

The Effect Of Training Using Climbing Ropes And The Throat Apparatus On The Development Of The Locomotor Index And Some Kinematic Variables And The Achievement Of Stick Jumping For Juniors

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Abstract: The importance of researching the topic of power and the mutual actions between the body of the jumper and the stick in this activity and the nature and application of the mechanical conditions for the performance of the jump from the other side that are carried out during the performance and what it needs in terms of mastery and training, by emphasizing the workforce in the body during the performance stages, whether from the stick or The body as well as identifying the best training methods and monitoring this performance periodically to set and follow up training and develop mechanical conditions and to correct the wrong ones, to come out with the best technical performance that every player needs in order to achieve better performance.

The study aimed to prepare a group of exercises with climbing ropes, parallel and throat systems, and to know their effect on the development of the locomotor index and some kinematic variables.

The researchers used the experimental approach to suit the nature of the problem by designing one experimental group, the research sample was selected from Diyala Youth Club players for the effectiveness of stick jumping, and the research procedures included conducting photography and extracting the variables that included (starting angle, speed of departure, hips angle, approach speed) and an index was extracted Motor transport also, the application of the training program began on the research sample on Saturday 10/3/2018 for a period of 8 weeks with (3) training units per week for days (Saturday, Monday, Wednesday), i.e. a total of (24) training units, as it included The exercises using climbing ropes and the throat device, the researchers concluded that the exercises used in the climbing ropes and the throat apparatus had worked to develop the kinematic transmission index and the kinematic variables under study, which reflected the level of achievement.

1. INTRODUCTION:

It is not hidden from the people of experience and specialists and workers in the sports field the positive impact that science, technology and creativity have had in developing knowledge methods, measurement techniques and human performance in athletics, there is no doubt that such advanced knowledge of knowledge has contributed to the progress of many sports competitions, especially Athletics events.

The progress in high achievements in the effectiveness of stick vaulting (the pole) did not come about arbitrarily. Rather, it came with the adoption of correct and modern scientific methods, ideas, theories and methods that undoubtedly contributed to raising and improving the physical and technical capabilities and mechanical conditions that contribute to improving achievements in general, and the achievement of stick jumping in particular Which is full of many difficult and complex technical stages that require taking into account the mechanical conditions and mastering the technical aspects related to physical abilities and high mobility, and this gives an incentive for the trainers of this event to follow these developments, especially when working with stick jumpers for the juniors, the basis for progress in achieving this event, from Through the creation, testing and use of modern educational-training methods that help to learn technical performance in a way that serves the movement paths and the accompanying mechanical conditions in a way that enhances the skillful and physical practice and continuous communication using these means, and emphasizes the importance of repeated auxiliary exercises and methods related to technical performance in order to make an impact in the learning process. Technical stages of these activities Mechanism and its integration with the integration of physical capabilities simultaneously and optimally on the one hand, and the development of muscles working to achieve the movements of the stages of this event on the other hand, and this is what must be focused on in order to shorten the time and effort to achieve development and improvement in the level of performance and the level of physical abilities of the emerging players of this event (To Abidi: 2018: 21)

In recent years there has been a fundamental change in the biomechanical study of athletic performance of the effectiveness of stick jumping and its association with special strength training and workforce momentum training. As the focus shifted from the external description of the movement (biochemical) to an attempt to understand the internal processes associated with performance (the causes of performance), that is, the special strength and physical ability of the jumper. In order to achieve an accurate level of performance, this must include the internal interaction between muscles, ligaments, and tendons, the amounts of resistance encountered during jumping with the stick, and the extent to which the jumper is prepared for actual high performance when exposed to various resistances. As well as the mutual exchange between these internal reactions of the jumpers' body and the devices and tools used in the performance.

As a result of the nature of the stick made of fiberglass and carbon material, and its flexibility and high ability to withstand change in shape. Stick jumping is one of the typical activities that provide the field of study and the effect of these mutual forces in order to reveal the extent of their influence on the integrity of performance and the achievement of this activity.

