Innovative device to control the body tilt angle during the stage of increasing speed and its impact on the number of steps and completion of 100 meters sprint

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استلام البحث : ٢٠١٨/١٠/٧ قبول البحث :٢٠١٨/١١/١٥

Summary

The work angles of muscles and body parts control most sports events, including the events of the race activity, and the effectiveness of the sprint 100 meters of multi-stage events that require linking them provide a sufficient amount of compatibility for fitness elements under the conditions of economy and the provision of appropriate energy To move to the next stage with a particular fluidity and speed, here comes the importance of the angle of the tilt of the body and the gradient in raising it within the stage of increasing speed within the distance of 35 meters from the beginning, and because of its characteristics in influencing achievement and also in reducing the external and internal effects which decreasing from runner speed that will ration the open body tilt angle is the focus of work at the increasing speed stage. The importance of the research is manifested in the creation of a device that works to open the angle of the tilt of the body and gradually to the desired angle, which will provide a regulated performance within the stage of increasing speed the researcher used the experimental method in the style of the group in the style of the one group by pre and post measurements, but the research community has included the research community players elected Al-Qadisiyah University is in the 100-meter sprint and has 6 runners, as the training curriculum was applied using the device to all of them. The training curriculum will be from (24) training units and was over the duration of (8) weeks and by (3) and training unit per week and distributed on the days (Sunday, Tuesday, Thursday) where the application of the training curriculum was initiated on the sample of the study and they are the runners of the 100 meters sprint. The researcher used multiple statistical methods to process the results, including the T test for interrelated samples, as well as the regression equation, as well as the use of appropriate statistics for pre and post tests.

Keywords :(Innovative device) (the body tilt angle) (the stage of increasing speed)

الملخص عربي

جهاز مبتكر للتحكم بزاوية ميل الجسم خلال مرحلة تزايد السرعة وأثره في عدد الخطوات وإنجاز عدو ١٠٠ متر

مصطفى علي عبد الله أ. د حسين مردان عمر البياتي

تتحكم زوايا عمل العضلات وأجزاء الجسم بمعظم الفعاليات الرياضية ومنها فعاليات الاركاض ، وتعد فعالية عدو ١٠٠ متر من الفعاليات المتعددة المراحل والتي تتطلب الربط بينها توفر مقدار كافي٩ من التوافق الخاص بعناصر اللياقة البدنية تحت شروط الاقتصاد وتوفير الطاقة المناسبة للانتقال الى المرحلة اللاحقة بانسيابية وسرعة خاصة ، وهنا تأتي أهمية زاوية ميل الجسم والتدرج في رفعه ضمن مرحلة تزايد السرعة خلال مسافة ٣٥ متر من البدء ، ولما لها من خواص في التأثير على الإنجاز وأيضا في التقليل من المؤثرات الخارجية والداخلية والمتمثلة بمقاومة المحيط وزوايا التي تتحكم بحركة اللاعب التي تقلل من سرعة العداء وبذلك يكون تقنين فتح زاوية ميل الجسم هو محور العمل في مرحلة تزايد السرعة .تتجلى أهمية البحث في ابتكار جهاز يعمل على فتح زاوية ميل الجسم وبالتدرج الى الزاوية المطلوبة والذي سوف يوفر أداء مقنن ضمن مرحلة تزايد السرعة أستخدم الباحث المنهج التجريبي بأسلوب المجموعة الواحدة بالقياسين القبلي والبعدي، اما مجتمع البحث وقد شمل مجتمع البحث لاعبي منتخب جامعة القادسية في عدو ١٠٠ متر وعددهم (٦) عداء، إذ تم تطبيق المنهج التدريبي باستخدام الجهاز عليهم جميعا. تكون المنهاج التدريبي من (٢٤) وحدة تدريبية وكانت على مدة (٨) أسابيع وبواقع (٣) وحداة تدريبية في الأسبوع وموزعة على الأيام (الاحد، الثلاثاء، الخميس) حيث تم الشروع بتطبيق المنهاج التدريبي على عينة الدراسة وهم متسابقي عدو ١٠٠ متر. وقد استخدم

الباحث وسائل احصائية متعددة لمعالجة النتائج منها اختبار T للعينات المترابطة وكذلك استخدم معادلة الانحدار وأيضا استخدام الاحصائيات المناسبة للاختبارات القبلية والبعدية.

