

Effects of preventive exercise in various approaches on the development of several indices of knee collateral ligament strength in advanced handball players

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Abstract

Preventive exercise, particularly in sports, is often regarded as one of the most efficient techniques for rehabilitating wounded individuals. Promotes cell healing facilitates the discharge of accumulated blood, and prevents internal bleeding in joints. Finally, accelerate the restoration of muscles and joints to their functional capabilities. In sports, we know that coming back from an injury without rehab is a big mistake. Injuries are compounded as athletes return and continue their training and competitive approach. Athletes may not feel pain when injured. Because it takes the form of new structures, it leads to chronic recurrence of the infection. Since the players are exposed to various sports injuries that stand in the way of developing their levels, we find that these injuries are increasing with the increasing requirements of sports. A source confirmed, "Based on statistics obtained from expert studies published in magazines and newspapers, more injuries occur during sports practice than on-the-job accidents."

The research challenge was the questions posed, which included:

1- Do preventive exercises have an effect on developing some indicators of strength among players?
2- Do preventive exercises with rubber bands have a role in strengthening the working and supporting muscles of the knee joint?

3- Is there a difference in the pre and post-tests between strength indicators for young handball players?

1- There are statistically significant differences between the experimental and control groups in the development of several indicators of muscular strength of the lateral ligaments of the knee joint of advanced handball players in pre and post-tests.

The researchers identified the study community as 16 players who were senior players in the Kufa Sports Club, divided them into two experimental and control groups, reaching eight players in each group, and concluded and recommended the following:

Special exercises positively prevent collateral ligament injuries (sprains, simple tears, weakness) from the knee joint to the ankle.

The recommendations included using special preventive exercises for the lateral ligaments of the knee joint to prevent injuries (sprains, minor tears, and muscle weakness).

Keywords: Preventive exercise, lateral ligaments, sport.

1- Introduction to the research and its importance

Preventive exercise is generally considered one of the most effective ways to rehabilitate injuries, especially in sports. These preventive exercises "accelerate cell healing. It also aids in the drainage of blood pools, preventing internal bleeding in the joint and rehabilitating muscles and joints to their functioning capacities. In sports, we realize that returning an injured athlete to play without first completing rehabilitation is a significant mistake. The athlete's comeback and further training or competitive approaches will result in a doubling of the injury. So because the damage has taken on a new structural shape, the athlete may not experience pain despite the injury, resulting in a chronic recurrence of infection. In addition, players are exposed to a variety of sports injuries that stunt their growth, and we've seen these injuries increase as the demand for the sport increases. According to the sources, "the injuries that occur during the practice of sports are more than the accidents of injuries at work, based on numbers acquired by specialists in their research published in magazines and newspapers."

These injuries include injuries to the knee joint's soft tissue since the knee joint's importance is that there is a reciprocal neural relationship between the structure of the joint and the neurosensory connections to the sensors in the clipboard. In addition, increasing the ligaments, tendons, and muscles surrounding the joint provides rapid stabilizing action to keep the joint in place, depending on the joint's pressure level and shape.

1-2 Research Problem:

Answering the following questions is the research problem:

- 1- Do preventive exercises influence the development of certain strength indicators in players?
- 2- Do rubber band exercises play a function in strengthening the working and supporting muscles of the knee joint?
- 3- Is there a difference between before and post-tests for young handball players' strength indicators?

1-3 Research Objectives:

- 1-Developing some indications of muscular strength of the lateral ligaments of the knee joint for advanced handball players through various preventive workouts.
- 2- To determine the influence of various preventative workouts on developing some indicators of muscular strength of the lateral ligaments of the knee joint in advanced handball players.

1-4 Hypotheses for research:

- 1- There are statistically significant differences between experimental and control groups in pre-and post-tests in developing several indices of muscle strength of the collateral ligaments of the knee joint in advanced handball players.

1-5 Research Fields:

- **The human field:** Kufa Handball Club players advanced class.
- **Time range:** from 8/16/2022 to 10/20/2022
- **Spatial field:** the indoor sports hall of the Kufa Club.

2. Field Research Procedures:

2-1 Research Methodology:

The method is the approach taken by the researcher when investigating a problem in order to discover the truth. One of the first tasks a researcher does when conducting research is to select a method that is appropriate for the nature of the research problem. As a result of

its adaptability to the nature of the study problem, the researcher utilized the experimental method in a single-group design (pre-test and post-test).

2-2 The Research Community and its Sample:

The researchers identified a research community of 16 senior athletes from the Kufa Sports Club and divided them into two groups, experimental and control, with eight players in each group.

Table (1). Research Community and its Sample

variants	constancy	honesty	objectivity
Maximum strength	0.987	0.993	0.999
Force bearing	0.990	0.994	0.998

2-3 Devices and instruments for gathering information in research:

The researcher used the following devices, instruments, and means of collecting information that contributed to completing the research:

Firstly:

- ❖ A video camera with a (SONY) camera.
- ❖ Dell computer. (Made in china).
- ❖ Manual Calculator (CASIO).
- ❖ Stop watch type mar times. (Made in china).
- ❖ A device for measuring the strength of the muscles working on the knee joint.

Secondly: Instruments used in the research:

- ❖ Bars of weighted iron (5-10 kg).
- ❖ Rubber bands (12).
- ❖ Signs number (20).
- ❖ Medical scale to measure weight and height. (made in china).
- ❖ Traps to perform jumping exercises.
- ❖ Measuring tape/sticky paper.
- ❖ Whistle.
- ❖ A piece of wood measuring (50 x 50) cm.
- ❖ Drawing paper measuring (40 x 40) cm.

