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Analytical study of some kinematics variables for the last steps in the javelin event and their relationship with performance

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Abastract

Kinematics is one of the branches of biomechanics used in the field of sports, and it is one of the important tools that aid in the diagnosis of faults and virtues of the technical performance of the movement. javelin. This effectively goes through multiple stages the require continuous biomechanical evaluation in order to accomplish advance achievement. This study's primary objective was to determine the values of some kinematic variables of the last three steps of the javelin throw by senior throwers from Erbil provence clubs. The the research population consists of senior throwers in Erbil governarate clubs who participated in the Erbil competition numbered (12) individuals, furthermore, the sample of (5) players intentionally selected from population. The results show that there is a correlation between the length of the second-to-last and last step in addition to correlation between vertical velocity in the third step with javalin achievement. The researchers concluded that the optimal extrusion angle (45 degrees) is not optimal for all events; although the javelin is a projectile, a 45-degree angle is not commonly used in the javelin (angle younger had a correlation with the best achievement of the angle 45).

Keyword: Analytical study, kinematic variables, for the last three steps, for the effectiveness of javelin throwing, with performance.

الدراسة التحليلية لبعض متغيرات كينماتيكية لخطوات الثلاث الاخيرة لفعالية رمي الرمح وعلاقتها بالاداء

علم الحركة هو أحد فروع الميكانيكا الحيوية المستخدمة في مجال الرياضة ، وهو من الأدوات الهامة التي تساعد في تشخيص عيوب وفضائل الأداء الفني للحركة. فعالية رمي الرمح يمر بمراحل متعددة تتطلب تقييمًا بيوميكانيكيًا مستمرًا من أجل تحقيق الإنجاز المتقدم. كانت الهدف الأساسي لهذه الدراسة هو تحديد قيم بعض المتغيرات الحركية للخطوات الثلاث الأخيرة لرمي الرمح من قبل رماة المتقدمين من نوادي محافظة أربيل. يتكون مجتمع البحث من رماة المتقدمين في أندية محافظة أربيل الذين شاركوا في مسابقة أربيل وعددهم (١٢) فردًا ، وتشمل عينة البحث (٥) لاعبا تم اختيارهم بطريقة عمدية من المجتمع. أظهرت النتائج أن هناك علاقة ارتباط بين طول الخطوة الثانية إلى الأخيرة والأخيرة بالإضافة إلى ارتباط السرعة في الخطوة الثالثة بتحقيق الانجاز في رمي الرمح. واستنتج الباحثان إلى أن زاوية الرمي المثلى (٤٥ درجة) ليست مثالية لجميع الفعاليات الرمي ؛ على الرغم من أن الرمح عبارة عن قذف ، إلا أن الزاوية ٤٥ درجة لا تستخدم بشكل شائع في الرمح (الزاوية الأصغر لها علاقة مع أفضل إنجاز للزاوية (٤٥).

كلمة الدال: الدراسة التحليلية، متغيرات كينماتيكية، لخطوات الثلاث الأخيرة، لفعالية رمي الرمح، بالاداء

1- Introduction

Biomechanics is a science that has evolved as a result of the human condition and its harsh experiences throughout the ages. Biomechanics is interested in the study of human movements in general and athletic movements in particular. Kinematics is one of the branches of biomechanics used in the field of sports, and it is one of the important tools that aid in the diagnosis of faults and virtues of the technical performance of the movement. These tools are accurately described so as to facilitate the polishing process, and they were created by coaches and specialists in the field of training and education.

Track and Field One of the most important sports practiced by humans of all ages due to its health benefits and recreational value, as well as its significance in Olympic competitions for able athletes and thus the distinction of winning the most medals when compared to other individual events and in track and field where many sporting events take place, including the javelin. This effectively goes through multiple stages of initialization prior to sprint approximate, and sprint approximate is divided into specific steps, such as first steps and then moving the intersection and step throwing, as well as bow stretching during throwing preparation. This related accomplishment has digital effectiveness, and from this arises the importance of research in the study of the relationship between the values of some variables in kinetics, three steps, and achievement, which could benefit workers and trainers with regard to the advanced level effectiveness of the javelin.

