, the researchers decided to study this problem and prepare exercises for the muscular lengthening in terms of some immune blood indicators of the posterior connective muscle of the thigh for soccer players.

**Research objectives**

1. Learn about the effect of stretching exercises and their effect on the immune blood variables of the posterior connective muscle of the thigh footballers.
2. Identify the differences between the pre and posttests of the immune blood variables of the posterior connective muscle of the thigh of the experimental and control groups.
3. Identify the differences between the dimensional tests, immune blood variables of the posterior connective muscle of the thigh of the experimental and control groups.

**Research hypotheses**

1. There are statistically significant differences in the immune blood variables of the posterior connective muscle of the thigh of soccer players and in favor of dimensional tests.
2. There are statistically significant differences in the immune blood variables of the posterior connective muscle of the thigh of soccer players and in favor of the experimental group.

**Research fields:**

- The human field: The research sample included ((16 of Diwaniyah football players).
- Spatial domain: Al-Diwaniyah Sports Club Stadium and Al-Mustaqbal Fitness Hall.

**Field research procedures**

**Research Methodology**

The researcher used the experimental method using the equivalence groups method, as it suits the nature of procedures research.

**Community and research sample**

Were selected (16) players from the research community of (24) players, and homogeneity was performed among the sample members, as the sample was divided into two groups (experimental and controlling) by lottery method randomly, as the number of members of each group reached (8) players[4,5]. Homogeneity was performed for the individuals in the anthropometric variables as shown in Table (1).

**Table 1:** Shows the homogeneity of the research sample in the anthropometric variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Cm</td>
<td>176.625</td>
<td>6.283659</td>
<td>3.557</td>
</tr>
<tr>
<td>Weight</td>
<td>Kg</td>
<td>79.5</td>
<td>4.41588</td>
<td>5.562</td>
</tr>
<tr>
<td>Age</td>
<td>Year</td>
<td>21.9625</td>
<td>1.099929</td>
<td>5.004</td>
</tr>
<tr>
<td>Training age</td>
<td>Year</td>
<td>2.4375</td>
<td>0.582961</td>
<td>23.891</td>
</tr>
</tbody>
</table>

The value of the difference coefficient appeared for the research sample, which ranges between (3.556-23.891). This means the homogeneity of the sample population and the correctness of the natural distribution between its members, which are acceptable values because the difference coefficient values whenever you approach (1%), the homogeneity is high and if it exceeds (30%) it means that The sample is heterogeneous.1

For the purpose of ascertaining the parity of the sample in immune blood variables, a test (t) was applied to the research sample of the experimental and control groups, and when comparing the calculated values (t) with tabular values (t) at the significance level (0.05) and freedom degree (14) of (2.14), it was found that the values of all calculated (t) are smaller than tabular (t) values, and this indicates that there were no significant differences between the two groups, which means that the sample is equivalent as shown in Table (2).

**Table 2:** Show the parity of the two groups (experimental and control) is shown in immunoglobulin variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Experimental group</th>
<th>Control group</th>
<th>(t) tabulated</th>
<th>Statistical function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>(IGM) immune protein</td>
<td>dl/mg</td>
<td>2.3355</td>
<td>0.408</td>
<td>2.609</td>
<td>0.420</td>
</tr>
<tr>
<td>(IGG) immune protein</td>
<td>dl/mg</td>
<td>17.382</td>
<td>0.747</td>
<td>17.878</td>
<td>0.207</td>
</tr>
<tr>
<td>WBC white blood cells</td>
<td>L/*10</td>
<td>12.922</td>
<td>0.599</td>
<td>13.624</td>
<td>0.323</td>
</tr>
<tr>
<td>(HB) hemoglobin blood</td>
<td>g/dl</td>
<td>15.6</td>
<td>0.382</td>
<td>15.815</td>
<td>0.549</td>
</tr>
<tr>
<td>(ESR) rate of erythrocyte sedimentation rate</td>
<td>mm/hr</td>
<td>37.34</td>
<td>0.714</td>
<td>38.032</td>
<td>0.410</td>
</tr>
</tbody>
</table>

**Research means and devices**

- The means of collecting data.
- Arab and foreign references and sources.
- Tests and measurements

Results registration form
A device for measuring weight and height prepared for this purpose - an electronic stopwatch
A laptop computer type (DELL).
A centrifuge to separate the blood serum.
Laboratory and devices for analyzing blood samples (immune proteins, HB, (E.S.R) rate of erythrocyte sedimentation rate, white blood cells analysis
Crushed Ice Box (ICEBOX) for placing and transporting blood samples.
Ice bags for cooling with a cool box ((Box.
Very sterile glass tubes to save blood samples.
Sterile plastic needles and needles to draw blood samples.
Special tubes containing anticoagulant (EDTA) to preserve blood until the tests are performed.
Automatic absorbent blood sample.
Medical cotton and cleansing alcohol.
Auxiliary staff.
Elastic rubber band.

