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Contribution of some muscular strength types indicators to javelin throw performance in juniors

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Abstract
The role played by strength sports, including the effectiveness of the javelin throw as determined by this study, has made a difference. The relationship between some forms of power Mike Banaj's study aimed to determine the effectiveness of the javelin throw and its contribution to predictive measurement of the research problem. This included measuring muscle strength indicators (maximum arm strength and speed- strength) in the javelin throw for the control group. To achieve this strength, the teacher assisted in descriptive teaching - linkage chains. the research tools consisted of a sample of (12) junior players, in addition to data collection methods and a support series, as well as continuity of participation within the time frame specified in the research, through a percentage of the individuals in the study sample. The experience was directly tested outside the research and from the original community, and then the main experiment was conducted using a test of javelin performance, maximum arm strength, characteristic strength, and speed-strength. Then the basic tools were used to reach, including the research service, and achieve the results. The experiment reached an experiment on the speed-strength of the hand for the research sample to deal with a true relationship to the javelin performance function. It was based on all parts of the study, and the learning percentage was derived using an equation whose percentages can be determined in all of the following.

Keywords: Explosive power, maximum power, speed-specific power, javelin

Introduction
Sports play an integral role in raising a nation's profile on the international and continental stage, thanks to their positive impact on achieving accomplishments and winning medals. Athletics often called the "queen of sports" is a distinguished discipline that combines strength, skill, and high technique. The javelin throw is a precise event that relies on a strong integration of speed and high-level skill. Although the javelin is lighter than other throwing tools like the discus, hammer, and shot put, its execution demands a high degree of speed in generating the necessary force for the required javelin test.

This depends on the effective balance between strength, speed, and precision. The javelin throw is a festival-style event for athletes, requiring a high degree of integration between capabilities, skill, and technique. Achievement in this event does not depend on a single factor, but rather is the result of harnessing talent, particularly endurance in its various forms, such as strength, maximum power, and speed-strength. These elements all contribute to achieving the javelin's speed at launch and achieving effective results.

These are multifaceted factors arising in late childhood development and skill development, allowing us to benefit greatly from numerous advantages at this stage, particularly those related to core strength, which can contribute to performance in javelin throwing. Developing strength, especially power, speed, and velocity, is a cornerstone of training in effective javelin throwing. This strength generates high acceleration, which contributes to optimal launch speed. An athlete's ability to apply force in a very short time is crucial for successful throwing and improved performance, as the throwing process requires a coordinated sequence of movements starting with the feet, passing through the torso, and ending with the arms. Therefore, achieving optimal performance depends on the athlete's ability to transfer force throughout the body in a complete and balanced manner.

Furthermore, preparing young athletes at this stage requires a broad and precise understanding of the strength indicators that directly influence throwing performance.

This involves performance analysis based on the contribution of specific factors such as execution, maximum, or speed-strength to improving overall throwing performance. Hence, the importance of this study lies in identifying the value of a small percentage of advanced female javelin throwers from Baghdad clubs and the National Center for Sports Talent Development at the Ministry of Youth and Sports. This aims to build a knowledge base for effective and scientifically sound training that helps develop technical performance to achieve better results. the existence of modern statistics, such as the analysis based on the percentage of contribution supported by trainers and researchers to identify the influential elements in a real way, places for the first time a reliance on scientific indicators, in line with fair performance and directs training towards keeping pace with the greatest impact on the final result to achieve success in management.

1.2 Research Problem

Many junior coaches focus on developing physical fitness in javelin throwing without addressing the fundamental aspects of fitness that contribute to performance, particularly the various types of physical conditioning. Furthermore, the precise definition of how different strengths manifest in the final throw remains largely absent or undefined within the junior training environment. The correlation between these indicators and performance levels is also poorly established in local training programs, resulting in inadequate program alignment for optimal results.

Hence the research problem in the following question

To what extent can strength indicators contribute to the javelin throw performance of junior players?

Hence, the research problem emerged in an attempt to identify the differences between strength indicators and the integration between some strength indicators and the achievement of javelin throwing, and to find results for these indicators, the most important of which is achieving the best performance, and thus they can be directed towards developing influential talents to achieve sporting achievements.