This study's primary objective was to determine the values of some kinematic variables for the final three steps of the javelin throw by advanced throwers from Erbil clubs. In addition to determining the relationship between the values of certain variables in the previous three steps and the success of advanced javelin throwers in Erbil, we had to determine the values of other variables.

1-1 Research statement

Through teaching, following-up in the field of track-and-field games whether from posts of field athlete clubs of Erbil, or teaching college-level physical Education, the researcher observed a deficiency in the values of certain variables kinematics, which are essential to the achievement of higher javelin efficiency, especially through Appearance apparent movement visible to the naked eye (such as displacement ,horizontal speed , horizontal transmission body and steps configuration before the start and the angle of the javelin). Despite the lack and limited

availability of studies and research on kinematics in the effectiveness of the javelin, a researcher was encouraged to investigate the facts of the reality variables kinematics for javelin using technologies and scientific programs in modern imaging and analysis kinematics for the best throwers of Erbil clubs in this event and discover a large number of variables.

1-2 Methodology

The researchers used the descriptive method relational manner relations for appropriateness and nature of the research. The population of the search throwing of Erbil clubs advance throwers who participating in the Erbil competition and their number was (12) throwers, was selected sample way intentional and was the number (5) throwers officially registered within the Erbil clubs participants in championship of Athletics of the Year (2020).

1-3 The main test

Before the main study, an exploratory experiment was conducted in the stadium of the College of Physical Education and Sports Sciences. Then Test was used javelin by international rule to athletics and the number of attempts that were given, and according to international law Athletics has 6 attempts analysed, with the best attempt attaining the longest digital distance for men; the researcher used a camera placed on the distance between the field where the javelin was thrown and the right side of the field. During the last three steps of a sprint, the javelin throwers follow the camera machine in height (12 meters) and camera lens machine (1.30 meters) for technical javelin.

1-4 Instruments

Japanese Sony-made video camera with a speed of 240 images per second and placed in a specific area of the field, running the javelin and the right-hand side of the throwers, and after (12 meters) from the lens and high machine camera (1.30 meters) above ground level.

1-5 The main experiment

Main experiment was conducted on Monday (9/24/2020) in the Stadium of the College of Physical Education and Sports sciences., was installed camera of video location specified by exploratory experiment after (12 meters) and height (1.30 meters), was run filmed for a moment prior to the beginning of the effort. Before beginning, the weather was warm enough for the entire public and private sample, and after adequate rest and the sequence of the list of names

within the allotted time for each thrower, the lists were taken and analysed, with the favorite attempt being the one with the longest distance among the six attempts.

2- Kinematics variables for the last three steps

Returning to the literature and scientific research in the field of javelin throwing, Kinematics selected the following variables for this search: steps three (distance, time, speed, and frequency for each step of the three speeds, horizontal and vertical centres of gravity of the body, speed of the angler's velocity), the high centre of gravity of the stages, and the final throwing angle. These variables comprised the final three steps and final step throw.

Statistical methods

The mean, Standard deviation, the coefficient of variation. test (r) Pearson correlation study with achievement.

3- Results

Table (1) shows the correlation between the lengths of the last three steps with achievement of Erbil clubs throwers

kinematic Variables	the first step	The second step	The third step	Achievement
the first step		0.384	0.643	0.494
The second step			0.757	0.961**
The third step				0.907*
Achievement				

* Significant in front of the degree of freedom (5-3 = 2 tabular r value = 0.878).

Table (2) shows the correlation between the speeds of the last three horizontal steps with achievement of Erbil clubs throwers.

kinematic Variables	Horizontal speed of the first step	Horizontal speed of the second step	Horizontal speed of the third step	Achievement
Horizontal speed of the first step		0.216	0.022	0.089
Horizontal speed of the			0.747	0.915*-

second step				
Horizontal speed of the third step				0.889*
Achievement				

* Significant in front of the degree of freedom (5-3 = 2 tabular r value = 0.878).