Pilot study

The researcher conducted a pilot study on (8) players from Al-Diwaniya Club from the sample members who are not participating in the main experiment on 15/2/2018, at ten in the morning in the pathological analysis laboratory in Al-Diwaniyah Hospital, and the aim of conducting the exploratory experiment was to identify.

1. The time it took to test the electrical activity of the twin muscle.
2. The validity of the devices and tools used to draw the blood and the efficiency of the medical staff in performing the test.
3. The ability of the assistant team to administer the tests.
4. The validity of the laboratory and its suitability for performing the tests.
5. The obstacles and difficulties that accompany the conduct of the tests.
6. Timings of applying the proposed training curriculum.
7. Knowing the time period required for the test procedure.

Field research procedures

Research tests

Mechanism of drawing blood

Blood (5cm) was withdrawn for all members of the sample and numbered according to the sequence of players on 23/2/2018 at 10:00 a.m. and then empty the blood in the siring to partial - the first part in special tubes and numbered according to the sequence of players for the procedures of blood tests[6,7].

The second part was saved by special tubes containing the substance (EDTA anticoagulant for blood preservation and then the serum was separated in a centrifuge to separate the blood serum and put it in the special refrigerator until the completion of the blood test and analysis, and after the measurement was carried out by the researchers.²

The proposed training curriculum

- The researcher prepared the proposed exercises with (2) training units per week at (6) weeks. The time of the main part of the daily training unit ranged at a rate of (60-30) minutes. The training curriculum included the following:
- Graduation with exercises from easy to difficult in exercises related to skill performance, as well as strengthening the muscles working on the joints, working to increase the muscular range of muscles,
increasing the speed of movement, reducing muscle tension during physical exertions, reducing the pressure applied, and muscle working naturally in all directions of movement[8].

Preparing a group of instant strength exercises in the opposite way accompanying the positive and negative flexibility exercises to develop the surrounding muscle strength and joint flexibility by straps, elastic cords and devices of different weights. The intensity used ranges from (10% - 30%) for reflex muscle stretching exercises.

**Statistical means**

To process the data used by the SPSS statistical program researcher. Mean, standard deviation, difference coefficient, standard error and correlation coefficient.

**Results**

Table 3: Shows arithmetic mean, standard deviations, standard error values and (t) values for the experimental group in immunoglobulin variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Standard error</th>
<th>(t) calculate</th>
<th>(t) tabulated*</th>
<th>Statistical function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(IGM) immune protein</td>
<td>dl/mg</td>
<td>2.3355 0.408</td>
<td>1.830 1.080</td>
<td>1.016</td>
<td>4.345</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(IGG) immune protein</td>
<td>dl/mg</td>
<td>17.382 0.747</td>
<td>12.438 0.881</td>
<td>0.440</td>
<td>9.511</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBC white blood cells</td>
<td>L/*10</td>
<td>12.922 0.599</td>
<td>8.781 0.142</td>
<td>0.183</td>
<td>15.275</td>
<td>2.14</td>
<td>Sig.</td>
</tr>
<tr>
<td>(HB) hemoglobin blood</td>
<td>g/dl</td>
<td>15.6 0.382</td>
<td>12.698 0.829</td>
<td>0.264</td>
<td>40.194</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ESR) rate of erythrocyte sedimentation rate</td>
<td>mm/hr</td>
<td>37.34 0.714</td>
<td>23.522 0.615</td>
<td>0.502</td>
<td>27.645</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Below the significance level (0.05) and the degree of freedom (15).

