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The contribution of certain anthropometric and physical measurements to explosive and speed-characteristic leg strength in junior wrestlers

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Abstract
The study sought to determine the impact of specific physical and anthropometric measurements on the explosive force and speed of the legs in novice wrestlers. To do this, the study was conducted on a sample of 30 young individuals from sports clubs in the Maysan governorate, focusing on wrestling. Physical measurements were conducted about long jump, lower back and hamstring flexibility, and a 30-meter sprint. Regarding the muscular strength of the legs, anthropometric measurements regarding lengths and circumferences, and skill assessments pertaining to explosive strength and leg speed. The study's results indicated the averages for the long jump, lower back and thigh muscle flexibility, 30-meter sprint, leg muscle strength, average lengths of the leg, thigh, torso, arm, and palm, as well as the averages for the circumferences of the forearm, upper arm, leg, thigh, and abdomen. The results indicated that the optimal correlation in physical measurements exists between leg muscle strength and the performance levels of explosive force and leg speed in novice wrestlers. The correlation was more pronounced in the open jump, but the anthropometric measurements indicated the most significant association between belly circumference and skill performance levels in explosive strength and leg speed among novice wrestlers. The researchers advised prioritizing leg muscular strength and belly circumference when selecting novice wrestlers, particularly emphasizing explosive power and leg speed.

Keywords: Contribution ratio, anthropometric measurements, physical, explosive force, speed mark, wrestling

Introduction
In order to reach the athlete to the highest possible level, it is essential to have a solid understanding of the physical and physical characteristics (anthropometry) that serve as the foundation for the fundamental supports that must be provided. On the other hand, the structural structure of the body plays a significant and fundamental role in athletic performance (Furkatovna, 2021) [12]. It would appear that the significance of anthropometric measurements lies in the fact that they are frequently utilized as a foundation for determining whether or not an individual is successful in a specific endeavor (Thamizhselvi & Geetha, 2019) [37]. According to the findings of Charcharis (2023) [7], Corso (2018) [9], Kriswanto *et al*. (2021) [20], and Kwon and Kim (2025) [22], the length and shortness of bones have an effect on the mechanical characteristics of skill performance. This means that the difference in bone lengths will have an effect on the skill performance of athletes, and this effect can be either positive or negative. On the other hand, people are able to enhance their performance by engaging in a variety of sporting activities, provided that the principle of individual differences is taken into consideration during the educational and training process (Ericsson, 2020) [11]. It is possible to determine these individual differences, in instance, through the use of anthropometric measurements. Anthropometric measurements are of particular significance, according to Robertson *et al*. (2018) [34], since their availability provides a larger possibility to absorb the appropriate motor execution of abilities. As a result, anthropometric measurements hold a significant position in a variety of sports sectors. The research conducted by Zhao *et al*. (2019) [41] highlights the significance of acquiring knowledge of and conducting research on anthropometric and physical measurements among athletes. This is due to the fact that every sporting activity has its own unique physical requirements that set it apart from other activities. These requirements are reflected in the qualities that must be possessed by individuals who participate in this activity.

Consequently, the purpose of this study is to determine the most significant physical and anthropometric measurements that contribute to the performance of the two men in the sport of wrestling in terms of their explosive force skill and speed.

Study Problem

According to Joksimović *et al*. (2019) [15], the significance of the current study stems from the significance of physical and anthropometric measurements in the realm of sports. These measurements play a crucial role in determining the level of skill performance of players, as well as in the selection of sports and the success of skill performance in a variety of sports games and events. In their respective studies, Marques *et al*. (2019) [25] and Mazer (2020) [28] highlight the fact that every sport has its own specific criteria, particularly wrestling, which necessitates precise physical and anthropometric measures. Furthermore, they highlight the fact that the player's skill performance is directly proportional to their ability to accurately measure these measurements. Identifying the contribution of these measurements and percentages to contribute to skill performance, as well as identifying the scientific predictive equations for them, is the purpose of the study. The significance of the study is demonstrated by the knowledge of physical and anthropometric measurements that contribute to the success of the performance of skills in explosive power and speed for both men and beginners in wrestling. Due to the aforementioned, as well as the fact that there are not enough research that have been completed on wrestling beginners in Iraq, it is important to take into consideration the impact that physical measurements and anthropometric measurements have in skill performance. The problem of the current study emerged as a result of the work that the researchers did in teaching the wrestling course and supervising the teaching of the wrestling course at the Faculty of Physical Education and Sport Sciences. The purpose of this study is to determine the relationship between physical measurements and anthropometric measurements in the explosive force and speed of the two men who are participants in the junior wrestlers, as well as the extent to which these measurements contribute to the skill performance of the juniors.

