Effectiveness assessment of motor transportation Indicators Of high jump takeoff

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Introduction and research problem:

Adel Abdul Basir Confirms (1998) kinetic analysis considered at the forefront of science, which plays an important role in the field of performance education for the novice , as well as in the field of training for the players with a high level of skill , where is interested in studying and analysis the motor performance according to the affecting factors on the performance directly or indirectly, targeted access to the most appropriate solutions to the problems of mobility and dissemination the information gained about the art of performance for various sports activities separately in still images of the kinematic foundations, to serve the perfect athletic performance to achieve the maximum kinetic achievement . (1: 196)

Sareeh abd el krem el fodaly refer to (2007) that the motor transport indicator is a mechanical indicators that give a real explanation of the type motor transport in fulcrum moments in all the jumps , and through the relationship between angle of starting (the moment of fight), and mechanical energy (the total kinetic energy and potential) in moment of takeoff in two moments fulcrum and push, are known to have contact with the land consists of two phases fulcrum and stand up , and It is possible to calculate the mechanical energy of both types (potential and kinetic) which in the end, the total mechanical energy. (9: 118)

Sareeh abd el krem el fodaly adds (2007) usually decrease in energy between the fulcrum and the push for players, high levels is few, as have rate of energy decrease is less as possible to ensure the highest Indicator for motor

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transport and proof that the push was perfect, and therefore the change in the momentum is least value , and the moment of force and resistance was appropriate , and the angles of the body during absorption and push moments the best values and to ensure the body for ideal situation during the takeoff . (9: 121)

Bastawisi Ahmed Bastawisi refers to (1996) that the takeoff phase in the high jump of the most important motor performance phases, which is a complex process, where the produce from that phase the pushing force for jumper, a product of the outcome of the work of a lot of motor groups in the body, especially the work of both abductor muscle to the joints of takeoff leg and swinging free leg and arms during the takeoff phase. (2: 261)

Through follow-up to various competitions for high jump , and readings references and scientific research, whether Arab or foreign which dealt with kinetic analysis of high jump competition, observed scarcity of scientific research that dealt with this important biomechanical principle, this is a motor transport indicator, as well as the low level of egyptian players in the high jump competition at the local level compared to the world level , which calls for a practical scientific study through which to reach an optimal method for performing skill with the explanation results of the motor transport indictor and which is one of the indicators that give a real explanation of the motor transport type in takeoff moments , and find out how they could contribute to the upgrading of the level of performance skills.

Herein lies the problem of the research , this research is an attempt to assessment the effectiveness of motor transport indicator for different levels of performance, and This eventually lead to increase the digital level, **"any attempt to assessment the efficiency of the implementation of the players for this biomechanical principle"** and this study aims to identify the most important biomechanical indicators for transport motor during takeoff and the differences between the performance levels of high jump (first-second -third) during the moments (the

beginning of touch - break contact) in the high jump?

-Research objective:

The research aims to Effectiveness assessment of motor transportation Indicators

Of high jump takeoff ،and through the identification of:

- The most important biomechanical indicators of motor transport indicator through takeoff (beginning of the touch-break contact (for performance levels of high jump competition (the first level - the second -third.(
- The most important differences of biomechanical indicators of motor transport indicator through takeoff) beginning of the touch-break contact) between Performance levels of high jump competition (the first level - the second – the third).

Research questions.

According to the aim of the research, the researchers formulated the following objectives:

.١What are the most important biomechanical indicators of motor transport indicator through takeoff (beginning of the touch-break contact (for performance levels of high jump competition (the first level - the second -third؟(

2. Are there differences in the biomechanical indicators of motor transport indicator through takeoff) beginning of the touch-break contact) between performance levels of high jump competition (the first level - the second – the third)?

Key words: -

Indicator: motor transport

One of mechanical indicators that explains motor transport in moments of takeoff in all the jumps ،the amount of transport of the strength of the working muscles on the joints involved in motor performance and represents a digital mechanical quantity, and is determined by :

Motor transport indicator = Kick-off angele of the body / decreasing the :٣)،(١٢٠ :١٠) (١٣٤Mechanical energy

Material and methods-: Design

The researchers used the descriptive method by using the biomechanical analysis based on a video camera and kinetic analysis **3D** of Simi Motion program.

