# An innovative system to controls the body tilt angle during the accelerate phase and impacts on steps numbers to achieve 100-meter sprint 

# PH.D Hussein Mardan Omar AI Bayati 

Hussein_mardan@yahoo.com

Mustafa Ali Abdulla

Mustafa92.sport@outlook.com
The angle muscles and parts of body control most sporting activities including race activity, 100 -meter sprint considers of multiple steps activities which requires link both, must provide enough amount of compatibility to fitness elements under economy conditions and provides suitable power to move to the following step with steamily and special speed. Here comes importance of body tilt angle and gradually lifted during increasing speed through distance of 35 meter from start .As what it has features that influence on achievement and also reducing internal and external impacts which decreasing from runner speed that will ration the open body tilt angle is the focus of work at the increasing speed stage . The significance of search to creates a system that works to opens body tilt angle and graduates to wanted speed which provides professional performance within increasing speed stage ,the researcher uses experimental method with the one group method with (before)(after) measures. The community research includes team runners of Al-Qadisya university 100 meter six runners which applied training method with using system on all of them. The training method is form of 24 training unit with 8 weeks period in 3 training unit weekly distributes on (Sunday , Tuesday, Thursday ) begins application the training method on study sample who are runners of 100 meter sprint . The researcher has used multiple statistical means to treats results like ( T ) test to the linked samples also used correlation equation and used the suitable statistics to test before and test after

KEYWORDS: An innovative system, body tilt angle

## INTRODUCTION

The modern science is interesting in its sport field in particular the link between human and machine and it is a compact matters to control and rationing the training process and the work being between system and runner is the main control in progressing the educational and processing development in different activities and sport. The angles of working muscles and the parts of the body are control on most sport activities like activity of running. The activity of 100 meter running considers as activity of multiple stages that require link provides a sufficient source of compatibility elements of fitness under conditions of the economy and provide the appropriate power to move to the next stage seamlessly and special speed. Here came the importance of body tilt angle and gradually lifted during increasing speed stage distance 35 meter from start. Since its features influencing achievement also in reducing internal and external influences that reduce the speed of runner and thereby rationing open body tilt angle is the focus of work at some point increasing speed. The significance of research appeared in innovating a system that works on open body tilt angle and gradually to point angle that will be provides a ration performance within stage of increasing speed.

## 2-purpose of research

To identifies the influence of system on body tilt angle and steps numbers the accelerate phase.

## 3-Search procedures

## 3-1-Research community sample:

All individuals or events will be research subject (1:143), includes research community of AlQadisya university runner's team in 100 meter running, and then completely applied training method by use system on them

## 3-2-Study Design:

Indeed research used trial method by single group manner in test before and test after measure.

## 3-3-Studied Variables:

The study included the following variables:

## 3-3-1-The Independent variable:

In this study the independent variable represented by innovative system which contains of iron structure associated with some important tools that manufactured by international companies with best specifications to transmits move , lean and motion divided into three parts (carrier arm, body, railline),the system moves with railline to 36 meter distance ,but performance is only (25-30) meter ,rest of railline be save zone to stopping the runner .The movement begins when runner pushes system in his chest that links with vest forward which means the runner behind the system not in front of intuit st rotate wheel gearbox that transmit the movement to the carrier arm of the movement and then rushes to push internal arm vest overtook its movement angle, which in turn will push the runner from the chest area and thus be the movement sequence. When the movement of the system (1) meter it is corner movement (1) degree for every 1 meter (1) the degree of angle movement begins (45) degrees which is the best angle to the runner starting the machine movement distance (30) meters have an angle of movement ( 45 to 75 ) and are the perfect angle that should the runner moves in High (100) meter along the stage race of any distance 30 meter from the start of the race.

## Details parts of system with pictures

## 1. the carrier arm motion with vest and gearbox



Form ( $)$ shows arm movement and gearbox

the carrier with vest

Form (2) illustrates the waistcoat
2. The components of the body and measurements


Form (3) show the body and its components and measurements

## 3-The railline which system moves on it to (36) meter



3-3-2-The dependent variable

3-3-2-1: Variable (distance -angle)


Function the tendency of the body

This a way to denotes the tendency of the runner body during a certain distance which is the amount of body deflection with a certain distance to horizon. Inclination has been extracted the body during increasing speed stage by kinetic analysis program (Kinovea) that represents in horizontal ground rib and the other body rib from ankle point to shoulder point for each step of ran steps to the runner at full extension to the pushing leg and before breaking contact with ground as in figure (5).

Form (5) illustrates a function (distance-angle) the tendency of the body

## 3-3-2-2-number steps

Number steps that runner clocking during increasing speed stage as in figure (6)

Form (6) illustrates number steps

## 3-4-The Tests

## 3-4-1-tests of ran (100) meter from sitting start

## The goal of the test: measures the accomplishment of ran (100) meters

Test description: Test starts after complete of warm up to instructs the lab ,on the starting line where the lab took first sitting start when the shooter gives signal ,at this moment the time keeper operates timer, when the lab reaches end line timer off.

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-Test before:

The test before was conducted on Wednesday 28.2.2018 at 9.30 morning 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 after for 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 recognize the 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, the test after was implemented on Tuesday 1-52018 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 in before test.

## 4- Showing, Analyse, discuss, the results: <br> 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 |
|  | the body tilt angle | maximum extent | degree | 69.16 | 2.99 | $\cdot .431$ | 72.16 | 8.28 | -0.52 |
| 3 |  | Maximum bend | degree | 40.33 | 2.732 | . 448 | 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

| $s$ | variable | Measure <br> unit | average | Stdeva | T-test | Sig. (2- <br> tailed) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Number steps | number | -1.833 | 0.753 | -5.966 | 0.002 |
| 2 | Distance of the <br> accelerate phase | meter | -422.33 | 145.382 | -7.116 | 0.001 |
| 3the <br> body <br> tilt <br> angle | maximum <br> extent | degree | -5.333 | 2.338 | -5.587 | 0.003 |


than or equal to
error level less
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).


[^0]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


2120191817161514131211109876543210


19181716151413121110987654210
(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.

## The sources:

1. Mushtaq Abdul Redha Mashi Sharara: concepts and applications of scientific research on physical education and sports science. Zero one for print advertising, Iraq, (2016).
2. Qasim Hassan Hussein and others: testing, measurement and evaluation in physical education, Mosul, higher education press, 1990.
3.The International Federation of Athletics: international law competitions, translate and prepare Haider faeeq al-shamma ,Aseel Jalil Qateaa 2011-2913.
3. Amane Moussa Mohamed Cairo: statistical analysis of data. Postgraduate and research development center - faculty of engineering, Cairo University, (2007).
4. wesam Salah abdolhossein, Samer Yusuf tired: Biomechanics and its applications in physical education and sports. Scientific Library (2008).


## ISSN (Print) 1991-7791 (Online) 2313-3635-



An innovative system to controls the body tilt angle during ) تقرّ قبول بحثك the accelerate phase and impacts on steps numbers to achieve 100Meter sprint للتفضل بالاطلاع ........ مع التقاير


E-mail : journal_sport2012@yahoo.com
Website: www.qu.edu.iq/spojou www.nil.edı.in/sno


[^0]:    correlation in the (before) (after) measures in variable body tilt angle