Objectives of the study

This study aimed to

- Identify the level of some selected physical and anthropometric measurements among wrestling beginners.
- To identify the relationship between the physical and anthropometric measurements under study and the level of performance of the explosive force skill and speed of the two men in wrestling beginners, and then to identify the measurements that contribute the most to the explosive power and speed of the two men in wrestling beginners.

Study Questions

The present study sought to answer the following scientific questions

- What are the levels of certain physical and anthropometric dimensions, as well as explosive and speed skills, of the two men in beginner wrestling?
- What is the correlation between the physical and anthropometric measurements examined and the performance levels of explosive force and speed skills in novice male wrestlers? Additionally, which of these measurements are most significant for explosive power and speed in this demographic?

Areas of study

- **Human Area:** Junior wrestling from sports clubs in Maysan Governorate who participated in the wrestling championship in the Iraqi Championship.
- **Spatial Area:** Gyms in Maysan Governorate.
- **Time Area:** From 1/2/2024 to 15/2/2024.

Methodology

Study Methodology

The descriptive method was used in one of its forms "relational study" due to its suitability for this study.

Study Population

The study population consisted of (65) junior wrestling teams in clubs in Maysan governorate, which numbered (65) in ten sports clubs.

Study Sample

The study sample consisted of a sample of (30) juniors from ten club teams in Maysan governorate who participated in the wrestling championship, and the best three juniors from each school were selected according to their rank in the championship, and Table 1 shows the characteristics of the study sample according to the variables of age, height and body mass.

Table 1: Shows the characteristics of the study sample according to the variables of age, height and body mass (N=30)

Variables	Unit of Measurement	M	SD	Torsion coefficient
Age	Year	15.88	0.40	0.427
Training Age	Year	2.68	0.64	0.266
Length	Cm	161.25	5.28	0.568
Weight	kg	58.92	8.59	0.271

Instruments and measurements used in the study

In order to collect data, the following tools were used

A data collection form that included the following information for each youngster: age, height, body mass, anthropometric measurements (lengths and circumference), physical measurements (long jump, sitting on the back, flexibility of the back and thigh muscles, running 30 meters, strength of the muscles of the legs), and skill tests (explosive strength and speed of the legs).

Tools and devices used in research

- Medical scale weighing to the nearest kg.
- Rest meter to measure the total length of the body.
- Modern camera.
- Nearest Time Stopwatch (0.1).
- Certified measuring tape in centimeters.
- A set of iron bars-a set of moves of different weights.
- Wrestling mat.
- Medical balls, training warm-up and physical preparation.
- A wrestling doll.

Anthropometric Measurements

- **Measurement of Lengths:** Measured by the tape measure tothe nearest (1) cm as follows

- **Leg length:** The distance between the knee incision from the lateral side to the lateral heel of the fibula was determined (Vogt *et al.*, 2020) [39].
- **Thigh length**: Measurement was made from the standing position by calculating the distance between the large trochanter of the femur to the incision of the knee joint from the lateral side (Kwon & Kim, 2025) [22].
- **Torso length:** From the sitting position on a chair without a back, the measurement is made from the edge of the seat to the cantilever of the seventh cervical vertebra (Kozina *et al*., 2021) [19].
- **Arm length**: The distance between the monstrous crest of the acromial cantilever and the needle cantilever of the radius was determined (Pelana *et al*., 2021) [32].
- **Palm length**: The length of the palm was measured using a tape measure from the middle of the wrist to the end of the middle finger and it is flat (Vidona & Elijah, 2023) [38].

