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RELATIONSHIP OF TIME OF DROP UNDER SQUAT CLEAN WITH THE SELECTED KINEMATIC VARIABLES

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ABSTRACT

The main purpose to conduct the study was to record the relationship between linear kinematics and Angular kinematics of time of drop under Squat clean at moment stance and final Squat clean and the performance of All India University weight lifters. The range of age was 17-25 and the subjects were selected randomly from the concerned groups and five weightlifters were made to perform Squat Clean. Kinovea software version (0.8.25.) was used to measure the clean and in analysing different angles of the body during that time and the two-dimensional body movements were captured at 1000 Hz. Four different processing approaches were used to determine the angular and linear kinematics variables. For comparing the kinematic variable and the performance the Pearson correlation moment technique was imported to collect the data. Also, it was noticed that when mean differences of Weightlifters were compared it was found that there was no significant difference between the different linear and Angular kinematic variables and the performance.

Introduction

Biomechanics is very helpful in improving the performance of sports or activities where the process is more important than body structure or physical strength. Since biomechanics is actually a science of the process of movement. Biomechanics research and sports techniques are sometimes lacking in the wake of the natural changes in sports. Athletes and coaches

constantly try new things. Biomechanics students may be surprised to find that there are often limited biomechanical studies in many techniques in many popular sports. The sheer number of techniques, their diversity and the high levels of innovation and innovation often overwhelm biomechanics research resources. The part of biomechanics in accomplishing superior can't be disregarded, since it is the main logical field which assists with recognizing the issues in performing method definitely. There are essentially two strategies by which engine aptitudes can be dissected. They are the subjective and quantitative strategies, rapid moving film for precision has been utilized seriously to inspect in extraordinary subtleties of the developments of the body which happens excessively quick for the natural eye to identify. From multiple points of view of the first class sports preparing and research organization around the globe, power applied during high bore games, while examination tests have been done a lot to improve our comprehension of developments and the exhibition of the tip top competitors, the investigation task looked by the mentor are prevalently subjective in nature.

In the technique of clean in weightlifting, the lifter works to gain control over a bar that has effectively been launched into the air during the pull. The faster the lifter's leg regain contact with the floor and faster the lifter assumes position in which he/she is able to receive force, that able the lifter will be to catch a bar so launched. Rapid movement under the bar can be facilitated by a conscious effort to lower the body quickly. In the clean the lifter needs to think of pulling himself under the bar once the squat under has begun. Amongst the variety of techniques used by the top lifters minimal bar drop is one of the most important one but is equally harder to detect

With the advent of high quality video cameras at reasonable cost, relatively sophisticated methods of techniques analysis are available to the average trainee. Dr. john Garhammer, a professor of biomechanics recommends that the video camera be placed to the side of the platform at its centre (front to back). The camera is set at the height of the average lifter's waist and place down a tripod. The camera is adjusted so that the screen displays the lifter's feet and the bar is at its highest point overhead. This is the optimal position for analyzing bar trajectories and the other aspects of bar movement that will be very useful for many coaches. The camera should be level and pointing straight towards the platform from its position and clearly focused.

Kinovea Software Program is video investigation programming committed to brandish. It targets principally clinical experts, the mentors and competitors. The upheld documents are shown. You can spare the recordings effectively and access it later out of luck. The video can be examined in moderate movement so the video can be seen by outline by outline. Lines and bolts can be included the video with the drawing apparatus. At the point when recordings are stacked, you can hinder their playback speed for the investigation of movement by utilizing the speed cursor, and determine a working zone to make the route cursor more exact and play out a superior examination

Delimitations

1. The study was delimited to five male weight lifters of All India Inter university Weightlifting competition of L.N.I.P.E. Gwalior.
2. The study was further confined to the squat clean technique.
3. The study was also delimited to the following selected kinematic variables-

A. Angular kinematic variables (Initial instance, Moment drop under & Final Squat clean)

- Right ankle joint
- Right knee joint
- Right hip joint
- Right shoulder joint
- Right elbow joint

B. Linear kinematic variables

- Height of center of gravity of the subjects during initial stance, drop under & final squat.