Table 4: Shows arithmetic mean, standard deviations, standard error values, and (t) values for the control group in immunological blood variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Standard error</th>
<th>(t) calculate</th>
<th>(t) tabulated*</th>
<th>Statistical function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(IGM) immune protein</td>
<td>dl/mg</td>
<td>2.609 0.420</td>
<td>1.265 1.115</td>
<td>0.259</td>
<td>4.425</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(IGG) immune protein</td>
<td>dl/mg</td>
<td>17.878 0.207</td>
<td>13.458 0.832</td>
<td>0.256</td>
<td>17.881</td>
<td>2.14</td>
<td>Sig.</td>
</tr>
<tr>
<td>WBC white blood cells</td>
<td>L/*10</td>
<td>13.624 0.323</td>
<td>11.206 0.817</td>
<td>0.317</td>
<td>7.646</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(HB) hemoglobin blood</td>
<td>g/dl</td>
<td>15.815 0.549</td>
<td>13.568 0.829</td>
<td>0.440</td>
<td>4.872</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ESR) rate of erythrocyte sedimentation rate</td>
<td>mm/hr</td>
<td>38.032 0.410</td>
<td>25.912 1.259</td>
<td>0.772</td>
<td>18.889</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Below the significance level (0.05) and the degree of freedom (15).
Table 5: Shows the arithmetic mean, standard deviations, standard error values and (t) values for the experimental and control groups in the immune blood variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Experimental group</th>
<th>Control group</th>
<th>(t) calculate</th>
<th>(t) tabulated*</th>
<th>Statistical function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(IGM) immune protein</td>
<td>dl/mg</td>
<td>1.830</td>
<td>1.265</td>
<td>7.142</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(IGG) immune protein</td>
<td>dl/mg</td>
<td>13.458</td>
<td>12.438</td>
<td>1.682</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBC white blood cells</td>
<td>L/*10</td>
<td>11.206</td>
<td>8.781</td>
<td>5.927</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(HB) hemoglobin blood</td>
<td>g/dl</td>
<td>13.568</td>
<td>12.698</td>
<td>1.514</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ESR) rate of erythrocyte sedimentation</td>
<td>mm/hr</td>
<td>25.912</td>
<td>23.522</td>
<td>3.416</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Below the significance level (0.05) and the degree of freedom (14).

Discussions

We note from the results that have been shown in table (4) (3) ((5) that there are significant differences for pre and posttests between the two groups (experimental and control) and for the benefit of the experimental group in the post-measurement of biochemical variables, and the researcher attributes the reason for that to the effectiveness of lengthening (regression) exercises is Which is carried out using the muscles of the player himself and without any assistance from a colleague or external force and usually perform stretching exercises in the form of groups of selected exercises that are repeated during training with the need to take into account the progressive progression of the extent of the likelihood of the various movements until they reach their extreme end, and must be taken into account not to arrange This is with a sense of pain that serves as a sign that indicates the need to limit the increase in the range of likelihood[9].

