International Journal of Psychosocial Rehabilitation, Vol. 27, Issue 02, 2023
ISSN: 1475-7192

Training according to sensory information through visual observation in improving some biomechanical indicators of hammer throwing for Applicants

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Abstract

Feedback with a sense of movement is the basis for the picture of correct performance in hammer throwing. This leads the thrower to control the movements that occur below perception, which allows him to review other aspects of movement so that the feedback information is consistent with the picture of motor performance, which allows the thrower to perform better in situations. Competition, and this problem the researcher wanted to find solutions to through visual monitoring of the shooter's performance and reviewing it by the player and coach to identify the exact defect in performance and avoid it through repeated practices accompanied by this type of feedback. The research may require measuring some mechanical variables to demonstrate the effectiveness of using feedback through repeated and immediate visual review in correcting them. The research was applied to a sample of advanced Iraqi hammer throwers three times a week for a period of (6) weeks. Among the results of the research was the development of the instantaneous momentum at the moment of throwing, and the development of The resulting acceleration (vertical and tangential) at the moment the hammer is fired, the differences in the amount of movement between the throwing position and the final throw decrease, and the final achievement improves.

Keywords: Training, sensory, biomechanical and throwing.

Introduction

The primary goal of hammer throw players and their coaches is how to gain more information about performance during every moment of the player performing a special motor performance and how he can rely on this information to correct and implement the skill. This leads us to the importance of mental abilities and their level in the player as a key and guide to what... This player wants to practice accurate performance during training and competition. Which could help him develop his performance to remain at the highest distinguished skill level.

Visual monitoring of the stages of the motor performance of the hammer in particular may help the shooter monitor the performance with high accuracy and discover the error that occurs outside his awareness when executing this performance. This monitoring is inevitably linked to the development of sensory perception, motor memory, and the image of the skillful motor action that he possesses, which are considered among the most important factors that can They are able to correct and execute the skill well, and this image is linked to the goal of skill performance, which requires the player to control the body's position during the main section in particular, and this comes from achieving an appropriate angle for the inclination of the torso and emphasizing the extension of the arms. All of these movements require feeling the amount of force required to achieve integration in The instantaneous speed and the hammer's final acceleration required at the moment of launch.

These principles should not be realized by the player except with technical visual aids that help him discover the error that he cannot perceive and try again by focusing on correcting that error, whether this error results from a wrong angle in one of the joints, or failure to use the required force with the working muscle. Similar to many factors. On this basis, the idea of this study came to be that these errors cannot be realized by the player without careful observation and analysis of the data related to the performance in order to modify the parts of the body responsible for them during the application of the performance again, and to understand this we must understand how the movement can be controlled and controlled or what can The player must do in order to master the correct performance.

A question arose for the researcher, as he is a former international player and coach of national athletics teams, about the possibility of what the hammer thrower can add to his skill performance, or what he can learn to complement his performance even though he represents the highest skill level in this event, as we find that our throwers in particular do

not occupy An advanced level, whether Arab, regional or international, so the researcher wanted to delve into studying this problem with a careful study, which consisted of developing a list of goals that must be known in order to give complete information about the extent of harmony in the appearance of movements according to their sections or not among Iraqi hammer throwers, through self-analysis and observation. Visual and discovering performance errors that occur without the player's awareness, in light of these goals, correcting skill performance and enhancing information about the performance of the stages of skill performance and what it requires of careful monitoring and analysis of what happens in the sections of the movement and what the player feels about whether it was completed in an integrated manner or not, especially information about what happens in the sections of the movement. Without perception, which the player cannot feel without resorting to visual observation to ensure that the error occurring in the performance is detected by himself and with the help of the coach and modified accordingly, to ensure the development of control and high accuracy in this performance and to achieve a good skill level under ideal mechanical conditions, and on this basis the researchers considered this topic to be It constitutes a real problem in the motor performance of hammer throwers, which could give limits to their levels in reaching international levels with this effectiveness.

One of the important characteristics of outstanding skill performance is the availability of accuracy in performance, "as the player can perform a movement with a high level of compatibility and fluidity, but fail to achieve the goal of this movement" ,[1] the most important of which are the sense of direction, distance, timing, and the amount of force required and ability. On controlling and controlling muscular action .[2] Control is also one of the important factors in outstanding skill performance related to accuracy, as control means the skill performance strategy, and it means studying the motor situation in all its dimensions before judging the type of performance required for the particular situation and how to choose among other skill alternatives. The success of the performance depends to a large extent on the player's intelligence in choosing the type of performance from among the possibilities that represent his motor repertoire. [3]

The research aimed to develop a system for real-time visual monitoring of the hammer throwing skill of applicants. And to identify the effect of using information analysis without perception in developing some mechanical conditions (throwing and throwing phase) for applicants in hammer throwing.[4] The researcher hypothesized that there were significant differences with statistical significance between the results of the pre- and post-tests in some biomechanical variables for the two stages of throwing (pairwise focus) and the final throwing. And the presence of significant differences with statistical significance between the results of the pre- and post-tests and the final achievement.