C. The study was further delimited only to the relationship between selected kinematic Variables with drop-under time in squat

Hypothesis

Based on expert opinion, Scholar's own understanding of the problem & research findings-

1. It was conjectured that there might be huge relationship between the time of drop under and the selected angular kinematic variables in the moment initial stance in squat clean.
2. It was conjectured that there might be huge relationship between the time of drop under and the selected angular kinematic variables in the moment drop under stance in squat clean.
3. It was conjectured that there might be huge relationship between the time of drop under and the selected linear kinematic variables in the moment drop under stance in squat clean.

Significance of the study

In the field of sports & games every sportsman tries to do all that is within his capacity to enhance performance. It is not enough to put in maximum effort but more important is the fact that minimum effort is used efficiently so as to gain the maximum output possible from the same effort.

1. The study may serve as a biomechanical model for improving the crucial drop-under phase enabling teachers of physical education & coaches to enhance the performance of trainees.
2. The study may provide knowledge to the students regarding the procedure related to the analysis of various angles to be found out in human movement.
3. The study may also help the coaches to analyze the technical faults.
4. The study may also help the weightlifters to understand & analyze their technique & further make necessary corrections to have better performance.

Selection of subjects

Five primary between college members in weight lifting of 18 to 25 years old, who had partaken for Lakshmibai National Institute of physical instruction, Gwalior, were chosen as subjects for this examination. Since the subjects had been going through preparing for impressive period, thusly it was viewed as that they gangs great degree of method. The reason for the investigation was disclosed to all the subjects and encouraged to put their best during every preliminary and had taken an interest enthusiastically.

Statistical Technique Employed

To find out the relationship of selected biomechanical variables and time of drop under in squat clean was calculated by using person's product moment correlation. All the information were examined by measurable bundle for Social Science (SPSS) VERSION 20. For testing the degree of importance was set at 0.05.

Table – 3

Relationship of selected angular kinematic variables with the time of drop under in squat clean at moment initial stance

S. NO.	Variables(Unit)	Mean (Degrees)	Coefficient of correlation(r)
1.	Right Shoulder Joint(Deg)	42.60	.685
2.	Right Elbow Joint(Deg)	181.20	.026
3.	Right Hip Joint (Deg)	58.40	-.090
4.	Right Knee Joint(Deg)	103.00	.023
5.	Right Ankle Joint(Deg)	89.00	.628
6.	Height of C.G of body(Cm)	.81.60	-.364

Table 3 unmistakably uncovered that the determined estimation of connections in all the factors were not exactly the organized estimation of (n-2) for example r(3) 0.878 at chose level of hugeness, along these lines, the chose precise kinematic factors at the choose second have demonstrated irrelevant relationship with the hour of drop under in squat clean.

The relationship of chose precise and direct kinematic factors of second drop under with the hour of drop under in the squat clean is given in Table 4.

Table – 4

Relationship of selected angular & linear kinematic variables with the time of drop under in squat

Clean at moment drop under

S. NO. (r)	Variables(Unit)	Mean	Coefficient of Correlation
1.	Right Shoulder Joint(Deg)	17.60	.184
2.	Right Elbow Joint(Deg)	90.80	-.242
3.	Right Hip Joint(Deg)	164.20	-.117
4.	Right Knee Joint(Deg)	130.20	-.927
5.	Right Ankle Joint (Deg)	110.80	.066
6.	Height of centre of gravity of body (Cm)	.46	-.906

Table 4 obviously uncovered that the determined estimation of relationships in all the factors were not exactly the classified estimation of (n-2) for example r(3) 0.878 at chose level of criticalness, accordingly, the chose precise kinematic factors at the chose second have indicated immaterial relationship with the hour of drop under in second drop under of squat clean.

Table – 5

RELATIONSHIP OF SELECTED ANGULAR & LINEAR KINEMATIC VARIABLES WITH THE TIME OF DROP UNDER IN SQUAT CLEAN AT MOMENT FINAL SQUAT STANCE

S. NO. (r)	Variables(Unit)	Mean	Coefficient of Correlation
7.	Right Shoulder Joint(Deg)	216.20	-.008
8.	Right Elbow Joint(Deg)	28.80	-.389
9.	Right Hip Joint(Deg)	64.40	-.200
10.	Right Knee Joint(Deg)	51.20	-.286
11.	Right Ankle Joint(Deg)	109.20	.158
12.	Height of centre of gravity of body(Cm)	.46	-.026

Table 5 unmistakably uncovered that the determined estimation of connections in all the factors were not exactly the arranged estimation of r (n-2) for example r (3) 0.0878 at chose level of essentialness, thusly, the chose precise and straight kinematic factors at the chose second have demonstrated inconsequential relationship with the hour of drop under in definite position of squat

Discussion of findings

As shown by the table 3 that none of the selected angular kinematic variables like angle of shoulder joint, elbow joint, hip joint, ankle joint showed any significant relationship at 0.05 level of significance at the

moment initial stance. Thus it may be that the starting position of a lifter does not determine the time required to get under the bar after the second pull in clean. To the scholar's understanding weight lifters while executing the lift should have proper stance and grip so that they can hold the weight as quickly as possible.