The researcher believes that the interest in the issue of training with auxiliary tools did not take place when training Iraqi jumpers and needs a lot of development, so the issue of developing the achievement of stick jumpers requires the preparation of special training strategies that include emphasizing new approaches that play a role in achieving this achievement.

The importance of research on the topic of power and the mutual actions between the body of the jumper and the stick in this activity and the nature and application of the mechanical conditions for the performance of the jump from the other side that are implemented during the performance and what it needs in terms of mastery and training, by emphasizing the workforce in the body during the performance stages, whether from the stick or from The body as well as identifying the best training methods and monitoring this performance periodically to set and follow up training and develop mechanical conditions and to correct the wrong ones, to come out with the best technical performance that every player needs in order to achieve better performance.

The study aims to prepare a group of exercises for climbing ropes and throat apparatus and to know their effect on the development of the locomotor index and some kinematic variables.

The researchers also assume that the exercises used with climbing ropes and the throat apparatus have a real effect in developing the kinematic transmission index and some kinematic variables between the pre- and post- tests in favor of the post tests.

2. RESEARCH METHODOLOGY AND FIELD PROCEDURE:

Research methodology: The researchers used the experimental approach to suit the nature of the problem by designing one experimental group.

Research sample: The research sample was selected from Diyala Youth Club players for the effectiveness of stick jumping, and they were chosen by the deliberate method to obtain ideal characteristics and advantages and included (5) players registered with the Iraqi Central Federation for the 2017-2018 season.

Devices and tools used in the research:

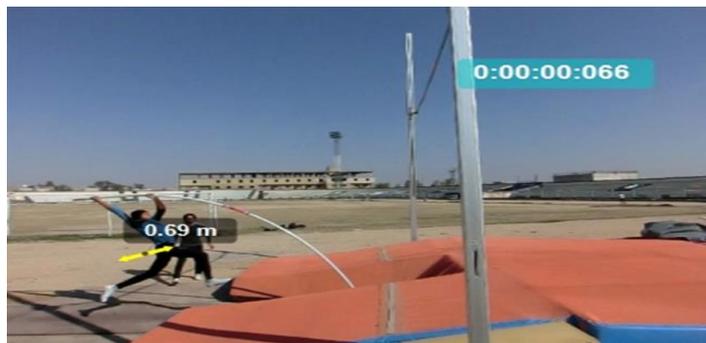
- A video camera for imaging (SONY) of Japanese origin, number 2, speed (25-1200) images per second, a computer (laptop) type hp, an electronic medical device for measuring weight and height, laser discs, a tape measure (linen) in meters, climbing ropes, Hooping device, stick jumping device, jumping sticks and wooden boxes of various sizes and heights.

Biomechanical variables and imaging procedures:

The research sample was photographed within the pre and post tests by a high-speed 2D (Casio 120 p / s) video camera. The video recordings were captured after the first camera was fixed on its bearing at a distance of 5.8 meters and a height of 2.23 meters, so that its lens was perpendicular to the player's elevation point from the right side,

As it included some kinematic variables as follows: -

1. The angle of departure (degrees): measured by the angle between the line connecting the hip point before leaving the ground, and after leaving the ground in eight images with the line passing through the hip, horizontally and parallel to the ground (note Figure 4).
2. The angle of the hips (in degree) was measured during the attachment and balling position through the angle between the line connecting the shoulder point and the hip with the line between the hip point and the knee.
3. Approach velocity (m / s) was measured by determining the length and time of the last approach step directly from the computer, since the velocity of this step represents the final velocity before the ascent.
4. Cruising speed (meters / second): It was measured by the distance traveled by the hip point from the moment it left the ground to eight images from leaving the ground and dividing this distance by its time.