Thirdly: Methods of collecting information:

- ❖ Arabic and foreign sources and references.
- ❖ Tests used.
- ❖ Observation and experimentation.
- ❖ International Information Network (Internet).

2-4 Tests used in the research:

Characterization of motor ability tests.

The first test is the maximum (fixed) strength of the leg muscles.

- **The aim of the test:** to measure the strength of the muscles of the legs.

- **Tools needed:** dynamometer.

Performance description: The same equipment used to evaluate the strength of the back muscles is utilized in this test, however the technique of performance is different. This test can be performed with or without the belt. The belt performance approach is described below. As long as the palms of the hands are facing downward in front of the region where the thigh bone

and the pelvis connect (this position is after installing the belt). Noting the appropriate length of the chain for the length of the laboratory.

- The conditions:
 - The test must be performed in light of the conditions described in the performance specifications.
 - Before the stretching operation, it should be noted that the arms, back, and head are erect and the chest is upward.
 - Each laboratory has two attempts to record the best of them.
- **Recording:** The laboratory records the number recorded in kilograms or pounds in the best attempt.



Figure 1. Recording.

The second test: the vertical jump from standing with the knees bent in half

- **The aim of the test:** is to measure the strength and endurance of the muscles of the two legs.
 - **The tools required:** two legs connected by a rubber rope (the rope is parallel to the ground) with a height of (50) cm. It is placed behind the laboratory during the performance.
- Performance description: From a standing position with the palms intertwined behind the neck and the knees bent in half, the tester jumps high until it parallels the horizontal rope with the feet, then descends in the middle of the place and bends the knees in half until it parallels the horizontal rope with the pelvis. This action is repeated as many times as possible. .

- **The conditions:**

- You must reach the level of the jump until the feet are parallel to the horizontal rope.
- The knees should reach the level of the pelvis parallel to the horizontal rope.
- The body must be fully straightened when jumping high.
- The jump is in the vertical direction.
- Each test has one attempt.

-**Recording:** The tester records the number of correct attempts made.



Figure 2. Correct attempts

2-3-1 Post-tests:

Post-tests were conducted for the research sample on Thursday corresponding to (10/20/2022).

2-4 Statistical Methods:

To process the results, the researcher relied on statistical methods (SPSS).

3- Display the result:

Presenting and analyzing the t-test findings for the study's variables as well as the control and experimental groups to measure the maximal strength of the muscles in the two legs in pre and post-tests:

Table (1). Presentation of the results of the t-test for the study variables and for the control and experimental groups to test and analyze the maximum strength of the muscles of both legs in the pre-and post-test:

Variables	Pre-test		Post-test		P	P H	Calculated T	Real morale	Difference Type	Percentage of Evolution %
	S (km)	A	S (km)	A						
control	30.87	2.30	34.666	2.743	4.640	0.543	8.367	0.000	Moral	%15.03
Experimental	26.123	3.938	35.322	3.912	9.166	0.512	16.899	0.000	Moral	%35.05

Significant $\leq (0.05)$ at (5) degrees of freedom

3-1 Presentation of the test results (t.test) for the study variables and for the test and control group of the vertical jump stability test in the post-test and its evaluation:

Table (2) Displays the post-test results of the arithmetic mean, standard deviations, and calculated t-value for the experimental and control research groups in

Unit of measurement	Control		Experimental		Calculated T value	The real morale	Difference Type
	S-	A-	S-	A-			
Equipment	36.643	2.789	35.354	4.283	0.164	0.849	Random

the Standing Jump Test.

Significant $\leq (0.05)$ at (10) degrees of freedom.

3-2 Results Discussion:

Through the results obtained by the researcher in the post-tests and as shown in the tables for the research variables. Random differences in the post-test between the experimental and control group were demonstrated. Random variance is understandably a negative case, but the outcome is positive here. The experimental groups were characterized as a result of the arithmetic mean and percentage evolution that occurred between the pre-and post-tests discussed in the previous section.

It means that the research sample achieved better strength by the arithmetic means in the post-test, the greater the weight of the weight, the better the strength indicator, which gave a better result.

The researcher attributes this development to the effectiveness of exercises through the preventive program used by the researcher in the development of some biokinetic capabilities of the muscle group of the feet, which led to improved muscle strength and strength of the foot ligaments, especially the lateral ligaments from the medial and lateral side.

This gives priority to the experimental group members of the advanced players during the execution of the exercises and is consistent with his statement (Puma, 2000) that "strength development in players of this age group has a positive impact on the improvement of speed and strength levels."

Here the researcher agrees with (Abd Ali Nassif, 1978) that "the use of exercises with a characteristic similar to the main movements enhances and develops strength and strength endurance according to performance and improves achievement",

This is consistent with what Youssef Lazem Kmarsh (2002) pointed outit : "contributes to determining the correct direction of motor performance as well as in complex movements that require the player to rebalance."

5- Conclusions and Recommendations

5.1 Conclusions

Through presenting, analyzing and discussing the results, the researcher reached the following conclusions:

1. Special exercises have a positive effect on preventing injuries to the collateral ligaments of the knee joint of the ankle joint (sprains, minor tears, and muscle weakness).
2. The results showed a positive effect of preventive exercise on the special abilities of the muscle group working on the ankle joint.

3. The results showed a positive effect between the test results of the two groups through the rates of development and in favour of the experimental group.

5.2 Recommendations

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

1. Use special protective exercises for the lateral ligaments of the knee joint to prevent injuries (sprains, minor tears, and muscle weakness).
2. Preparing special preventive exercises and the need for participation 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 rest period.
3. The need to conduct similar research on the same age group of players and choose another important and influential joint for effectiveness because of the importance of this in the prevention of future injuries (knee joint or hip joint) for its purpose is preventive.

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