Table 4 also reveals that none of the selected angular kinematic variables like angle of shoulder joint, elbow joint, hip joint, ankle joint showed any significant relationship at 0.05 level of significance at the moment drop under. Thus it may be that the position of moment drop under does not determine the time required to get under the bar during the second pull of clean.

Similarly as shown by the Table 5 that none of the selected angular kinematic variables like angle of shoulder joint, elbow joint, hip joint, ankle joint and linear kinematic variables like height of C.G. of the bar, height of C.G. of the body at the moment drop under stance showed significant relationship at 0.05 level of significance. Thus it may be that the squat clean position of a lifter does not determines the time required to get under the bar after the second pull in clean even though a proper squat position of a lifter may help the lifter to effectively balance the weight lifted. Weight lifters while descending under the bar should have proper body positioning of the body along with the C.G. of both bar and the body so that they can descend under the quickly to hold the weight.

Amongst the variety of techniques used by the top lifters minimal bar drop is one of the most important one. Rapid movement under the bar can be facilitated by a conscious effort to lower the body quickly. In the clean the lifter needs to think of pulling himself under the bar once the squat under has begun.

In the technique of clean in weight lifting, the lifter works to gain control over a bar that has effectively been launched into the air during the pull i.e., the faster the lifter's leg regain contact with the floor & the faster the lifter assumes a position in which he or she is able to receive force, the able the lifter will be to catch a bar so launched. However the above findings indicated that the selected linear and angular kinematic variables at the selected moments may not be the determining factors for an effective drop under time.

Instead linear kinematic variables such as maximum vertical displacement and drop displacement of the bar and maximum vertical velocity of the bar might be more of the deciding factors for an effective drop under time. The findings of the study may be attributed to small sample size selected for the study and because of unavailability of sophisticated equipment. Moreover the performance related to the skill of squat clean relies on much more viable contributing parameters apart from the selected kinematic variables selected for the study. Further the insignificant findings may also be attributed to poor skill level of the subjects selected.

Discussion of hypotheses

Total three hypotheses were formulated in the beginning of the study in which:

1. The first hypothesis was that there will be significant relationship between the time of droop under and the selected angular kinematic variables in the moment initial stance in squat clean. Since all the selected angular kinematic variables showed insignificant relationship in the moment initial stance the hypothesis was rejected.
2. The second hypothesis as stated earlier was that there will be significant relationship between the time of drop under and the selected angular kinematic variables in the moment drop under stance in squat clean. However, the results showed no significant relationship between the times of drop under with selected angular kinematic variables rejecting the hypothesis.

The third hypothesis as formulated at the beginning was that there will be significant relationship between the time of drop under and the selected linear kinematic variables in the moment drop under stance in final squat clean. Since, the results of the study indicated no significant correlation between the time of drop under and the selected linear kinematic variables in the moment drop under stance in squat clean the hypothesis stated earlier was rejected.

Conclusions

Based on the analysis and within the limitations of the present study, following were the conclusions drawn:

1. All the selected angular kinematic variables showed no significant relationship with the time of drop under in squat clean in weight lifting at both the selected moments.
2. All the selected linear kinematic variables also showed insignificant relationship with the time of drop under in squat clean in weight lifting at the moment under phase.

Recommendations

Based on the conclusions drawn in this study, the following recommendations have been made:

1. A study may be undertaken with large number of subjects and variables contributing to the time of drop under in squat jerk.
2. Similar study can also be conducted on female weight lifters.
3. The same study may be replicated with the use of much more sophisticated equipments and by conducting on real competitive conditions in order to have more objective and accurate data for the purpose of biomechanical analysis.
4. Similar study can also be undertaken to biomechanically analyze various skills in other games and sports.

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