الكلمات المفتاحية :(جهاز مبتكر) (زاوية ميل الجسم) (مرحلة تزايد السرعة)

1- Introduction:

Modern science and its sports field is particularly interested in linking machine and human, which is a court matter to control and codify the training process and the work of the combination of the device and the player is the main control in the progress of educational and development processes in the field of the competence of different events in Sports .The work angles of muscles and body parts control most sports events, including the events of running, and the effectiveness of the sprint 100 meters of multi-stage events that require linking them provide sufficient compatibility of fitness elements under the conditions of economy and the provision of appropriate energy To move to the next stage with a particular fluidity and speed, here comes the importance of the angle of the tilt of the body and the gradient in raising it within the stage of increasing speed within the distance of 35 meters from the beginning, and because of its characteristics in influencing achievement and also in reducing external and internal effects that reduce the speed of racer and thus regulate open angle of body inclination is the focus of action in the stage of increasing speed. The importance of research is reflected in the creation of a device that opens the angle of the body's inclination and gradually to the desired angle, which will provide regulated performance within the stage of increasing speed.

2- The purpose of the research:

2-1 to identify the effect of the device on the angle of the tilt of the body and the number of steps during the stage of increased speed and completion.

3- Research procedures:

3-1 The research community and its sample:

" all the individuals, events or objects that are the subject of research" (1:143), the research community included the players of the Al-Qadisiyah University team in the sprint of 100 meters and their number (6) runners, as the training curriculum was applied using the device on all of them.

3-2-Study Design:

The researcher used the experimental method in the same group method in pre and post measurements.

3-3-The variables studied:

The study included the following variables:

3-3-1-Independent variable:

Represents the independent variable in this study of the innovative device where the device consists of a structure of iron associated with some important tools manufactured by international companies and good specifications for movement, reliance and movement, divided into three parts (the carrier arm of movement, body, And the railway), the device runs within the railway and for a distance of 36 meters but the performance is only for a distance (25-30) meters and the rest is a safety zone to stop the player. The movement begins by the player when the device pushes his chest because it is attached to the chest area forward .

i.e. the player behind the device and not in front of it and when moving the device begins the motor transfer of the frame that is in the center of the device which is connected to the track which in turn transfers the movement to the wheel in the gearbox The rotation of the gearbox that moves the movement to the moving arm and then the inner arm rushes to push the bra to start its angular movement, which they started will push the player from the chest area and thus be the sequence of movement .,When the movement of the device (1) meter it is the angular movement shall be (1) degree (1) meter (1) degree and the movement begins from the angle (45) degree, which is considered the best angle for the launch of the player, the movement of the device distance (30) meters may have moved at an angle of (45 to 75) which it is the ideal angle where the player must move effective (100) meters along the race stage i.e. 30 meters from the start of the race.

Details parts of device with pictures

1. The conveying arm of movement with the bra and gearbox

Figure (1) shows the shape and performance of the device

Figure (2) the conveying arm of movement with the bra and gearbox

Figure (3) Shows the bra

2. Body and its components and measurements.

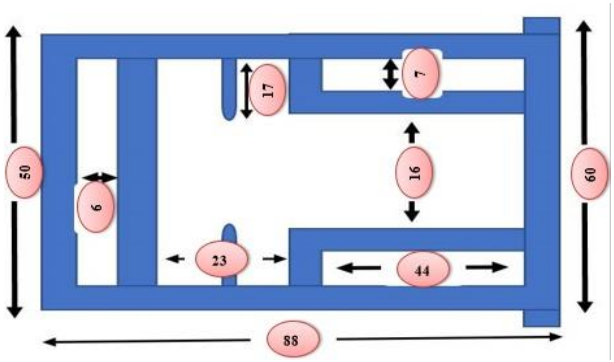


Figure (4) shows Body and its components and measurements

Figure (5) shows the installation of the railway and the movement of the device on it

-3.2 The dependent variable:

3-3-2-1 variable function (distance - angle) of the body's inclination

A method of indicating the tilt of the player's body within a certain distance, i.e. the amount of the body's inclination with the ground horizon for a certain distance. The angle of the body's tilt has been extracted for the speed increase despite the dynamic analysis program (Kinovea) represented by the ground horizontal rib and the other side of the body (from ankle point to shoulder point) for each step of the jogging player at the full extent of the driving man and before breaking Its connection with the earth as in figure (6)