Methodology and procedures

The researcher used the experimental method. The research was applied to the (6) national team players in the hammer throw for the 2021 season, at the age of (23.65 and ± 1.7) years and at the training age (8.81 and ± 2.5) years, and their achievements in the hammer throw (46.70 and ± 5.65) meters, and for their heights. (1.77 and ± 4.30), meters, and their weights (88 and ± 6.8), kg.

The following mechanical variables related to immediate feedback and self-corrections were identified:

1. Instantaneous payment when throwing.
2. The final result of acceleration of the hammer.
3. The turning radius in the last stage.
4. The distance between the feet at the last moment of throwing.

These variables were measured directly through video recording and the (kinvoei) program after a camera was placed to the right of the player at the moment of throwing, at a distance of 7.8 meters, and a camera from above the player, at a distance of 4.75 meters, to ensure that all players' movements were captured within the three axes of movement. In addition to filming the player's performance with a regular video camera.

The researcher relied on a strategy to monitor the player, which was based on photographing his performance when he performed the skill performance, and then presenting each attempt to him directly after completing the performance, so that each player could evaluate his performance and discover the error of his own and with the help of the coach to correct that error in the next attempt, and the monitoring continues with a number of attempts. By asking the player to do his own analysis, make a decision, and give suggestions about the performance for correction until the player is convinced that this error has been corrected. The role of the coach is to help the player analyze his performance and decide what he will do next, then direct him to repeat the performance with the correction information, and in particular to ask him. His sense of skill, in order to use the image of the performance that he stores in correcting the performance in the subsequent attempt, which he cannot realize except through observation (beyond perception), and the development of the player's performance is helped to solve his problem and what he feels, whether the performance was done incorrectly or correctly, and his feeling of the error so that the coach can Of helping him. From the above, the monitoring and analysis strategy for each player is as follows:

1. Detecting the error: The player tries to discover the error by watching his motor performance and tries to imagine how to avoid the error by choosing the best positions in the corners of his body to achieve a new correct attempt later.
2. After discovering the error: Focus on the player, what he wants to do in the next attempt after discovering the error and what he can change in performance in order to make the new attempt correct.
3. The nature of the information used: The coach intervenes to help determine the type of corrections in motor performance and the procedures that the player uses to implement the new motor task.
4. Preparing for the next attempt: Helping the player use the basics of performance and error correction in order for the player to work on correcting his attempts himself and giving an answer about his feeling about the performance for each attempt after watching the performance after each attempt. This helps the player in applying the correct information and what to focus on. For his attempt to be very successful.

The player began reviewing his performance through the display screen with the coach, and the player decides to take the correct approach after each review by applying the skill according to his understanding and forming the correct idea about the performance in order to apply it in the next attempt. When he returns to the display screen, he is asked to inform him of whether his feeling about the performance was correct and in the form. What is required or not, and the review is done after each performance and determines where the error occurs, as the error may be in using the force exerted and which muscles, in the player's opinion, did not give enough propulsion in an optimal and effective manner, and the player tries to sense the error he made in each attempt and gives self-feedback. necessary for himself, with the help of the trainer to correct that error, and to review the changes that actually occur in performance during ten attempts (repetition), for each skill in each training unit. This work was done at a rate of three times a week, within the main section of the training unit.

The experiment was implemented in the period from 8/15/2021 until 10/4/2021, and this program continued to work in accordance with the training programs for the national team in hammer throwing. These programs are implemented for a period of (7) weeks at a rate of three units per week, so the number of educational units is (21). Skilled educational training unit. The educational training units emphasized the technical stages, linking them to the main throwing position and the final throwing.

Results and discussions

Table 1. Shows the mean and standard deviation of the differences and the calculated and tabulated (t) values in the pre- and post-tests of the research variables

Variables	Pretest		Posttest		Mean Diff.	Std Diff.	(t) calculated	Error level
	Mean	Std	Mean	Std				
Instant payment	3015	342	3251	267	236	15	15.72	*0.014
Acceleration achieved	364.7	98.13	373.5	67.12	8.8	2.2	4	*0.003
Turn the rotation	2.09	0.07	2.15	0.5	0.06	0.013	4.55	*0.00
The distance between the feet	0.65	0.11	0.43	0.03	0.22	0.036	6.1	*0.011

Table (1) shows the results of the differences in mechanical variables between the pre- and post-tests. The results showed that there were significant differences in favor of the post-tests in these variables.