Table (3) shows the correlation between the vertical velocities of the last three steps with achievement of Erbil clubs throwers.

kinematic Variables	Vertical speed of the first step	Vertical speed of the second step	Vertical speed of the third step	Achievement
Vertical speed of the first step		0.461	0.308	0.535
Vertical speed of the second step			0.854	0.909*
Vertical speed of the third step				0.959*
Achievement				

* Significant in front of the degree of freedom (5-3 = 2 tabular r value = 0.878)

Table (4) shows the correlation between the angler velocity and the circumferential speed and the angle of throwing with achievement of the Erbil clubs throwers.

kinematic Variables	Angler velocity	Circumferential speed	Angle Throw	Achievement
Angler velocity		0.139	0.967**-	0.958*-
Circumferential speed			0.260	0.182
Angle Throw				0.899*
Achievement				

*Significant in front of the degree of freedom (5-3 = 2 tabular r value = 0.878)

Discusses

The results of tables numbered (1-2-3-4), which show the correlation between variables and kinematics for the last three steps with javelin achievement, appeared as follows:

1 – There is a correlation between the length of the second-to-last step (phase of flight) and achievement. The researcher explains that the phase of flight preceding the last step is to prepare for the last step, and it was the best achievement whenever the phase of flight was appropriate and time-less.

2 – correlated between the length of the third step last and achievement, the researchers explain that the final step is to prepare for the final throw, where the short distance step and the short time earned high horizontal velocity and thus will gain the javelin maximum speed to operate levers the body to move in the right direction because the movement speed by the levers body enables them to obtain the maximum power and speed effective benefit from the amount of force applied. Therefore, the ground reaction permits maximum force and velocity in the throw, and there is a correlation between the length of the final step and achievement.

3 – There is a correlation between speed step horizontal second (phase of flight) penultimate and achievement .the Researchers explain that the phase of flight preceding the final step is to prepare the step so that when the phase of flight is appropriate, any distance move large and time-few were speed flying high moments, and whenever the step flew high speed, the throwing in the final step was a good achievement, and it was whenever they stepped speed flight (seconds) before the final step.

4 – There is a correlation between step speed horizontal third last step and achievement, the researchers explain that the speed of the final step is to prepare to throw, the short distance step horizontal velocity high and therefore will gain javelin maximum speed is this factor (Speed last step) are important factors in the javelin and features technique aimed successful that effort aimed at all his strength muscle to achieve the greatest high speed through a shuffling motion. .

5 – There is a correlation between step speed vertical second (phase of flight) penultimate and achievement, the researchers explain that the phase of flight preceding the final step is to prepare the final step when the phase of flight is appropriate any distance move large and time-few were vertical velocity moment flying high due to the difference between the point impact of a leg and the point leave (vertical distance large a time few get vertical velocity large).

6 - There is a correlation between vertical velocity in the third step (step flinging) and achievement, according to the researchers. The last vertical distance step when it is small and a time few are vertical velocity moment high due to the difference between the point impact centre weight body and point-leave difference between the high center of gravity body at the point of impact and leave (vertical space large a time few get vertical velocity great).

7 - There is a correlation between angular velocity in the third step (step flinging) and angle shooting, according to the researchers, who explain that the angular velocity in the final step is calculated by dividing the difference between the angular moment of impact and the leave-on time spent by the angular moment of impact. Angular was a period when a few large factors, as well as the relationship between them and the effectiveness of javelin throwers' clubs, caused it to become fast.

8—There is a link between angle shooting in the third step (step flinging) and achievement, according to the researchers, who explain that angle shooting in the final step is based on real access to higher achievement and that it and the angle shooting appropriate search did not exceed 45 degrees or less than 30 degrees (1). However, it appeared in the middle, which led to higher achievement for clubs and throwing, the moral relationship between the throw and achievement for Kurdistan athletes' clubs.

4- Conclusions and recommendations

Based on their findings, the researchers came to the following conclusion:1: Shown some of the relationships between variable values, kinematics, and achievement.2 - The horizontal velocity of the final step has a positive correlation with achievement, which is accompanied by a correlation between step length and achievement. The optimal extrusion angle (45 degrees) is not optimal for all events; although the javelin is a projectile, a 45-degree angle is not commonly used in the javelin (angle younger had a correlation with the best achievement of the angle 45).

5- Recommendations

1: Emphasis on the performance of the last three steps in their positive form according to variables and kinematics that lead to good results and achievement.2: Emphasis on the performance of high-quality technique includes an appropriate angle of not more than a 45-degree angle and less than a 30-degree angle.3: The possibility of using similar research on the female athlete.4: Additional research is being considered, including the use of a force platform to measure the strength of two men during the throwing process, as well as the use of devices to measure the strength of the arms through the body.

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