- Kinetic transmission in terms of mechanical energy and flight angle (degrees / joules / kg)

This indicator was calculated as follows:

- Calculation of the total mechanical energy at the stance moment, which is the sum of each of $(0.5 \text{ mass} \times \text{the square of the approach velocity}) + \text{potential energy (mass} \times 9.8 \times \text{height m kg g the moment of fulcrum when planting the column)}$

- Calculation of the total mechanical energy at the moment of thrust, which is the sum of $(0.5 \text{ mass} \times \text{the square of the launch velocity}) + \text{potential energy (mass} \times 9.8 \times \text{height m km g moment of thrust)}$

- Kinetic transmission index = Launch angle (mechanical energy moment of stall) - (mechanical energy moment of thrust)

The result is divided by the body mass in order for the index to be (d / joules / kg), meaning the energy decrease is per 1 kg of the body. Al-Fadhli: 2010: 123) (1).

Pre-tests:

The two researchers conducted the pre-tests on Monday 5/3/2018 and the analysis was conducted to jump with the stick to extract the mechanical variables through the Kinovia analysis programs.

The exercises used

After the training program was fully prepared and the assisting work team was informed of the training program for training prepared by the researchers, preparing the stadium and training requirements, the application of the training program on the research sample began on Saturday 3/10/2018 for a period of (8) weeks with (3) training units in The week for days (Saturday, Monday, Wednesday), that is, a total of (24) training units, and it was part of the main section of the training unit, which lasted (40-45) minutes. The exercises for the research sample and their adaptation to the training loads.

As it included the exercises using climbing ropes and the throat device, as the exercises targeted the working muscles during the performance of the stick jump that could contribute to the development of the performance level of the members of the sample according to the mechanical conditions as well as the exercises to develop special physical aspects related to the stages of performing the stick jump.

Post-tests:

The two researchers conducted the dimensional tests on Thursday, 5/10/2018, after completing the implementation of the exercises, taking care to provide all the conditions in which the pre-tests were conducted.

3. PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS.

Presenting, analyzing and discussing the results of the differences between the pre and post-tests in the kinematic variables and achievement.

Table (1) shows the statistical parameters of the research variables									
Variables	Pre-test		Post-test		Differences	Differences Std	Value (t) calculated	Level of morale	significance
	A	ST D	A	ST D					
Angle of departure	22.2	2.38	31.4	1.94	9.2	0.86	10.69	0.00	sign
Hips angle	31.6	4.87	19.2	2.77	12.4	25	9.38	0.001	sign
Approach speed	7.06	0.43	7.84	0.30	0.788	0.14	10.26	0.001	sign
Cruising speed	7.76	0.43	8.34	0.32	0.58	0.09	5.667	0.005	sign
Kinematic transmissio	18.2	1.79	24.3	1.9	6.11	0.55	11	0.00	sign

n									
Achievement	3.1	0.0	3.4	0.1	0.32	0.059	5.40	0.043	sign
nt	3	9	5	4					

Table (1) shows the statistical parameters of the research variables, which indicate the presence of significant differences between the pre and post tests in favor of the post tests. The researchers attribute these differences as a result of using climbing ropes by the research sample, which included climbing and attachment exercises, lengthening and rotation exercises for a situation similar to the actual performance, and this led to Increasing the efficiency of the muscles responsible for these stages, the previous results indicated that the exercises that aimed to deepen the foundations of applying the correct movements according to their technical path by using some auxiliary means and building the necessary exercises and preparing them to improve and develop these variables and training them, according to the results of the analysis strengthened the values of these variables In a positive way and making the performance appear consistent as possible with the goal of performance, as training according to the results of the analysis and by using the proposed training methods that the sample members were exposed to was influential in developing the speed of approach and improving the good linkage between the last steps of approaching with the rise, which made the starting angle influential In ensuring that the cruising speed is not diminished and giving sufficient room for the movement of the legs and their weight A to ensure the achievement of a good position for the ball, represented in the decrease in the angle of the hips at this moment to reduce the body's own inertia, and to maintain the amount of movement gained and required to continue the body at its ideal speed after starting and getting attached to the stick, as training with the use of ropes when special exercises for these stages strengthened The player's mental ability and reviewing the motor pathways through the kinematic image that he creates in the brain as well as the corrective information (feedback) that he is exposed to in each repetition, and these repetitions worked to increase the muscular strength of the muscles working in the performance of these stages and increase the efficiency of their neuromuscular compatibility at appropriate times Between the repetitions and all these exercises led to an improvement in the movement paths, especially at the moment of linking the last steps, planting the column, upgrading and attaching to it and starting the ball, which is one of the most important stages affecting the technical performance of the jumping stick player, which inevitably affects the achievement of a good achievement, and it was necessary to There will be iterations to train the velocity of the column and perform the rise on different elevation platforms that help increase the sense of position The blood of the elevation and the increased feeling of effective propulsion at this moment