Ocean measurement: Measured by the measuring tape to the nearest 1 cm as follows:

- **Forearm circumference:** The arm was measured with the arm straight, and the largest forearm circumference was adopted (Dutta, Thomas & Kumar, 2022) [10].
- **Upper arm circumference**: Wrapping the measuring tape from the middle of the biceps with the arm straight (Barbosa *et al*., 2024) [4].
- **Leg circumference:** Wrap the measuring tape around the middle of the leg fat (Karatieieva *et al*., 2022) [17].
- **Thigh circumference:** The young person stands on a Swedish chair so that the distance between the feet is shoulder-width, and the measuring tape is rolled from just below the fold of the mechanism, and from the front it is aligned with the same level and the distance of their meeting point is determined (Karatieieva *et al.*, 2023) [16].
- **Abdominal circumference:** Fixing the tip of the measuring tape at the umbilical cord, wrapping the tape measure around the body and determining the distance between them (Auliadina *et al.*, 2019) [3].

Physical Measurements

- **Long jump:** It is a matter of consistency and the best attempt score for a player to make two attempts, as described by Yefremenko, Piatysotska and Pavlenko, (2023)., and the consistency and honesty of the test was (0.91).
- **Sitting on the back:** Recording the correct number of times the player performs during the (30s) of the lying position on the back, as described by Kemenuh *et al.* (2024) [18], and the stability and validity of the test was (0.92).
- **Back flexibility and quadriceps**: The standing bending reach test was used as described by Nagai *et al.* (2021) [30], and the stability and validity of the test was (0.89).
- **Speed:** The 30 m sprint test was used in a straight line, as described by Altmann *et al.* (2019) [2], and the test was stable and honest (0.92).
- **Muscle strength of the legs:** The test was performed using a dynamometer according to the procedures referred to by Hietamo *et al.* (2020) [13].

The researchers affirm that all employed measurements are of the ratio scale type, exhibit a minimal likelihood of mistake, and are distinguished by high integrity and consistency, as noted by Królikowska *et al.* (2023) [21].

Motor Abilities Tests

First: Speed Tests (Löllgen & Leyk, 2018) [23].

- **Purpose of the test:** To measure the force characterized by the specific speed of the muscles working in the performance of the snatching skill.
- **Tools Used:** Wrestling Mat/Stopwatch.
- **Test Description:** From a standing position, the tester performs a skill (snatching) (3) times as fast as possible.
- **Test Instructions:** The player does not touch the mat with any part of his body, including the forehead, palms, and feet during the performance. And the player does not stop during the performance for any reason.
- **Calculating Grades:** Calculate the performance time of the snatching skill (3) repetitions) by imaging and calculate the best.

Second: Flexibility Test (Nuzzo, 2020).

- **Purpose of the test:** Flexibility of the spine.
- **Tools used:** Wrestling mat/dress tape.
- **Test Description:** From the position of lying on the back, the laboratory takes the position of the dome to reach the maximum possible distance between the torso and the rug, so that the distance between the hands and legs is as minimal as possible, and the heels of the feet are in a straight line drawn on the mat, and the feet are completely on the mat, and the distance between them is allowed to balance the laboratory.
- **Calculating Grades:** The horizontal distance between the line between the heels and the line between the palms is measured and vertical distance is measured by measuring the distance between the highest area of the torso and the mat.

Third: Explosive Force Test (Buckthorpe, 2019) [6].

- **Purpose of the test:** Measurement of the explosive force of the muscles of the legs.
- **Tools used:** Flat ground that does not expose the individual to slipping Measuring tape with a drawing on the ground starting line.
- **Test Description:** The tester stands behind the starting line, the feet are slightly apart, the arms are high, the arms are swinging forward and down, with the knees halfway back, and the torso is tilted forward, so the two arms are swinging forward, which remains with the legs along the stump, and pushing the ground with the feet with force from trying to jump forward as far as possible.
- **Calculating grades:** The farthest distance the laboratory can reach is calculated.

Fourth: Knee test for 50% weights class (MacDonald *et al*., 2020) [24].