Subjects

The subjects was chosen with random way represented

in the (3) players of the Egyptian national team for athletics in high jump competition for the first class , registered the Egyptian federation of athletics and those who jumping the dorsal way and use the left foot to the takeoff , where each player (9) attempts to high jump skill at a height represents 98% of the digital level for each player , It was chosen as the best (6) attempts to correct a technical and legal for motor analysis , so the first level has become " the first player" (6) attempts to height (2.10 m), as well as the second-level "second player" (6) attempts to height (2.00 m) and third-level "third player" (6) attempts to height (1.96 m) and thus The research sample has become the (18) attempt.

Table (1)
data subject's The

.Sr No	Player name	Team	Height ((m	Weight ((Kg	Age ((Year	Training (year)	Personal Record (m)	BMI Kg/m2
١	Amr Samir kaseep	El maady	١.٨٥	٧٠	١٧	٤	٢.١٥	٢٠.٤٥٣
٢	Tamer Mohamed hanafi	semouha	١.٩٦	٩٤	٢٨	٨	٢.٠٥	٢٤.٤٦٩
٣	Khaled salama showman	Police union	١.٨٣	٧٨	٢٢	٧	٢.٠٠	٢٣.٢٩١

-Instruments and tools for data collection:

•The balance of medical standards for measuring the weight) kg.(

•Rstamer to measure the overall height of the body) cm)

•Legal device of high jump .

-Kinetic analysis tools:

•Unit of advanced computer and kinetic analysis program "Simi Motion."

•Box for calibration 1m × 1m× ١m" Calibration."

•Two (2) video camera 125 cadre / second" Fistic Imaging "

•Two (2) a tripod and Data Show.

-To identify performance phases that has been studied According to title of research : Assessment the effectiveness

of motor transport Indicator for takeoff in the high jump

The researchers chose takeoff phase because of its great importance in the success of the jump, takeoff is a link between the horizontal movement and vertical and its success reflects the success of the jump as a whole so researchers will be subject to the final step (takeoff) during the selected performance moments)beginning touch moment - break contact land(.

1-The moment (beginning touch) : The moment when the player begins touching the ground with takeoff foot during the last step

2. The moment (break contact): The moment where the player begins to extend all the joints of takeoff foot ready to fly up.

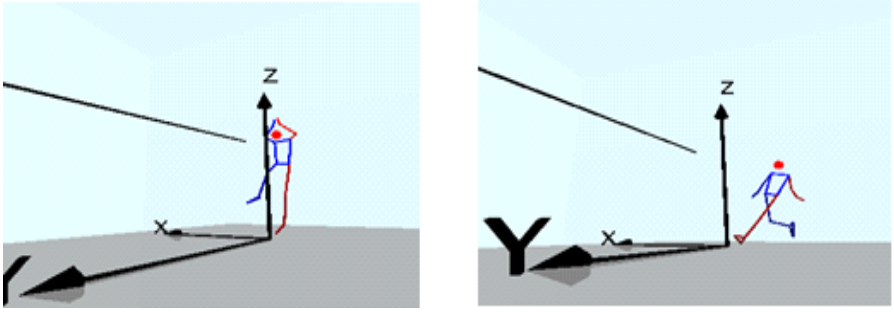
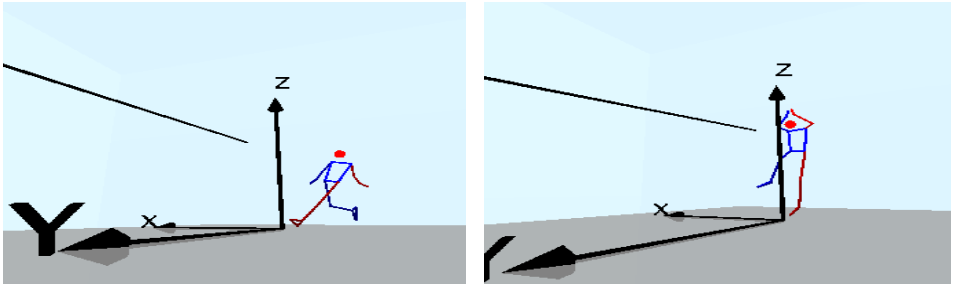


Figure (1) The moments (beginning touch- break contact)



The pilot study:

The researchers conducted the pilot study on a sample search on Saturday, 16/7/2016 to prepare for the shooting skill of the high jump, the study was coordinated with the research and sports consulting the Faculty of Physical education for meals Center Zagazig University, As it was filmed the pilot study at the field of athletics (Maadi club) Cairo.