With the aim of developing mechanical variables for these stages, which are related to approach speed, cruising speed, angle, and angle between the hips and the trunk.

As for the kinematic transmission index at the moment of ascension, the index indicates the integration of the body's motor state and its harmony with all other technical movements that make up the performance of this activity, as the kinetic transmission index and its

development among the sample members indicated that the energy acquired during the approach and its preservation during The launch was one of the positive indicators that characterize the sample members, and that the decrease in the total energy at the moment of approach was ridiculed, with a slight decrease in it at the moment of launch with the development of the starting angle that is inversely proportional to it, and this indicates the development of this kinematic index that enhances the development of kinetic fluidity associated with the development of force Muscle responsible for maintaining mechanical energy values at the moment of elevation. And through the development of physical abilities for the use of auxiliary means, as the energy produced during these exercises is mostly produced anaerobically, and the goal of the exercises used is to develop the special speed, learn to sense the correct rhythm, and continue with it, so it is necessary to allocate an appropriate enough rest period to be able The player is able to maintain the desired rhythm of running during these exercises and to link correctly to the climbing process. (Khayria Al-Sukkari& Al-Sayed: 1997: 335)

The two researchers believe that the exercises applied to the members of the research sample, which focused on training the special speed, the speed of launch and the momentary push between them, has positively and effectively affected the development of these capabilities, as the special training works to achieve a new digital achievement and maintain the level in the races of repeated movement. (Al-Hadi: 2011: 260).

4. CONCLUSION:

In light of the results obtained by the two researchers, the researchers concluded that the exercises used by the climbing ropes and the throat device had worked on developing the kinematic transmission index and the kinematic variables under study, which reflected the level of achievement. The researchers recommend emphasizing the use of exercises, means and auxiliary tools according to the performance that were applied in this research when training talented and young people for their effectiveness in developing some physical and biomechanical variables, as well as the diversity in the use of modern training methods and various and appropriate training methods that work to break the monotony of the kinetic pattern of the exercises used and develop athletic achievement effectively Stick jumping, and the researchers recommend the necessity of knowing the biomechanical conditions for stick jumping from the coaches and players of this event due to its importance in the integration of physical and skill performance and success in achieving good achievement.

5. REFERENCES

- [1] Sarih Abdul Karim Al-Fadhli: Biomechanical Applications in Sports Training and Kinetic Performance, Amman, Dijla House 2010.
- [2] Khairia Ibrahim and Mohamed El-Sayed: Running Physiology for Long Distance Runners, (Part 1, Cairo, Dar Al-Maarif, 1997)
- [3] Saleh Shafi Al-Ayedhi: Sports Training - Its Ideas and Applications, (Damascus, Dar Al-Arrab and Darnour Studies and Publishing House, 2011)
- [4] Muhammad Abdul-RedhaFaleh Al-Obaidi, The effect of using auxiliary tools (educational - training) to improve some special physical abilities and mechanical

variables to accomplish stick jumping for juniors, Unpublished Master Thesis, University of Baghdad, College of Physical Education and Sports Sciences, 2014.

- [5] Muhammad Abdul-RedhaFaleh Al-Obaidi, The effect of absolute momentum training on tracial kinematic analysis on some physical and kinematic variables and achievement of stick jumpers, unpublished PhD thesis, University of Baghdad, College of Physical Education and Sports Sciences, 2018.