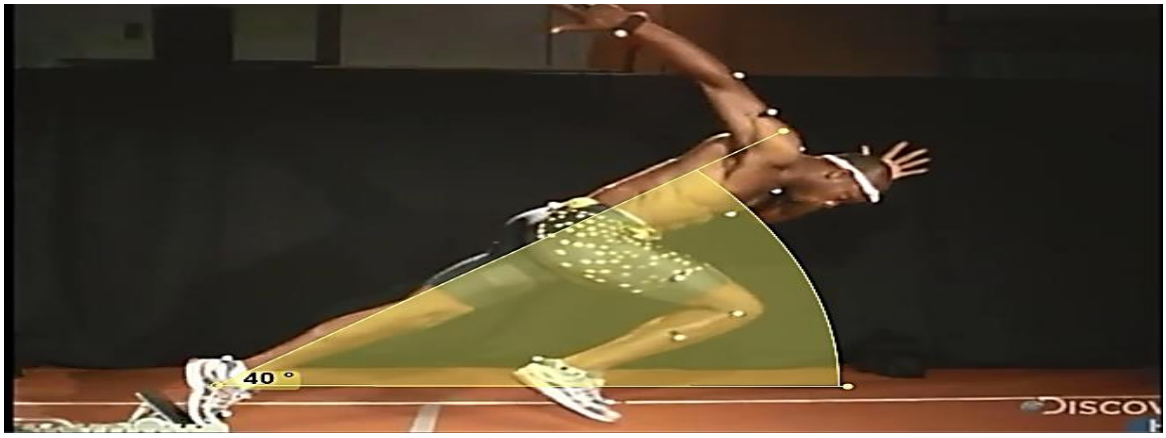


Figure (6) shows function (distance- angle) of the body's inclination

3.3.2.2 Number of steps:

Number of steps by which the runner has travelled the speed-increasing stage distance as in figure (7)

Figure (7) shows the number of steps

3-4 Tests used:

3-4-1 run test (100) meters from the starting point: (2: 51-50)

Test goal: measurement of the completion of a run (100) meters

Test Description: the test begins immediately after the completion of the warm-up process by instructing the laboratory, on the starting line, where the tester takes the starting position The start then gives the launch signal, at which point the timers turn on the timing hours, and when the tester reaches the finish line, the timing hours are stopped.

Time Recording: Records to nearest (0.01) of a second through three hours timing take average timing.

3-5-Procedures of field research:

3-5-1-The exploratory Experience:

Search experts on important exploratory experience, which is about "practical training of the researcher to determine the positivity and negativity that runner meets during the test to avoid." 2:107). The second was the exploratory experiment on Monday, 26/2/2018 on a sample of four students outside the sample, at 10 a.m., for the purpose of identifying the obstacles that may faces work of the researcher ,the purpose of exploratory experience to confirms on followings:

• The efficacy of cameras.

• Identify the dimensions of the cameras on the location of the runner's performance.

• Identify high cameras on the ground level.

• Ensure efficient staffing Assistant work

3-5-2-Testbefore:

The testbefore was conducted on Wednesday 28.2.2018 at 9.30 mornings in field of physical education and sports science college AL-Qadisiya University, the researcher has installed special circumstances of the test in terms of time and place, testing performance method, staff to achieve same or similar conditions as possible when testing afterfor sample research.

3-5-3-Main Experience (training method):

After procedure of test before and preparation beforehand of researcher to training curriculum ,the researcher has applied the curriculum on sample research depends on sources and scientific references in the science of sports training as well as the opinion of experts and specialist in track and field games ,sport training curriculum included several matters:

1. Exercises have been carried out at (8) weeks and reality (3) training units per week (24) training unit.
2. These units were applied in days (Sunday, Tuesday, and Thursday).
3. The undulant method had been used.
4. Researcher used four training units within curriculum to recognizethe system.
5. The first four weeks of training were among moving and plain.
6. The researcher used the training method in corner during moving and plain that is two exercises with plain angle and one in moving angle, then researcher focuses on principles of ease and difficult training angles (45 dfficult-80 easy).
7. The last four weeks angle was animated in all exercises and starting with angle (45) degree.

3-5-4-test after:

After applying the method search sample, thetest after was implemented on Tuesday 1-5-2018 at 9.00 morning in field of physical education and sports science AL-Qadisiya university that followed the same way that was followed in the before test, the researcher take into account the temporal and spatial circumstances and the same tests means and tools which were used inbefore test.