Results of The pilot study:

- Prepare imaging 2. Place the camera setup 3. Player for imaging

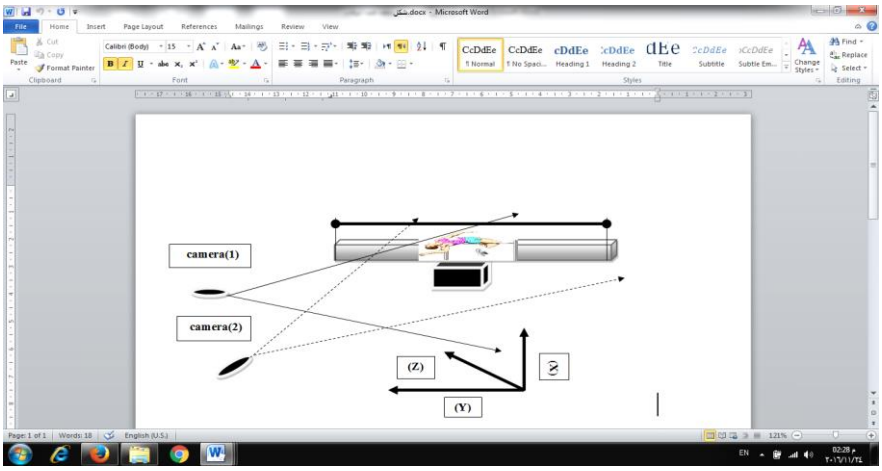


Figure (2) Dimensions and directions and locations cameras during basic study

Study of basic research:

the researchers conducting basic experiment on thursday, 21.07.2016 at the field of athletics (**maadi club**) cairo. the data were recorded by following the following steps:

- implementation and record attempts.
- dealing with attempts after recording.
- account data and basic variables of skill.

-statistical analysis:

- arithmetic *mean*
- standard deviation
- test kruskal wales differences

-results and discussion:-

Table (2)
Statistical characterization of Biomechanical indicators for motor transport indicator during high jump Takeoff to levels of performance (first-second-third), the moment of the beginning of Touch

Third level		Second level		First level		Unit	Biomechanical Indicators	Sr. No
STDEV	Average	STDEV	Average	STDEV	Average			
٠.٠٢٠	٠.٩٦٠	٠.٠١١	١.٠٦٧	٠.٠٠٩	٠.٩٨٢	Meter	Height of CG	1
٠.٢١١	٦.٠٧١	٠.١٥٤	٦.٣٤٧	٠.١٣٧	٦.٦٢٨	m\s	Total speed of CG	2
١٠.٢٥٧	١٤٦.٦٧٠	٩.٤٥٢	١٩٣.١٠٩	٦.٥٣٨	١٥٦.٧٧	Joule	Kinetic energy	3
١.٥٩٤	٧٤.٨٦٧	١.٠٢٥	١٠٠.٣١٢	٠.٥٩٦	٦٨.٧٢٥	Joule	Potential energy	4
١.٢٦٧	٢٧.٨٦٣	٠.٩٢٥	٣٠.٦٢٢	١.٠٣٧	٣١.٦٠٢	Joule	Total energy	5
٥.٤٧٧	١٥٢	١.٧٥١	١٥٦	٤.٣٢٠	١٥٧	(°)	Angle of left hip	6
٤.٣٦٧	١٦٩	١.٦٧٣	١٧٢	١.٩٤١	١٧٣	(°)	Angle of left knee	7
٢.٩٦٦	١٢٧	٤.٨٨٥	١٢٦	٥.١٧٤	١٢٠	(°)	Angle of left ankle	8
٢.٠٠	٥٣	١.٦٧٣	٥٦	١.٥٤٩	٦٣	(°)	Angle of the back Inclination with the land	9

Table (2) explain the means and means of biomechanical indicators for motor transport indicator during takeoff in the high jump to levels of performance (first-second-third), the moment of the beginning of Touch .