The researcher attributes the reason for the development of these variables by the research sample to the influence of the members of this group on the strength of information and their expectations of what they see, as Roberton and Harvelson 1984 indicated that the most important information that must be known from watching is that "watching allows the player to know what he is looking for according to his experience in watching, which "It allows him to see and feel the appropriate information and provides a good basis for collecting information about the person's movement performance situations",[5] which is adopted in the training curriculum, which makes the momentary push made by the athlete at the final push phase improve according to continuous correction and monitoring of the performance of each A member of this sample, and on the other hand, this development is the reason for achieving the best conditions for effective propulsion performance and achieving the final acceleration, which is the squared sum of both the radial acceleration and the tangential acceleration, as this variable has developed significantly as a result of continuous corrections based on repeated monitoring information of the attempts made by the sample members and conducting Appropriate correction and feeling of exerting appropriate force.[6]

Through the sample members watching their movements during the application, the researcher focused on two basic principles: the first is directing attention to the thing that the throwing player is observing. The second is how to monitor (monitoring plan). Therefore, these two principles ensure that viewing is regular and decisive in collecting important

information about performance. Schalhoff (1993) believes that the distinctive characteristics of each skill must be identified in as accurate a manner as possible and stored in the mind, and the player must understand that this information is affected by the deflection of the body and taking the correct preparatory position and the subsequent angles to generate the desired movement in the upper part of the body in an effective manner. And efficient,[7] and on this basis there was a development in the radius of rotation with a relative increase in its length, and this increase is directly proportional to the increase in tangential speed or tangential acceleration, according to the results that appeared in the resulting acceleration.

From the above, researchers believe that the method of working according to observation and self-kinetic analysis of the stages of hammer throwing performance works to improve the technical aspects and the ability to perceive movement and correct the movement of the arms, torso and legs during the throwing position and pushing for the final throw. Therefore, this type of practice is of great benefit if its use is mastered. In developing the mechanical conditions for performing the hammer throw, which are necessary and important in achieving good performance.

In addition, the distance between the feet at the moment of throwing has evolved in terms of reducing it, which ensures that the player obtains the best position that allows him to perform an effective rotation at this moment, and this development requires continuous training in a way that is compatible with the level of activity practiced, as this positively affects the individual's ability to reduce of the amount of energy expended to achieve the goal of the movement with a performance characterized by harmony and balance and with as few errors as possible" ,[8] which is represented by the ability to apply rapid movements such as the movement of the feet, which are indispensable in quickly completing the required skill, as the movements of the feet have become necessary for the success of an effective throw as well. About the main role.

The plan followed by the researchers, using continuous monitoring to discover errors and continuous correction, helped the sample members to highlight errors and shortcomings in performance and then give the necessary treatments to avoid weak points in performance. Some studies have confirmed the existence of two different methods that we observe in performance, as the two scientists (Hay and Reed) used these two methods, which are the "sequential method" and the "mechanical method," as mental images of the body's positions in each stage of the movement can be used in succession. It is used more Trainers provide an eye-mind image of the desired movements and movement phases for comparison with actual performance .[9]

This helped in achieving control of body mass deviation and control swinging the arms while rotating in the final stage and performing the performance with the required accuracy and with good control of the movements of the body parts, as the goal of repeating and monitoring the attempts was to determine strength and weakness in the performance.

Conclusions

1. Continuous monitoring to collect information about performance effectively contributed to the development of instantaneous propulsion and final acceleration of the hammer.
2. The integrity of the numbers among the sample members was related to achieving the best radius of rotation at the moment of final thrust.
3. The subjective motor analysis based on observation worked to improve the correction of the work of the legs during the final moment of the push.
4. Continuous monitoring and analysis of sub-perceptual information about the movements performed helped transmit sensory information and respond to this information by giving instructions about what is required to be performed in the motor cells that perform the performance.

Recommendations

1. Directing trainers to the necessity of using accurate scientific methods using photo recording devices to monitor the performance of hammer throwing skills.
2. Emphasis on developing the sensory-motor abilities of the hammer throwing player, especially in training junior teams, in addition to the necessity of developing special tests to measure these abilities and the extent of their development.
3. It is necessary to develop training curricula to develop sensory-motor (special) abilities.
4. The necessity of conducting similar studies and research on other samples from women's and men's teams, in addition to conducting comparative studies to identify sensory-motor perception between throwing players and other sports.

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