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Some kinematic variables to find the best position to stand ready for young lifters and its relationship to the accuracy of the snatch

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Abstract

The sport of weightlifting is currently witnessing a great development in achievements as a result of the development of physical and functional capabilities through Opening up the field of weightlifting to scientific researchers with their various scientific specializations, as it actively contributed to the development of achievement and the upgrading of the capabilities and physical, motor and mental qualities of quadruples and directing these capabilities towards the best in performance and the high level of achievement and the investment of effort and time during training. The importance of the research comes from the bio-kinematic variables related to the stand-by and thus reaching the correct ideal model by achieving the bio-kinematic requirements. The research problem here is what the standby mode contributes to achieving the main factors in lifting weights and comes through the relationship with the kinematic variables and thus reaching the correct ideal model for the standby mode by achieving the biokinetic requirements that give us quantitative estimates in the values of the variables to avoid the weakness that occurs in the standby mode. Through the researcher's follow-up of developments in this game and watching many local tournaments, the researcher found that there is a weakness in the standby mode. There is a relationship between some kinematic variables and the readiness pause, and to identify the contribution ratios of kinematic variables and the readiness pause. As for the hypotheses of the research, identifying the values of some bio-kinematic variables and their relationship to the standby pause, there is a significant correlation between some bio-kinematic variables and the standby pause. As for the field research procedures, the researcher used the descriptive approach as it is the most appropriate way to solve the research problem, and the sample included (2 lifters) from Al-Amara Club (3 lifters) from Al-Kut Club with a weight of (69) kg. As for the conclusions, there are significant contribution rates for some kinematic variables, including the angle variable. The knee where the biggest contributor in the grabbing phase. As for the recommendations, the trainers must familiarize themselves with the foundations and rules of biomechanics and kinetic analysis in addition to other sciences so that they can have the correct training according to the scientific foundations and the correct information.

Keywords: Kinematic, lifters, accuracy, the snatch

Introductions

The sport of weightlifting is currently witnessing a great development in achievements as a result of the development of physical and functional capabilities through the modernization of training methods for quadruples, which led to breaking records one after the other, especially in recent times, which requires those interested in this sport to keep pace with the development taking place at international levels. By following updated training programs for the coach and the player, priority is given to the type of modern training and the best method, and the openness of the weightlifting field to scientific researchers in their various scientific specializations has effectively contributed to the development of achievement and upgrading the capabilities and physical, motor and mental qualities of quadruples and directing these capabilities towards the best in performance and level High achievement and investment of effort and time during training, and these efforts have yielded great achievements at the international level, so we see champions achieving miraculous numbers, but they do not last long until we see that they have become from the past as they were broken with new numbers and lifts with greater weight. Given the specificity of the activity in terms of the implementation of the lifts and the high speed of the movement, which is one of the most important features of this sport, the kinetic analysis had an important aspect in analyzing,

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identifying and correcting the most important points of weakness and strength during the stages of performance by retrying the slow show and using Technology is to determine the kinetic paths of certain points on the body or the kinetic path of the weight, or a set of angles for the body is measured and determined based on imaging performance with high-speed imaging devices, etc. By achieving the kinematic requirements that give us quantitative estimates of the values of the variables to avoid the weakness that occurred in the standby pause.

In addition to the fact that the physical measurements of the lifters are one of the reliable determinants in changing the type of performance and its formation, the lifters with a relatively longer trunk compared to the rest of its body parts are characterized by a Performance differs from the normal trunk holder or comparatively shorter. Likewise, the owner of the long arms tries to take a distinctive movement style following this feature of his, such as working on holding the iron bar as wide as possible for the weight pole.