4- Showing, Analyse, discuss, the results:

4-1-View and Analyse the biomechanical variables and accomplishment in increasing speed stage:

Table 1 shows descriptive statistics for the search variables during increasing speed

s	variable		Measure unit	Test before			Test after		
				average	Stdeva	skew	average	Stdeva	skew
1	Number steps		number	**17**	**1.26**	**-0.88**	**18**	**1.47**	**-0.71**
2	Distance of the accelerate phase		meter	**27**	**294.31**	**0.086**	**31**	**236.31**	**-0.38**
3	the body	maximum extent	degree	**69.16**	**2.99**	**.431٠**	**72.16**	**8.28**	**-0.52**

	tilt angle	Maximum bend	degree	**40.33**	**2.732**	**.448٠**	**40.16**	**3.371**	**-0.91**
4	achieve		sec	**12.213**	**0.683**	**-0.583**	**11.417**	**0.411**	**0.767**

Table (1) shows the mathematical community values and standard deviation to four variable biomechanical and to (before) and (after) tests to the sample search during increasing speed stage ,mathematical circles calculated and standard deviation for each variable in stet before and test after besides body angle tilt takes binary value(maximum extension-maximum twist) from total values , and some variables take values in general that means the variable in this case has one value for (before - after)test .Here are classification to those variables depending on the number of values that given them to facilitate the process of analysis and discussion .Variables(1,2) signal numeric significance and each of arithmetic mean and standard deviation and twist for two test before and after represented with one attempt for community sample search .Variable (3) which represents body tilt angle during maximum extent with horizon land and maximum drape with horizon land that represents by two digits to each of the arithmetic mean and standard deviation and twist to (maximum extent-Maximum bend) at every step with full extension during increasing speed stage that represents variable (4) achievement standard by arithmetic mean standard deviation and twist. From the table notes that some values of mathematical means were less than test after measure which represents with values of time .As standard deviation to some variable were less than test after measure that indicates to be uniform of collection of sample search in this variable and the observed increase for some value of standard deviation in test after measure has virtual connotation that some members of sample search had been progressed best of each other.

2-4-Discussion biomechanical variables and achievement in increasing speed stage

Table 2 shows difference between tests (before) (after) measure variables

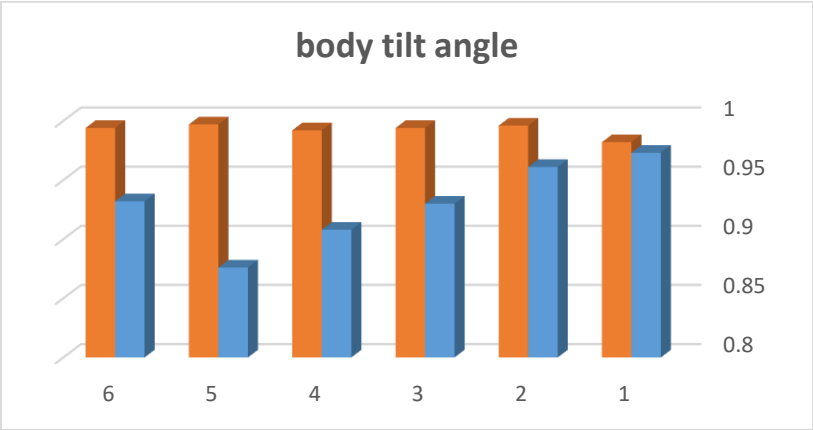
s	variable		Measure unit	average	Stdeva	T-test	Sig. (2-tailed)
1	Number steps		number	-1.833	0.753	-5.966	0.002
2	Distance of the accelerate phase		meter	-422.33	145.382	-7.116	0.001
3	the body tilt angle	maximum extent	degree	-5.333	2.338	-5.587	0.003
		Maximum bend	degree	-2.666	3.444	-1.896	0.116

Whenever the error level less than or equal to (0.05), difference was moral .Notes from the table by statistically significant differences in both moral variable (number steps, distance of increasing speed stage) due to evolution of 100 meter sprint racers. In the growing of distance increasing speed stage which can be seen through the frequency factor for quick step that has led to decrease in step length and also In a recognized cruise in body tilt angle that allows to raise the knee within small angle also leads in lack of step length .Notice that the body tilt angle is moral at(maximum extension)and at start it is in the maximum twist and we notice this angle at increasing speed stage in the move and gradation .We notice the graduate of angle in the opening to reach to the required angle until to the end of the race each anatomical range to the runner. Regarding the angle of the trunk when start race ,the angle in the maximum extent because relationship between it and body tilt angle is reverse that means whenever the angle became bigger ,the angle of the trunk became small in certain ratios until reach to maximum (extent-twist)to both angles. Regarding the achievement got there noticeable progress in biomechanical area that the runner could earns during smooth opening body angle, redirect power amounts within horizontal component is better than vertical which serves direction of horizontal running, since the vertical component leads to spend

more time to flight stage during running that lead to high arc that does not serve the direction of horizontal move.