This is what the researcher took into account during his training method as well as the selection of the proposed exercises in proportion to the physical capabilities and capabilities of the players and the skill and the correct gradient of the loads of the training load in terms of the intensity of the pregnancy and the number of repetitions and proportions of appropriate rest Between exercises and during the training unit, which contributed to "rapid response, activation of cardiovascular functions, and an increase or activation of the percentage of oxygen and its distribution among the tissues that lead to the growth of enzyme activity, which helps in biochemical changes to Each is fast especially in muscle tissue [3]. As for the immune protein variable (IGM), it became clear that there were significant differences between the pre and post measurements, as its percentage increased by pre-workout (the training approach) in the pre-measurement. As for its percentage, it decreased significantly after the exercise (the training approach). The researcher attributes the reason for that to controlling the components of the training load. For prolonged exercises because this protein responds directly to the nature of physical efforts in terms of quantity and type, whenever the physical effort is violent, there is an increase in the level of the immune protein, which causes the player's injury. Therefore, prolonged exercise between exercises leads to an increase in the level of IGA and a decrease in levels of IGM, IGG and that the association of IGA ratio with the muscular effort exerted during the training had a positive effect[4]. The dimensional measurement of the IGM variable for two dimensional measurements indicates The return of the variable to its natural state after exercise through conducting exercises with its method contributed to strengthening the muscle and increasing its...
flexibility. As for the dimensional measurement, it became clear that there are significant differences with statistically significant between the two measures of the two groups of the immune protein variable (IGM) in favor of the experimental group and this is due to stability as well as a return in the level of IGM to its natural state as a result of training or moderate physical efforts and regular and regular training and its continuity which increases of immune globulin in the blood serum, which does not expose the body's systems to stress, and this is confirmed by "that this variable is mainly confined to a system of blood vessels, so it is of little importance in providing protection within the tissues." Significant differences between the pre and post measurements[10,11]. It became clear that there is an increase in the proportion of protein in the pre-measurement before exercises. Muscle stretching as a result of the increase in the activity of immune cells. Its activity of excreting toxins that kill thwart many pathogens, depending on the "response and change in those immune cells, depending on the intensity of the exercise, the period of its duration, the components of the training load and the level of physical exertion[5]. As for telemetry, the researcher attributes the variable's return to its normal state to the effectiveness of the immune protein (IGG) "as a result of its elimination of foreign bodies by combining the foreign body with the bodies that suffer from the injury and then destroy it and eliminate it” [6]. Some studies indicate that the number of killer cells increases to three times the rate during rest during and immediately after the completion of a high-load performance, i.e. with a high intensity, especially the praise of the performance of certain movements that cause the occurrence of connective muscle fatigue due to the performance of the movements that require a muscle stretch and contract at the same time for periods Long, as this causes pressure on the muscles, especially in football, thus increasing the activity and effectiveness of the immune protein. Response of immune cells and the release of toxins and controlling the causes of infection. After the effort and its completion, it returns to its normal position and soon gradually returns to At its levels, it takes an hour to 6 hours, and this is confirmed by (Mitchelletal). The researcher also finds that the differences that showed immune blood proteins IGM, IGG in favor of the experimental group, so the researcher attributes this to the mechanism of physical homeostasis, which restores the player to his condition more quickly as a result of getting rid of foreign substances in extracellular fluids and cleaning the blood fluid and is always done automatically in the body despite the pressures and troubles he is exposed to. As for the control group, the return needs more time than in the experimental group as a result of the proposed exercises compared to the traditional approach of the coach. This is what is indicated by "that training The regulator improves, develops and increases the activation of the cells of the immune system and is a strong line of defense to prevent injuries to the player, when activatedcomplementary immune system protein efficiency increases by destroying foreign bodies [12,13].The cells reach their levels during 12 to 24 from the end of performance [8]. The player’s exposure to various exercises in which various exercises are used to continuously stretch the muscles, in addition to positive flexibility exercises in the rest periods during the training approach that lead to an increase in the number of white blood cells as a result of an increase in response The immune system of the body[9,10]. including the connective muscle, which meets its need when performing the exercise by increasing its numbers to increase the body's immunity and for the white blood cells WBC to perform its defensive functions. (As for the blood hemoglobin variable (Hb), the researcher attributes the morale of the post-test of the two groups in the tests before The intensity and dimension to the exercises followed in the prepared training curriculum and the trainer training, which affected the (Hb) as a result of strengthening the working muscles in a greater amount through contraction and extraversion during the performance of the exercises, which requires the muscles to oxygen and thus the need for blood hemoglobin increases, since "the continuity of training during the curriculum Training and the continuous need of the muscles to hemoglobin in large quantities to bridge the lack of oxygen, the body increases the proportion of hemoglobin in the blood, union with oxygen in order to provide the working muscles during physical work with the largest possible amount[10]. Adjust the speed of erythrocyte sedimentation (E-SR) Vent Physical effort facial placed on the shoulders muscles Ala. As for the variable of his hope in performance, he caused sharp changes in the physiological variables of body fluids or special proteins in blood plasma and immunoglobulin, which caused differences between the two groups and that the most influencing factor on erythrocyte sedimentation (E-S-R) is the plasma concentration.[15,16]

Conclusions
1. The muscular stretching exercises helped to strengthen the working muscles, which comprise the muscular connective groin, to stimulate blood circulation and muscle relaxation, increase the permeability of the membranes, increase the ability of tissues to regenerate themselves, and relieve pain so that it pressures on cells.

2. That stretching exercises continuously lead to reduce muscle (tension) muscles and its ease and speed of movement and reduce pressure on them during violent physical exertion and increase blood circulation activity.

3. The codified planning of muscle stretching exercises for the joints, bones and tendons associated with the pelvic bone of the hip connective muscle by warming up and strengthening the muscles and increasing their elasticity, as well as combining the thighs with the pelvis inward and lengthening the foot to a distance and at an appropriate speed contributed to activating the immune cells to prevent injury to the players.

4. The experimental group that used the stomach muscle stretching exercises was better than the control group that used the traditional trainer exercises.

**Recommendations**

1. Adopting the curriculum designed for stretching exercises in daily exercises in training units to keep players from injury to the hip connective muscle as a result of unhealthy warming and weakness in working muscles during sudden player speeds.

2. The necessity of adopting immune blood variables to infer the development of the working muscles of the lower limbs of football players.

3. The necessity of using this study to strengthen muscles and stimulate the blood circulation of the posterior and anterior connective muscle of football players.

4. Carrying out studies and research to know the effect of other immune variables related to all injuries that the player can experience in the upper section of group and individual games.

**References**


2. Abu El-Ela Abdel-Fattah and Leila Salah El-Din: Sports and Immunology, Dar Al-Fikr Al-Arabi, Cairo, 1999, p. 87.