Research problem

The interest of those in charge of the sport of weightlifting came to young age groups to achieve accurate balance in the mathematical achievement calculations and predict the physical and physiological capabilities of athletes, and here the motor performance in weightlifting depends on the principle of economy in employing forces to take positions that overcome the resistance of gravity and gravity to achieve maximum balance The path of the weight is closer to the body of the lifters, which is known as the proper motor path (Shehadeh, 2013) [14] Wajih Mahjoub defines it as “an imaginary line that draws the movement skill from its beginning to its end through marked points on the body, in addition to the center of gravity of the body and the tool.” Luay Al-Sumaidaie adds, “The path gives us a (Mahgoub, 1990) [13] schematic form that represents the shape of the movement on which the various points of the body lie, and the length of the path shows us Point movement distance (Al-Sumaidaie, 1987) [6] Wadih Yassin Al-Tikriti confirms that "through the curve of the movement path of the weight column, we can judge the extent of the mastery of the weightlifter in the art of performance in a scientific manner and the extent of the impact of the exercises performed by the weightlifter to develop the art of his performance (Al-Tikriti, 1985) [7] Most of the researchers emphasized the importance of analyzing the motor path of the different activities of the coach's work, as Talha Hussam El-Din stated, "The motor analysis of skills gives the coach a broad idea of the nature of the performance and the players' mistakes so that these errors can be addressed immediately." (El-Din, 1993) [9] Therefore, the standby state is considered one of the most important factors in lifting weights and comes through the relationship with the bio-kinematic variables, thus reaching the correct ideal model for the standby state by achieving the bio-kinematic requirements that give us quantitative estimates in the values of the variables to avoid weakness in the standby state. Through the researcher's follow-up of developments in this game and watching many local tournaments, the researcher found that there is a weakness in the standby mode.

Search Amis

1. There is a relationship between some biomechanical

variables and the readiness pause.
 2. To identify the percentages of the contribution of the kinematic variables and the readiness pause.

Search hypothesis

1. Identify the values of some bio-kinematic variables and their relationship to the standby
 2. There is a significant correlation between some biomechanical variables and the readiness pause.

Research areas

1. The human field: two quartets from Al-Amarah Club and three quartets from Al-Kut Club.
 2. Temporal domain: the period from 1/2/2023 to 1/7/2023
 3. Spatial field: the two halls of the Majidiyah Youth Center and the Kut Sports Club for weightlifting.
 4. Research methodology and field procedures

The researcher used the descriptive approach in the manner of studying the correlational relations, as it is the most appropriate method to solve the scientific research problem. (Hamdan, 1989) [12].

Materials and Methods

Research community and sample

The research sample consisted of five quadruples for the youth category weighing (69 kg), and they were distributed (2) from Al-Amarah Club and (3) quadruples from Al-Kout Club. The researcher made some measurements, including the length of the four lifters in addition to the real weight. The researcher has homogenized the sample using the coefficient of variation, which is shown in Table No. (1)

Table 1: It shows the arithmetic means, standard deviations, and coefficient of variation of real height and weight

T	Height	Real weight	Leg length
1	170 cm	68 kg	38 cm
2	171 cm	67 kg	40 cm
3	170 cm	65 kg	39 cm
4	165 cm	67 kg	37 cm
5	163 cm	66 kg	36 cm
Arithmetic mean	167 cm	66 kg	38 cm
standard deviation	3.56	1,140	1.58
coefficient of difference	1.59	0.50	0.707

Exploratory experience

An exploratory experiment is "a preliminary experimental study that the researcher conducts on a small sample before conducting his research, with the aim of selecting research methods and tools." (Al-Saadi, 1988). The researcher conducted the exploratory experiment on 1/2/2023 in the hall of the Majidiyah Youth Center to ascertain the following:

- Ensure that the tools for the experiment are available.
- The appropriate height for the camera from the ground and the distance the camera is from the lifters.
- Do not know how much lighting is appropriate in the hall.
- Knowing the level of performance of the assistant work team for its required duties.
- The time required to complete the experiment.

The main experience

The main experiment was conducted for the period from 5/1/2023 to 7/1/2023 in the halls of the Majdiyah Youth Center and the Al-Kout Sports Club for weightlifting. The sample included (2 lifters) from Al-Amarah Club (3 lifters) from Al-Kut Club weighing (69) kg, where (2) video cameras were used. 1.5 m, through which the quaternary variables were identified.

Means: Spss version 22 was used

- Arithmetic mean
- standard deviation
- coefficient of difference
- The calculated F value

Results and Discussions

Table 2: It shows the values of the arithmetic mean and standard deviations of the biomechanical variables at a stage before the weight grab and the grabbing stage

T	Kinematic variables	The starting stage before you grab the weight		Gravity phase	
		The middle	Deviation	The middle	Deviation
1	The angle of the ankle joint	77,400	5.17	85.21	1.92
2	Knee joint angle	85,200	1.92	99.80	5.20
3	Hip joint angle	44,200	2.94	64.40	4.30
4	Torso tilt angle	00-43	54-2	800-50	86-2
5	Shoulder joint angle	51.00	1.58	49.00	1.58

The process of transferring the weight from rest to motion requires a motor action performed by the weightlifter, which means that the standby mode ends from the moment the weight is extracted and overcoming inertia, that the process of lifting the weight at once without stopping from the bottom up (3,109) Where you need high speed in addition to great strength, and this was confirmed by Muhammad Jassim during his study that "it takes less than (3-4.5 seconds) to perform the complete lift without calculating the preparation time for the lift (Fadel, 2009) [11].