2-4-Analysis and discussion of smooth open trunk and body tilt angle at some point increasing speed

The goal of measuring all of the body trunk inclination angle is to discover their anatomical pattern when the increasing speed and noticed through competitions that skill performance for launch and the running to a certain distance, accompanied by a rise in the body's Center of gravity as shown in figure (7).



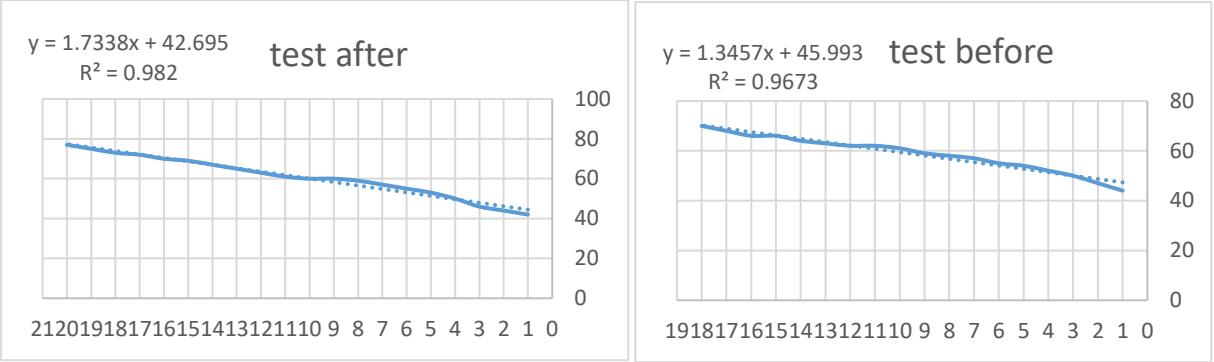
Form (7) illustrates rise of body gravity

Note that this distance, short steps can be lengthened by as we proceed forward any steps could be function of body tilt and trunk angle as the system made to open a corner to (mechanical) from (45-75) degree in line form n, so that the researcher sees that linearity between number steps and between each of body tilt angle corner and tendency of trunk will be better in test after measure. Naturally overcoming an early opening to those two angles mean saving energy expended on increasing speed stage .The power inflicted on the ground at an angle leading to degradation to horizontal and vertical whenever opening angles seamlessly whenever the power overcome inertia and gain momentum for prolonging increasing speed stage. Notes from shapes (14, 13) of body tilt angle and trunk that the correlation coefficient squared values increase and clearly in the measurement of(after), the general trend line tends to better linear when observations of runner (Dia)through an equation "is the prediction of the dependent variable value for a specific value of the independent variable values. (69:3).

Format (8) shows the values of correlation in the (before) (after) measures in variable body tilt angle

In measurement test before found that value of squared correlation coefficient (0.967) high link shows that the runner recognized by open body and tilt angle flow increases value to (0.982) after being subjected to the independent variable is the designed system ,that the runner responds to the changes imposed the automated system behavior is the smooth opening angle . As the curve illustrates the possibility that low-angle runner starts compared to measurement of (before) that starts the race angle value (42.69 degree) instead of start angle (45.99) in test before measurement and get a better flow to the advancement of the angle at which the variable parameter value of apparent tilt angle body ,Cruise "is of the utmost importance to kinetic performance is one of the defining characteristics of sports movement and is an essential criterion in kinetic performance

and the flow of movement mean concurrency between all parts of the body when performing sports movement. " (12:4).



Format (9) streamlined body tilt angle shows (test before) (test after measurement

5-Conclusions and recommendations

1-5- Conclusions:

1. The innovative device's positive impact of key variables special biomechanical 100-meter sprint racer during the stage of increasing speed.

2. Affected by both the number of steps and the length and frequency of steps directly step variable body tilt angle and the angle of the torso and vice versa.

3. It appears there impact on the total amount of the race due to mechanical improves cruise tilt angle of body and improve all of (space stage increased speed, number of steps).

2-5- Recommendations:

4. Preferred trainers full knowledge about the importance of the innovative system and how it works and methods of manufacture.

5. The need to train 100 meters racers on how innovative system.

6. Amendment to the system by connecting with other means of movement of the arms and on the angles of sound performance.

7. Increase the distance of the system to cover all stages of the race through the railline design of the system.

8. The adjustment on the system and put electronic microcontroller to control its speed to suit every runner.

9. Similar studies on different samples of effective ran 100 meters.

10. The need for other similar studies for the present study but similar race stages.

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