Table (3)
Statistical characterization of Biomechanical indicators for motor transport indicator during high jump Takeoff to levels of performance (First-second-third), the moment of break contact

Third level		Second level		First level		Unit	Biomechanical Indicators	Sr. No
STDEV	Average	STDEV	Average	STDEV	Average			
٠.٠٣٢	١.٣٥٧	٠.٠٢٧	١.٤٤٣	٠.٠٢٨	١.٣٦٦	meter	**Height of CG**	1
٠.١٨٠	٤.٨٩٩	٠.٠٦٠	٥.٣١١	٠.١٩٥	٥.٧٨٥	m\s	**Total speed of CG**	2
٧.٠١٩	٩٥.٥١٤	٨.١٢٠	١٣٥.١٣٢	٣.٠٢٨	١١٩.٥٢٠	Joule	**Kinetic energy**	3
٢.٥١٨	١٠٥.٨٣٤	١.٩٥٦	١٣٥.٦٤٠	٢.٥٤٥	٩٥.٦٠١	Joule	**Potential energy**	4
١.٠٨٦	٢٥.٣٢٣	٠.٩٥٧	٢٨.٢٥٨	١.٠٨٦	٣٠.١٤٨	Joule	**Total energy**	5

٠.٠٠	٠.١٧٩	٠.٠٠	٠.١٧٩	٠.٠٠	٠.١٧٣	second	**Takeoff Time**	6
٠.٠٤٢	٠.٣٩٧	٠.٠٢٩	٠.٣٧٦	٠.٠٣١	٠.٣٨٤	meter	**Change in Height of CG**	7

Follow Table (3)

Statistical characterization of Biomechanical indicators for motor transport indicator during high jump Takeoff to levels of performance (First-second-third), the moment of break contact

Third level		Second level		First level		Unit	Biomechanical Indicators	Sr. No
STDEV	Average	STDEV	Average	STDEV	Average			
٠.٨١٤	٢.٥٣٩	١.٠٣٠	٢.٣٦٤	٠.٢٠٥	١.٤٥٤	Joule	**Decreased energy during takeoff**	8
٣.٦٨٨	٥٢	١.٠٩٥	٦٤	٢.٣٦٦	٥٤	(°)	**Kick-off angel**	9
١.٧٢٢	١٦٥	٢.٠٦٦	١٥٩	٣.٢٥١	١٦٦	(°)	**Angle or left hip**	10
٤.٨٠٦	١٧٠	١.٩٤١	١٧٥	٠.٧٥٣	١٧٧	(°)	**Angle of left knee**	11
٥.١٥٤	١٣٢	٣.٧٤٢	١٣٣	١.٢٦٥	١٣٦	(°)	**Angle of left ankle**	12
٣.٥٠٨	١٦.٤٨٣	٤.٨٠١	٢٠.٢٦٠	١.٧٢١	٣٣.٧٩٣	Newton/s	**The push**	13
٨.٧٠٢	٢٠.٤٨٠	١٠.٦٧٥	٢٧.٠٧٢	٥.٣٦٦	٣٧.١٣٨	°/Joule	**Motor Transport Indicator**	14

Table (3) explain the means and means of biomechanical indicators for motor transport indicator during takeoff in the high jump to levels of performance (first-second-third), the moment of break contact.

Table (4)

Significance of differences between Biomechanical indicators for motor transport indicator during high jump Takeoff to levels of performance (First-second-third), the moment of the beginning of Touch n1=n2=n3=6

Sr. No	Biomechanical Indicators	Unit	Mean Rank			Test(٢X) Kruskal Wallis	.Sig (p.value)	Function
			First level	Second level	Third level			
١	**Height of CG**	meter	٨.٥٠	١٥.٥٠	٤.٥٠	١٣.٠٥	٠.٠٠١	Significance
٢	**Total speed of CG**	m\s	١٤.٨٣	٩.١٧	٤.٥٠	١١.٢٨	٠.٠٠١	Significance
٣	**Kinetic energy**	Joule	٨.١٧	١٥.٥٠	٤.٨٣	١٢.٥٤	٠.٠٠٢	Significance
٤	**Potential energy**	Joule	٣.٥٠	١٥.٥٠	٩.٥٠	١٥.١٦	٠.٠٠١	Significance
٥	**Total energy**	Joule	١٤.١٧	١٠.٥٠	٣.٨٣	١١.٥٦	٠.٠٠٣	Significance
٦	**Angle of left hip**	(°)	١١.٠٨	١٠.٧٥	٦.٦٧	٢.٥٨	٠.٢٧٥	Non Significance
٧	**Angle of left knee**	(°)	١٢.٣٣	٩.٣٣	٦.٨٣	٧.٢٥	٠.٠٢٠	Significance
٨	**Angle of left ankle**	(°)	٦.٧٥	١٠.٥٨	١١.١٧	٢.٤٥	٠.٢٩	Non Significance

٩	**Angle of the back inclination with the land**	(°)	١٥.٥٠	٨.٧٥	٤.٢٥	١٣.٧١	٠.٠٠١	Significance