1.3 Research objectives

1. Iron some Indicators Types of power muscles the relationship by achievement throw spear I have players juniors.
2. Identification on nature relationship between Indicators Types of power Muscles and level Achievement in throw the spear.
3. I want Contribution ratios for indicators some types of power Specific cramps to accomplish throw the spear.

1.4 Research hypotheses

1. Certain types of spasms and chest pain are significantly related to performance. Throwing skills among junior players.
2. Some types of spasms are ignored in terms of the throwing performance rate of junior players.

1.5 Research Fields

- **1-5-1 Human Fields:** Sample players of Baghdad clubs and the National Center for Sports Talent Management - Ministry of Youth and Sports.
- **1-5-2 Period:** Duration from 15/12/2024 to 15/2/2025.
- **1-5-3 Spatial field:** Baghdad Ministry of Youth - University of Baghdad.

1.6 Terms Defining

lineage Volume (Contribution Ratios): Values Statistics that communication on amount what It is located all variable independent from impact or Engagement in explanation Contrast All variable the follower, any that it It indicates ratio sharing all factor in investigation Result Final or Change in the phenomenon the studied one. and the phrase Other, It is It indicates to Size the role relative per variable independent in Prediction With the variable Follower within model decline or analysis predictive, where It is Expression About her usually with regards centennial after account Transactions Link and the inclination. (1:215)

Algebraic force

Is the ability on explosion maximum power in less time maybe means kinetic individual any that it power maximum instantaneous for performance Example that moment Jumping or Throwing or starting in the beginning in Running the Fast. (2:24)

Maximum forces: Become maximum contraction muscular voluntary predominating against resistance and repetition one only, and it depends in a way essential on midwife the device Nervous Central stimulation greater number maybe from Units the Navy. (3:130)

Speed-strength: Is the ability muscle or group muscular by reaching puberty with movement to higher to hesitate in less time Possible. (4:113)

Javelin throw: This is one of the track and field events where athletes throw the javelin, a sport that has been popular since Paris. The javelin is a long, thin tool with a metal tip, thrown over the shoulder. This sport requires strength, coordination, and high technique to achieve the best result. Where the javelin, which is a spear about 2.5 meters (8 pads and 2 inches) long, is thrown as far as the field, the javelin thrower gains momentum by running within a very specific area. The javelin throw is one of the events of the men's decathlon and heptathlon. (5: https://en.wikipedia.org)

2.1 Research Methodology

"Methodology is the reality where the researcher collects data through observations, interviews, questionnaires, and analysis of documents and records. "(6:107), where the researcher used descriptive stratification - survey segmentation, and the study of relationships.

Correlation

2.2 Research community and sample

The research community was defined and selected “from the part that represents the original community or presents the model that any researcher has as a whole and the focus of his work” (7: 84) with junior javelin throwers for the year (20-24), whose number is (12) athletes, who were chosen as a sample for research on juniors in Baghdad and the National Center for the Care of Sports Talents - Ministry of Youth and Sports.

2.3 Data Collection Methods

This research used several tools necessary for data collection, which the researcher employed. These tools are:

1. Arabic and foreign sources
2. The International Information Network (Internet)
3. Negev
4. Testing and Measurement

2.3.1 Devices and tools used in research

The researcher used many tools that benefited from obtaining basic data, including:

- Electronic calculator (laptop).
- A manual calculator of the (Casio) type.
- Tape.
- device dynamo foot
- Softball ball.
- Number of spears (5).
- Throwing sector cones.
- Legal field for throwing.
- Results registration forms.

2.4 Research Procedures

2.4.1 Testing and Measurement

The main goal he wants to achieve is to establish a formula that allows for recording the contributions of certain types of chest strength in achieving javelin throwing. He followed specific steps to reach the desired goal, in addition to some follow-up steps to complete the process and the situation. Equation:

- **First:** Test power maximum for the fetus (B device dynamo foot Dynamometer (8: 142) the goal from the test**:** measurement power muscles maximum for the arms (grasp) and the tension) which communication on capacity muscles the job on production maximum power maybe during Contraction muscles Voluntary.
- **Tools User:** device Day Growth Foot (dynamometer) - Chair - Record Documentation Results.
- **Performance:** sitting the player on chair in situation fixed, and the arm close from body and the attachment dual 90 degrees and he holds the player with handle dynamo by hand one only and when signal the examiner, He does the player At the maximum tighten maybe handle Don moving arm or the shoulder and it's recorded. Reading top that Appearance on device the dynamo, and it was repeated the attempt twice per arm, it depends better the result.
- **Registration:** register Result lonliness kilogram (kg) or Newton (N) according to type the device the user.
- **Second:** Test power explosive for the arms (throwing) ball soft Paul (9:185) the goal from the test: measurement power explosive for the arms and the shoulders, any capacity muscles on production power High in time short.
- **Tools User:** ball Soft pee its weight is (200-300 grams) - strip Measurement - Area throw Open - Line beginning clear.
- **Road Performance:** guide the player behind line Throwing in situation fixed, and the ball in One the hands. After take situation Prepare, He does the player throwing ball to maximum distance maybe using arm only with stability feet and not skip the line is measured. Distance from line throwing until a point Fall ball on Land. Grants the player two attempts and register better Result for him.
- **Registration:** register Distance the piece lonliness Meter (m).
- **Third:** Test power distinctive Quickly for the arms (of situation Reliance the Front (10:211) the goal from the test: measurement power distinctive Quickly for muscles arms and shoulders and the chest, Which Represents ability on performance number big from movements in time specific strongly and speed.
- **Tools use:** Carpet Exercise - hour Timing - Assistant checker for formation the number.
- **Road Performance:** Questions the player situation Reliance Front (pressure) therefore He is body right from head to feet, the hands they are close Presentation the shoulders. At signal to begin, leads the player greater number maybe from movements Press (push-up exercise) during the duration is only 20 seconds. He should that He is Height until progress the chest from the earth, then Height the complete by extension the arms. No. It is calculated movements not Complete or that touch in it body the earth.
- **Registration:** register number movements correct the executor during Time the specified amount.

2.5 Pilot Experiment

Ensuring the accuracy of scientific instructions and performance methods, identifying application requirements and associated difficulties, verifying implementation conditions, and checking test parameters. (Steadfastness), **the** researcher conducted the non - exploratory experiment on (3/1/2025), on its red amount (2) Rami, was randomly drawn from the original real search and from the new search.

2.6 Main Experiment

After obtaining the direct and accurate results of the expiration date, you can search for it. By conducting the study requires a date of 2/10/2025. It is still difficult to search (the main experiment) for sample members for the ongoing study tests.

2.7 Statistical methods

The researcher used the statistical package (SPSS) to identify the data and results, and simple regression lines, and found the following:

- Medium-sized (Pearson)
- Typical teachers of the simple linear regression model (A, B)
- Interpretation deal (publication ratio)
- (F) test for the significance of the simple linear regression model
- (T) test for significance of intersection, and significance of variance
- (T) test for correlation significance
- (Chi^2) test

3.1 Results presenting and discussing

3.2 Description of achievement measurement throwing and some types of force

Table 1: Describe the measurement of certain types of spasms in the performance of the throwing throw

Variables	Measurement unit	Mean	St.d	Lowest value	Highest value
Maximum power	Kg.	47.125	14.55	40	59.3
Exclusive power	M.	33.25	1.982	31.59	34.91
Rapid strength	Rep.	25.875	1.807	24	28
Achievement	M.	43.125	2.232	41.5	44.9

Table (1) shows the results of some of the representative actors using (mean, elastic deviation, and the values of the lowest and highest measurements).

3-3 Presentation and analysis of the results of a model for some types of strength and achievement

Table 2: Displaying the results of the analysis of variance for multiple linear variance

Analysis of variance for multiple linear regression with weighted estimates					
Variation Sources	Sum of squares	Freedom degree	Average of squares	F value	Sig.
Decline	33.402	3	11.134	30.225	0.003
Remains	1.473	4	0.368		

Table (2) presents the results of the analysis of variance for multipurpose linear variance, determined at a reliable level for the weighted estimates of the model factors.