The angle of the feet should point outwards (15 degrees), and this leads to a stable and comfortable position for the quadriplegic. (Al-Sudani, 2002) [5] This was confirmed by (Saad, 1998), the best position of the lifters and its semi-stable (Al-Dulaimi, 1998) [1]. The joints of the metatarsals are directly under the weight bar. (Al-Tikriti, Learning the Olympic Lifts in the Reverse Method from the Partial Method, 1999) [9] It is preferable to use the wide distance between the two fists in the snatch lift, although it is the most difficult to hold the ba (Al-Obeidi, 2001) [2].

The angle of the ankles is a large angle since the work of the ankle is stability and equilibrium in the standby position, and the movement of the ankle joint is minimal, as it is mentioned that the angle of the ankle ranges from (49-75) in the snatch, and (Al-Tikriti, A study of the relationship

between some (biomechanical) variables in the snatch, 1993) [7] this is what appeared in the research sample, but it was slightly greater than the general average For the angle of the ankle and this affects a certain way. Numerous studies have proven that the angle of the knee joint in the snatch raise ranges between (45-105°). The angle of the hip joints ranges between (35-54 degrees), while the angle of the torso ranges between (22-60 degrees). (Al-Obeidi, A comparative study of some kinematic variables between the tracks of the two ends of the weight bar in the Olympic lifts for men, 2001) [2] And here comes the greater role of the knee angle because here, the lifters tries to enlarge the knee angle to extract the weight from the ground, and through that, the column of weight is closer to the centre of gravity of the lifters. As for the work of the hip, it is less in this stage because the distance of the stage is short, in which the work of the hip does not appear, so the work of the hip is in the stage that comes after this stage, which is the stage of the first draw, and thus the role of the trunk does not appear compared to the stages that follow. As for the angle of the shoulder, it decreases because the role of the arms is to hold and not to lift. Likewise, the lifters tries at this stage to bring the pole of gravity closer to the centre of gravity of the lifters, and thus the angle of the shoulder decreases. This is what we saw in the research sample.

Table 3: Shows the most important biomechanical variables and their contribution percentage

T	Kinematic variables	Link	Contribution percentage	The calculated F value	Significance level
1	The angle of the ankle joint after lifting the weight	0.621	0.20	345 .5	1 3 0.0
2	The angle of the knee joint after lifting the weight	77 0.9	0.920	76 7.0	57 0.0
3	Hip angle after weightlifting	704 0	50 .0	938 . 5	051 . 0
4	The angle of the shoulder joint after lifting the weight	0.442	0.380	3,010	0.015

It is clear from Table (3) that the angle of the ankle joint after weight extraction contributed by (0.20), which is a reasonable percentage since the ankle joint has less range of motion than the joints of the body, and that is why the contribution percentage is less in random terms due to the small number of sample members in the biomechanical analysis when comparing the value of (F) calculated by the tabular value of (5.345) at the level of significance (0.031), while the contribution percentage became (0.977) the highest contribution. The angle of the hip joint after

extraction from the ground, in addition to the previous variable, and the percentage of contribution was significant when comparing the value of (F) calculated with the tabular value of (5.937) with a level of significance (0.051), while the percentage of contribution became (0.50) after adopting the variable of shoulder angle with the ground after extraction The weight of the contributing land is small, but with a random significance when comparing the value of (F) calculated with the tabular value of (3.010) at the level of significance (0.015).

Conclusions and recommendations

Conclusions

1. There are significant contribution ratios for some kinematic variables, including the knee angle variable, where the largest contributor is in the extraction stage.
2. The role of the arms is to hold the iron bar only in the grab stage.
3. The shoulder angle decreases in the snatch phase to bring the barbell closer to the centre of the body of the lifter .

Recommendations

1. The necessity of familiarizing the trainers with the foundations and rules of biomechanics and kinetic analysis in addition to other sciences for them to be able to properly train according to the scientific foundations and the correct information.
2. Emphasize the importance of the knee and hip angle in the grab phase.

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