

The effect of preventive exercises using the (imuscle2) program on the development of articular flexibility of the arms of the men's technical gymnastics players

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Abstract

The purpose of this paper is to preparing preventive exercises using the (imuscle2) program to develop the articular flexibility of the arm muscles of the men's technical gymnastics players, and identify the effect of preventive exercises using the (imuscle2) program to develop the articular flexibility of the muscles of the arms of the artistic gymnastics players for men. Researchers has adopted the experimental approach with two equal groups (experimental and control) with two tests (pre-and post-test) to suit the nature of the research problem the research community was represented by students of the third stage at the University of Kufa for the academic year 2021-2022, who numbered (52) students, and the basic sample included (20) students who were chosen by random method (lots) and were divided into (10) players for the control group, in which the teacher's method was followed Article, and (10) students for the experimental group to which preventive exercises are applied using the (imuscle2) program, and (4) students were used to conduct exploratory studies for research from the same research community.

Introduction:

In the modern era, the world witnessed a great development in various fields, which was reflected in the various physical aspects of physical education and sports, which led to the emergence of many problems in this field. The need for scientific research was the best way to address these problems, and there is no doubt that relying on the method the scientific field with its modern and multiple trends in various fields in general and the sports field, in particular, helps to reach the higher levels.

The preventive and health level of athletes is one of the indicators that depend on the prevention and prevention of injuries, so prevention is an important basic in modern sports medicine and therapeutic physical education, which is currently moving towards the prevention of injuries and striving to reduce the rate of their occurrence to a minimum, as sports medicine studies Sports injuries and how to prevent them first and then how to treat them if the injury occurs secondly, and includes within the concept of prevention many procedures that use preventive and curative means and methods based on natural factors that are included in preventive medicine for athletes, the most important of which are exercise and kinetic therapy.

The gymnastics game is one of the interesting and enjoyable games with its dazzling movements that have developed greatly in recent years, and the floor movements rug constitute the backbone of the rest of the gymnastics devices, in addition to that its movements require integrated accuracy and smooth flow in performance for all sections of movement and control through the kinetic path, and this requires precise details And good performance to reach the high skill mastery of the movements, and for this reason, the search for performance minutes will undoubtedly reveal the defects and weaknesses of gymnastics players, which increases the integration of the performance model compared to the results of similar research, but sometimes it may cause many and sudden injuries to the student, Including injuries that occur in the muscle groups of the arms, such as muscle tearing, pulling, muscle spasm and other injuries, so it requires prevention of these injuries and knowledge of how to avoid and prevent them, as the athlete always strives to continue the effectiveness without injuries to achieve a higher level of achievement, sports training and sports medicine are two of the sciences The important and specialized basic, in which medical sciences are used and applied from the preventive and curative side, as this . contributed Science in developing and legalizing training loads to be more appropriate to the body's ability to adapt and take advantage of the positive effects of the body's functional condition to provide the correct methods and programs to prevent or prevent sports injuries.

Hence the importance of the research in preparing preventive and preventive exercises using the (imuscle2) program in developing the articular flexibility of the arms on a sample of students of the third stage / University of Kufa for the academic year 2021-2022 in the technical gymnastics for men while they are at the beginning of their academic career in order to avoid what happens with injured students in the stages previous .

Research problem:

The great scientific development witnessed by various sports, especially gymnastics, is due to the benefit of workers in the field of sports 14 from following the proper scientific method and modern methods of prevention and rehabilitation in order to achieve the goals they seek, through the work and experience of the researcher in the field of gymnastics and his contact with teachers and students with this game. There are many injuries that occur to students in the arm used to perform technical skills in artistic gymnastics and is constantly increasing during learning and these injuries are concentrated in three main joints (shoulder, elbow, wrist), because of these joints of an important and effective role during the performance of basic skills As most of the skills depend on relying on the hands or shoulders, as well as forward and backward swings and rolls, so any incorrect position leads to various injuries in the arm used for students, and the researcher attributes this to weakness and imbalance in the muscle groups working on the arm used, so she decided the researcher sheds light on this problem in how to reduce these injuries and the possibility of avoiding them by developing preventive exercises using a program (imuscle2) in the development of articular flexibility of the arms on a sample of students of the third stage / University of Kufa for the academic year 2021-2022 in the technical gymnastics for men, which has an effect on the muscle groups working on the joints of the arm used to avoid injury that can occur to students during learning.

Research objective:

- Preparing preventive exercises using the (imuscle2) program to develop the articular flexibility of the arm muscles of the men's technical gymnastics players.
- Identify the effect of preventive exercises using the (imuscle2) program to develop the articular flexibility of the muscles of the arms of the artistic gymnastics players for men.