Sig.(p.value) < 0.05

Table (5)

Significance of differences between of Biomechanical indicators for motor transport indicator during high jump Takeoff to levels of performance (First-second-third), the moment of break contact n1=n2=n3=6

Sr. No	Biomechanical Indicators	Unit	Mean Rank			Test(٢X) Kruskal Wallis	Sig. (p.value)	Function
			First level	Second level	Third level			
١	**Height of CG**	meter	٧.١٧	١٥.٣٣	٦.٠٠	١٠.٩٠	٠.٠٠٤	Significance
٢	**Total speed of CG**	m\s	١٥.٥٠	٩.٥٠	٣.٥٠	١٥.١٦	٠.٠٠١	Significance
٣	**Kinetic energy**	Joule	٩.٦٧	١٥.٣٣	٣.٥٠	١٤.٧٥	٠.٠٠١	Significance
٤	**Potential energy**	Joule	٣.٥٠	١٥.٥٠	٩.٥٠	١٥.١٧	٠.٠٠١	Significance
٥	**Total energy**	Joule	١٥.٥٠	٩.٥٠	٣.٥٠	١٥.١٦	٠.٠٠١	Significance
٦	**Takeoff Time**	second	٣.٥٠	١٢.٥٠	١٢.٥٠	١٧.٠٠	٠.٠٠١	Significance
7	**Change in Height of CG**	meter	٩.٦٧	٨.١٧	١٠.٦٧	٠.٦٧	٠.٧١٧	Non Significance
٨	**Decreased Energy during takeoff**	Joule	١٢.٣٣	١١.١٧	٥.٠٠	٦.٥٤	٠.٠٣٨	Significance
٩	**Kick-off angel**	(°)	٩.٢٥	١٥.٥٠	٣.٧٥	١٤.٨٠	٠.٠٠١	Significance
١٠	**Angle or left hip**	(°)	١٥.٥٠	٥.٥٠	٧.٥٠	١١.٧٩	٠.٠٠٣	Significance
١١	**Angle of left knee**	(°)	١٢.٨٣	١٢.٠٠	٣.٦٧	١٠.٩٧	٠.٠٠٤	Significance
١٢	**Angle of left ankle**	(°)	١٣.٨٣	٩.٦٧	٥.٠٠	٨.٤٨	٠.٠١٤	Significance
١٣	**The push**	Newton/s	١٢.٧٥	٨.٠٨	٧.٦٧	٦.٣٨	٠.٠٤٤	Significance
١٤	**Motor Transport Indicator**	/°Joule	١٢.٨٣	١٠.٣٣	٥.٣٣	٦.١٤	٠.٠٤٦	Significance

Sig.(p.value) < 0.05

tables (4) (5) showing there are statistical significance differences between motor transport indicator during takeoff in the high jump to levels of performance (first-second-third), in the moments of the beginning of touch and break contact, where researchers sees that takeoff phase is the most important phases of the performance of the high jump, where he represents the bonding process between the gained horizontal high-speed from approaching and turn it into a vertical speed by increasing the push during takeoff to change the motor performance path.

the results showed there are statistical significance

differences in the total speed indicator to the general center of gravity of the body between the three levels of performance and for the first level as valued (0.001) (0.001) during the moments beginning of touch and break contact, as valued at the moment of the beginning of touch for the first level of the best (6.628 m /s) and the moment of breaking the connection to the same level (5.785 m / s).

researchers due this decrease in total speed values for the general gravity center of the body during takeoff of the three levels of performance from the moment of the beginning of touch to the moment of breaking the contact to change the performance path , player works to transform the horizontal speed gained to vertical speed to skip the bar , which affect the loss partly to that speed , when the player arrival to put the takeoff foot (the beginning of touch moment) it shall be the player to reduce the time fulcrum is standard for the perfect performance and which is confirmed by the results of the differences between the three levels of performance and for the first level, which amounted to value (0.173 w) where it is linked to an angle takeoff foot (left) where the player try to put his left foot semi-upright during the moment of the beginning of touch passing moment damping and ending for the moment to break contact, as the value of the left knee angle of the first level of moments beginning of touch and break contact, respectively (172 °), (177 °), as well as the results of the change indicator in the height of the high gravity center of the body during the takeoff, which amounted to three levels (0.384 m), (0.376 m), (0.397m), and it agrees with the study ch. raja rao, prof. y.kishore, dr. j.ramamohan rao (2014). (4)