3-4 Some suggestions for multiple linear regression analysis

Table 3: Some suggestions for multiple linear regression analysis

Model abstract				
Total correlation coefficient	Determination Coefficient	Corrected agreement	Estimation Error	Durbin Watson
0.979	0.958	0.926	0.606	2.294
The forecasters: (constant) X1, X2, X3,				

Table (3) includes estimates for some proposals for multiple representative linear regression analysis with multiple correlation coefficient between variance and model function

3-5 Presenting the results of the linear regression analysis for a relative reference model

Table 4: the contribution percentages of the variables are shown

Transactions	Non-standard transactions		Standard transactions	T test	Sig. level	Sig. comparisons
	B Transactions	Random error	Beta Transactions			
X1	0.062	0.02093	0.406022	2.974	0.034	HS
X2	1.281	0.17891	1.13783	7.161	0.011	HS
X3	0.071	0.19270	0.05821	0.372	0.721	NS
Fixed limit	-4.273	5.863		-0.728	0.654	NS

Table (4) shows the significance of the differences within the significant level (0.05) for the factors of the linear regression model for the variables (maximum force and driving force) and the randomness of the differences for achievement and rapid force, and the shape of the highest contribution percentage is the variable of moving force (1.281).

3.6 Discussion of results

The results indicate that the variables of maximum power and strength show a statistically significant ratio at the 0.05 level, meaning they directly contribute to javelin throw performance. the boxer's comparison revealed that the largest contribution was due to the strength variable (1.281), reflecting the crucial role of this type of power in enabling the thrower to generate high power in a short time, which is essential for maximum throwing speed at launch. Hard work also achieved a statistically significant ratio (0.062), and because it is capable of less than strength, this explains why maximum power provides a good foundation for other types of power. It helps support the muscles and muscles in meeting the demands of high performance, but it is sufficient for outstanding performance unless the explosive power is used to transfer the power quickly during the throw. In contrast, speed power did not show a statistically significant ratio (0.721), indicating that this type of power does not have a direct impact on performance in the technical study. This may be attributed to the fact that rapid force is related to repetition at a moderate speed, while javelin throwing relies more on a momentary muscular explosion that combines force and speed in one action. This is what Harah (1982) [9] (11:162) incorporated when he stated that "throwing performance is based more on leading ability than rapid force, which seems to be due to the nature of the movement, requiring a powerful and sudden contraction. "Zatsiorsky & Kraemer (2006) [10] also noted that "athletic strength is the most influential factor in throwing and jumping sports, as the success of running depends on the ability to generate running power in the shortest possible time" (12:201), which aligns with the results of this study that found this variable to be superior to other types of strength. Therefore, it can be argued that developing strength skills programs explosive He should that Tears Priority in numbers Ramama the spear, on that It supports it Training power maximum As a basis building power muscular Complete, while It comes power speed in Rank less from where impact direct on achievement.

4 Conclusion and Recommendations

4.1 Conclusion

1. As a result of the relative contribution analysis of the variation in maximum and strong power that she possesses, it is significant in the achievement of the javelin throw at a significance level of (0.05), which indicates that qualitative forms of power are fundamental in determining the performance level of young players.
2. Force reached the highest contribution ratio (B = 1.281) in explaining the variation in throwing performance, which reflects the essential role of the ability to produce a large force in a short time, which determines the speed and accuracy of the spear.
3. The maximum strength of the least protective force (B = 0.062) is appropriate to the nature of the significant impact, and represents the basic basis upon which other forces are built, especially the force that directly emanates from it.
4. High quality did not show statistical significance (p = 0.721), indicating that this type of force does not directly contribute to improving throwing performance, since the nature of performance in the javelin throw requires an explosive force. Muscularly Momentary, not poetic, of the movements.
5. The results of this study confirm that it is consistent with what we (Harre, 1982) and (Zatsiorsky & Kraemer, 2006) [9, 10] have concluded, that the effectiveness of javelin throwing depends more on the development of strong power than anything else, given the nature of the performance which requires the generation of high energy in a short time to achieve the maximum clearance distance.

4.2 Recommendations

1. The focus is on developing superior strength through the use of triple plyometric exercises and progressive resistance training, where the variable has become the biggest influence in achieving outstanding performance in javelin throwing.
2. Maximum strength training is used as a basis for building explosive power, characterized by effective, efficient, and effective athletic ability to withstand high tension during throwing phases.
3. New findings were included in program planning, whereby loads are built in addition to the power variables that contribute It is actually about achieving success, not just based on experience or profit and the achievement of throwing, he learns how closely it relates to the overall typical performance of the magazine's ratios.
4. The focus is on the integration of technical and physical training, through the main stages in throwing and the requirements of the generated force, and the transfer of the generated force from the feet to the arm and does not require high.

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