Research hypotheses:

- There is a positive effect of preventive exercises using (imuscle2) program to develop articular flexibility of the muscles of the arms of the artistic gymnastics players for men.

Research fields:

- Human field: Students of the third stage / University of Kufa for the academic year 2021-2022
- Time field: (20/10/2021) to (12/1/2022)
- Spatial field: Gymnastics hall in the College of Physical Education and Sports Sciences.

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

The study of the nature of the phenomenon that the researcher deals with is what determines the nature of the curriculum, because the curriculum is a method by which a person arrives at the truth" (Al-TaHER. 1986), and scientific facts are reached through research and investigation, and for that, the researcher has adopted the experimental approach with two equal groups (experimental and control).) with two tests (pre-and post-test) to suit the nature of the research problem

Community and sample research:

The research community was represented by students of the third stage at the University of Kufa for the academic year 2021-2022, who numbered (52) students, and the basic sample included (20) students who were chosen by random method (lots) and were divided into (10) players for the control group, in which the teacher's method was followed Article, and (10) students for the experimental group to which preventive exercises are applied using the (imuscle2) program, and (4) students were used to conduct exploratory studies for research from the same research community.

Sample equivalence:

In order for the researcher to be able to attribute the differences in the results of the post-tests of the variables under study to the effect of the experimental factor, and for the sample members to have a single starting line, the researcher resorted to verifying the equivalence of the two groups, using the (t) test for independent samples, as shown in the table (1).

Table (1) shows the equivalence of the two groups in all the research variables.

Variables investigated	Measuring unit	Pre-(Control Group)		Pre-(Experimental group)		T calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Shoulder joint angle (Degree)	High (aside)	176.4	1.404	178.2	1.332	0.77	0.088	Non sig
	High (in front)	177.01	2.42	176.2	2.31	1.07	0.22	Non sig
	High (backward)	43.2	0.997	41.2	0.987	0.98	0.56	Non sig
Elbow joint angle (Degree)	Drape	144.43	0.884	142.22	0.821	1.09	0.44	Non sig
	Extension	177.32	2.554	175.8	2.112	0.91	0.71	Non sig
Wrist joint angle	Drape	72.21	0.921	70.65	0.844	0.45	0.33	Non sig
	Extension	65.21	2.331	65.11	3.710	1.03	0.11	Non sig
	Approximation	25.12	0.991	23.22	1.821	0.54	0.67	Non sig
	Dimensions	15.14	0.886	16.44	0.665	1.022	0.72	Non sig

Means, tools and devices used in the research:

Data collection methods:

- Arab and foreign sources and references.
- Personal interviews.
- Tests and measurements.
- Special forms for recording test results for students.

Tools and equipment used:

- Electronic calculator (laptop) number (1).
- Electronic stopwatch, type (2).
- Plastic signs (10).
- Gymnastics hall.
- elastic ropes
- Sticky tape
- Forms for recording test results.
- Medical scale to measure weight

Tests used in the research:

Flexibility tests:

First / Shoulder joint flexibility test:

- Objective of the test: To measure the range of motion of the shoulder joint
- Necessary tools: a Goniometer to measure joint flexibility.
- Procedures: The laboratory takes a standing position, then raises the arm (right or left) high to the side and high in front and high behind to the maximum extent so that one arm of the Goniometer is perpendicular to the ground and the other arm is parallel to the Humerus bone.
- Test instructions:
 - The laboratory should not bend the elbow.
 - The laboratory must have both legs extended (the natural standing position).
 - The laboratory has two attempts to record the best of them.
- Calculation of degrees: The angle that appears on the Goniometer is read and the best reading is taken in both attempts

Elbow joint flexibility test:

- The objective of the test: To measure the range of motion of the elbow joint.
- Instruments used: a Goniometer device to measure joint flexibility
- Procedures: The laboratory takes a standing position and then bends the arm (right and left) as far as possible so that one arm of the goniometer is on the forearm and the other on the upper arm.
- Test instructions: The laboratory must bend the elbow as far as possible for the laboratory to score two attempts.
- Calculation of degrees: the angle that appears on the Goniometer is read and the best reading is taken in the two attempts for the tidal and bending cases.

Wrist joint flexibility test:

- The objective of the test: To measure the range of motion of the wrist joint.
- Instruments used: a genomic device to measure joint flexibility.
- Procedures: From a standing position, the laboratory bends, extends, approximates and distances the wrist joint as far as possible so that the two arms of the goniometer are in the direction of the fingers and the other on the forearm.
- Test instructions:
- The tester should bend the wrist joint as far as possible. The laboratory has two attempts to take the best of them.
- Calculation of degrees: The angle that appears on the Goniometer is read and takes the best reading in both attempts.