these results are consistent as indicated by **the international association of athletics federations (2006)** that during the takeoff must be a takeoff leg full extended with the heel, also must be the upper part straightness with takeoff leg to achieve angle of the back inclination with the land , with the installation of the buttocks, which shows through the presence of statistical significance

differences of angle of the back inclination with the land and in favor of the first-level value of (0.001), value of three levels, respectively (53 °), (64 °), (56 °) , in addition to the angle or left pelvis, which has not changed much during the moment of the beginning of touch and the moment of breaking the contact and value of three levels ، (157°،156°،152°),(166°,165°,159°) (5)

the tables (4), (5) showing there are statistical significance differences in values of motor transport indicator during the takeoff in the high jump, where researchers sees that the motor transport is one of the most important sports movement characteristics during the performance of the high jump, where this indicator varies according to the requirements of the performance of each skill, and the aim mechanic to high jump depends on the arrival of the player to the maximum vertical height so the motor transport indicator measurement is compared quantitatively and qualitatively through the ability of the player to produce the largest mechanical energy and not lose with the body starting , the results indicate the total energy during the performance moments ,there are statistical significance differences in favor of the first level, value of (31.602 joule), (30.148 joule) and therefore the amount of energy produced depend of the amount of mass and speed the player ,where the player mass was fixed, while the difference in player speed is basis for production energy , the best player is the one who can produce a top speed at the moment of breaking the contact, and it agrees with the study ziad saleh ali swedan (2013) (11)

whereas that a player's ability not to lose that energy (energy conservation) contribute to the effectiveness of the takeoff, which emerged through the results of decreased energy indicator from the moment of the beginning of the touch to the moment of break contact , where they found statistically significant differences in favor of the first level, reaching the value of decreased energy, respectively, for the three levels of performance (1.454) (2.364) (2.539), this is explained by the superiority of

the first level, where the lower value of the difference between two power, since the decreased total energy with the body starting with the perfect angle , impact directly proportional to motor transport indicator, which amounted respectively to the three levels of performance, respectively (54 °), (64 °), (52 °).

this confirms the results of tables (4), (5) there are statistically significant differences between the levels performance of high jump in motor transport indicator and favor to the first level whereas the values respectively (37.138) (27.072) (20.480) ° / joule , due researcher so to the important role for motor transport indicator as one of the biomechanical indicators that give a real explanation for the type of motor transport during moments of takeoff in high jump.

the researchers sees the player's ability to takeoff strongly in less time to fulcrum a base contributes to use the speed gained from approaching and transform to be vertical speed contributes to the increase of motor transport indicator, which confirms the results of pushing power to the levels of performance of three high jump, which showed statistically significant differences in favor of the first level, which amounted (33.793) (20.260) (16.483) newton.s .

where he was able player first level, which has achieved the digital level (2.10 m), which depends on the amount of produced power in less time to fulcrum. thus helping to help lift the center of gravity the body in preparation for the flight and bass over the bar and achieve the mechanic goal to perform of high jump which is to achieve the highest vertical distance highest, which depend on the starting indicators, a speed and angle and high starting ° of the body in takeoff moment.

conclusions and recommendations conclusions

.١identify the means and standard deviations of the most important indicators of biomechanical indicator of motor transport values during the beginning touch moment - break the connection to the takeoff of high jump .

2. there are significant differences between the three levels of performance of for high jump in biomechanical

indicators of the of motor transport indictor through the beginning touch moment - break the connection to the takeoff of high jump, in accordance with the following:

first: the moment of the beginning of touch found that there is statistically significant differences in favor of the (first level) in the total speed indicators for the center of gravity of the body, the total energy, the left knee angle, angle of the back inclination with the land.

second: the moment of breaking the contact appeared statistically significant differences in favor of the (first level) in the total speed indicators, total energy, time fulcrum, decreased energy, angle of the left pelvis, left knee angle, the angle of the left ankle, motor transport indicator, push.

3- there is an inverse relationship between the motor transport indicator and the amount of decreasing mechanical energy and direct relationship between the motor transport indictor and the angle of the body starting °.

4- mechanical motor transport indicator directly affects the level of achievement for the digital racers of high jump.

: recommendations

.١attention the coaches of jump competitions in athletics to mechanical motor transport indicator for the development the performance.

2. researchers rrecommended put the specific training to improve the amounts of speed and power to develop the level of performance of the three levels.

3. researchers recommend egyptian federation of athletics guided by the results of the current study because there are the best players in the egyptian national team for athletics in the high jump during put training programs for them.

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