Exploratory experience:

The exploratory experiment was conducted before starting the basic experiment in order to know the most important obstacles and negatives in order to be addressed, and the purpose of the exploratory experiment is:

- Knowing the suitability of the tests to the research sample and measuring the time of its performance.
- Ensuring the validity of the hall and the tools used and their suitability for the tests.
- Preparing the auxiliary work team, as well as identifying the difficulties, they may face.
- Knowing the difficulties that may face the course of work and developing the most appropriate solutions to them.

Pre- tests:

The researcher conducted pre-tests on the members of the experimental and control groups on (Sunday) corresponding to (24/10/2021) at (9:00) in the morning at the Gymnastics Hall in the College of Physical Education and Sports Sciences / University of Kufa, as all conditions related to the tests were taken into consideration. Where the tools, time and method of implementation in order to provide the same conditions in the post-test.

Steps to prepare, plan and apply preventive exercises using the (imuscle2) program:

The preventive exercises were carried out using the (imuscle2) program, which specialized in flexibility for the shoulder joint, elbow, and wrist during rest periods between groups in their part of the main part of the educational unit, according to the following principles:

- The stretching exercises are performed slowly to the maximum extent of the joint, and then slowly reaching this point, stability is made in this position for an estimated period of time (8-10 seconds) so that the corresponding muscles are fully relaxed and allow to perform the stretching exercises.
- You must remain in the position when performing each of the flexibility exercises (15-30) seconds - repetition, rest between one repetition and another (30-60 seconds), and the Goniometer measurement is performed after performing the last repetition slowly and for a period of (30 seconds).
- Weekly training days for the experimental group: (Sunday, Tuesday, and Thursday).

Post-tests:

After completing the preventive exercises using the (imuscle2) program, post-tests were conducted on the control and experimental groups on (Sunday) corresponding to 2/1/2022 at nine in the morning, in the same place and under the same conditions under which the pre-measurement was performed.

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

Presentation, analysis and discussion of results**Presentation and analysis of the results of the pre and post-tests for the control group in the research variables:**

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

Variables investigated	Measuring unit	Pre-test		Post-test		T calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Shoulder joint angle (Degree)	High (aside)	176.4	0.401	179.4	0.632	4.987	0.008	sig
	High (in front)	177.01	0.662	178.3	0.831	0.227	0.52	Non sig
	High (backward)	43.2	0.997	44.4	0.667	0.88	0.76	Non sig
Elbow joint angle (Degree)	Drape	144.43	0.884	149.5	0.621	7.039	0.004	sig
	Extension	177.32	2.554	180.2	0.912	4.771	0.001	sig
Wrist joint angle	Drape	72.21	0.921	73.55	0.664	1.115	0.073	Non sig
	Extension	65.21	2.331	67.11	1.110	0.93	0.31	Non sig
	Approximation	25.12	0.991	29.22	0.821	5.24	0.007	sig
	Dimensions	15.14	0.886	18.12	0.622	6.112	0.002	sig

Presentation and analysis of the results of the pre and post-tests of the experimental group in the research variables:

Table (3) shows the arithmetic means, standard deviations, the calculated (t) value of the interconnected samples, the level of test significance, and the significance of the difference between the pre and post-tests of the experimental group for the variables investigated.

Variables investigated	Measuring unit	Pre-test		Post-test		T calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Shoulder joint angle (Degree)	High (aside)	178.2	1.332	181.2	0.932	9.27	0.008	sig
	High (in front)	176.2	2.31	176.2	2.31	1.07	0.002	Non sig
	High (backward)	41.2	0.987	41.2	0.987	12.18	0.000	Non sig
Elbow joint angle (Degree)	Drape	142.22	0.821	149.82	0.833	23.19	0.000	sig
	Extension	175.8	2.112	182.3	0.812	18.11	0.001	sig
Wrist joint angle	Drape	70.65	0.844	75.35	0.624	10.25	0.000	Non sig
	Extension	65.11	3.710	68.31	1.210	9.63	0.001	Non sig
	Approximation	23.22	1.821	27.32	0.844	8.65	0.000	sig
	Dimensions	16.44	0.665	19.54	0.767	7.79	0.000	sig

Presentation and analysis of the results of the post-tests of the two experimental and control groups in the research variables:

Table (4) shows the arithmetic means, standard deviations, the (t) value calculated for the interconnected samples, the level of the test significance, and the significance of the difference for the post-tests of the control and experimental groups for the variables investigated.

Variables investigated	Measuring unit	Post-(Control Group)		Post-(Experimental group)		T calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Shoulder joint angle (Degree)	High (aside)	179.4	0.632	181.2	0.932	22.17	0.000	sig
	High (in front)	178.3	0.831	176.2	2.31	26.03	0.000	Non sig
	High (backward)	44.4	0.667	41.2	0.987	12.38	0.002	Non sig
Elbow joint angle (Degree)	Drape	149.5	0.621	149.82	0.833	18.29	0.000	sig
	Extension	180.2	0.912	182.3	0.812	31.01	0.000	sig
Wrist joint angle	Drape	73.55	0.664	75.35	0.624	9.95	0.000	Non sig
	Extension	67.11	1.110	68.31	1.210	13.23	0.000	Non sig
	Approximation	29.22	0.821	27.32	0.844	12.44	0.000	sig
	Dimensions	18.12	0.622	19.54	0.767	7.65	0.000	sig

Discuss the results:

The results that were presented in Tables (2) and (3) for the tests (shoulder joint angle, elbow joint angle, wrist joint angle) showed that there were significant differences between the pre and post-tests and in favor of the post-tests for the control and experimental groups, and the researcher attributed the reason for this moral difference to the members of the group. The control is due to the exercises and exercises that were applied in the methods and methods prepared by the teacher in his educational units, as it caused the development of the element of flexibility and other abilities among students of the third stage in artistic gymnastics. Prepared by the teacher and performed by students in the educational units, the repetitions lead to strengthening some physical and motor abilities and consolidating the motor program of the learner and expanding his perceptions and concepts in order to understand the skills and their clarity, and this was confirmed "excess repetition of any work will reduce the Error rates and increases learning rates, as well as leads to a speedy withdrawal of information from memory, so the learner is given many attempts while starting to learn (Khayoun. 2002)

The results presented in Table (2) for the tests (shoulder joint angle, elbow joint angle, wrist joint angle) showed that there were significant differences between the pre and post-tests and in favor of the post-tests of the experimental group, and the researcher suggested the reason for these differences to the preventive exercises prepared using the program (imusc2), which specialized in flexibility for the shoulder joint, elbow, and wrist, and the researcher attributes this development to the effect of preventive exercises prepared by the researcher, whose main objective was to influence the improvement of elasticity of muscles, tendons and connective tissue surrounding the joints (shoulder joint, elbow joint, wrist joint). The researchers see the importance of this trait because it has an effective role in the skill performance in artistic gymnastics, and as a result of the flexibility exercises included in the preventive curriculum, in which the researcher relied on different types of flexibility, the researcher used negative stretching exercises and positive stretching exercises as well as using tools to develop flexibility, and on the other hand The researcher used dynamic exercises using stretching exercises by movement, all of which effectively affected the development of flexibility The research sample, and the results were consistent with what was " that flexibility is one of the most important qualities that an athlete must acquire, because it leads to a reduction in the possibility of muscle injury and an increase in muscle resistance". (Al-Diri. 2019)

The researcher also attributes the reason for this to the fact that the exercises of joint flexibility and muscle lengthening of the joints of the arm used by the researcher had an effective effect in developing the range of motion of the joints in the arm used for students of the third stage in artistic gymnastics in performing the required skills and this was confirmed " that stretching exercises increase the range of motion of the joints that the player needs to perform the required movements" (Hamdan and Abdel-Razzaq. 2001).

This is consistent with the study "that the practice of stretching and flexibility exercises for the joints in addition to the positive effect of developing muscle strength leads to an increase in the range of motion of the joint, as there is a direct relationship between the increase in the range of motion of the joint and the increase in the strength of the muscle groups leading to the motions of the range of motion" (Shaalan. 1992).

All agree (Shaalán. 1992), (Omran. 1998), that practicing flexibility exercises achieves lengthening and increases the elasticity of the ligaments and muscles together, and by developing these properties, the motor range expands, so attention is paid to muscle lengthening and flexibility of the shoulder joint, and the elbow. The wrist, especially for gymnastics players, is an important factor in injury prevention.

Through the above, the researcher believes that taking advantage of preventive exercises using the (imusc2) program led to an increase in flexibility, range of motion, ligament strength and elasticity of muscles around the joints in the arm used, which gives the player the correct construction of muscles in order to avoid sudden injury that may occur in the future, whether during training or competition. This is also confirmed, "that the practice of flexibility exercises regularly and gradually works to develop and develop flexibility and contributes to the prevention of injury and the need to be the most important part of physical preparation in preventive training programs" (Omran. 1998).

Conclusions and Recommendations:

Conclusions:

- The application of preventive exercises using the (imusc2) program helped in developing the flexibility of ligaments and muscles and improving the angles of range of motion for the shoulder joint, elbow, and wrist, by improving the muscular balance of the working muscle groups of the arms.

Recommendations:

- Using the exercises prepared by the researcher to contribute to improving the elements of physical fitness through the daily training and preventive unit, due to its importance in the prevention and improvement of the performance level of students.
- Implementation of preventive exercises using the (imusc2) program on a larger number of students and in various activities.

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