- **Purpose of the test:** Measurement of muscular endurance of the muscles of the legs
- **Tools Used:** A range of iron bars of different weights
- **Test Description**: From a standing position of weights above the shoulders, the tester rotates the knees completely to reach a squat position. The tester then follows the two legs to reach a standing position of weights on the shoulders, then repeat the action for (31 seconds).

Exam Conditions

- The performance should be done in the shortest possible time.
- To be fully standing every time.
- No pause is allowed during the performance of the test.
- **Scoring Method:** The number of players who score is measured and the player is given one attempt.
- **Fifth:** Testing the time of falling on the legs from the outside (Millikan *et al*., 2019) [29].
- **Purpose of the test:** Measuring the motor speed of a wrestler
- **Tools Used:** Wrestling mat-stopwatch.

Performance Method

- The tester stands in the top fight mode a meter away from the teammate standing in the freestyle wrestler's top fight mode without moving.

Number of starting signal

- The tester falls on one foot from the outside while rotating to sit down with the colleague.
- The lab performs the movement as fast as possible.
- A video camera is placed perpendicular to the direction of motion and at a distance that allows the field of motion to be within the entire frame of the image and fixed at a height of one meter from the ground.

Registration method: Each lab is given one attempt and is calculated for the performance time from the moment of start to the end of the movement.

Sixth: Movements of Falling on the Legs (Shams, 2025) [36]
Falling on the legs from the front

- **Preliminary:** Body position the wrestler stands facing the opponent with the torso tilted forward, the feet parallel and the distance between them as far apart as possible.
- **Docking with the opponent:** The wrestler grabs one arm of the opponent from the upper arm with the forearm locked and encircles the opponent's neck with the other hand and places the front on the opponent's shoulder with the grip.

Main Stage

- **Penetration:** The wrestler penetrates the leg forward as the body level changes to place the knee between the opposing feet, and the back leg is on its entire stretch backwards.
- **Attacking Setup:** The wrestler encircles both of the opponent's legs with the hands and tightens them towards the chest with the back leg pulled for the lateral anchor, then holds his opponent over the shoulder and turns to the side.
- **Execution:** The wrestler pulls a competitor hard towards the mat and a veil on the back.

Final Stage

- **Follow-up:** The wrestler pulls the opponent's legs firmly towards the chest by turning his back on the opponent to secure his shoulders on the mat.
- **Control:** The wrestler controls his opponent from lying on his back on top of the opponent's torso, with the two legs open and the joints of the opponent's legs towards the chest.
- **Seventh:** Falling on the legs and throwing them to the side (Riccio, Tarulli & Maffulli, 2022) [33].
- **Preliminary Stage:** Body Position: The wrestler stands facing the opponent where the torso is for example forward, and the weight of the body is evenly distributed over them, and the distance between the wrestlers is as far apart as possible.
- **Docking with the opponent:** The wrestler grabs one of his arms with the opponent's forearm with the forearm locked and encircles the opponent's neck with his other hand, and places the forehead on the opponent's shoulder with grip.

Main Stage

- **Penetration:** The wrestler does not level the body by falling on the opposing leg and resting on his knees.
- **Attacking Setup:** The wrestler encircles the thighs and his head on the opposing right side at pelvic level.
- **Execution:** After the wrestler lifts his torso upwards and lifts his opponent off the mat and drops his opponent to the left until his body is horizontal with the mat, then he bends his torso forward and lands with the opponent's chest to expose his back to the mat.

Final Stage
Chest pressure on the opponent's torso
Continuity: The wrestler continues to hold his two legs with control. The wrestler lifts the opponent's legs up and holds them tight with the opposing shoulders on the mat.

Eighth: Falling on the legs, lifting up, and then throwing backwards (Mazer, 2020) [28]

- **Preliminaries**: Body posture, the wrestler stands facing the opponent, the feet are parallel and the weight of the body is evenly distributed and the distance between the wrestlers is as far apart as possible.
- **Docking with the opponent:** The wrestler grabs one arm of the opponent by the upper arm with the forearm locked while the other hand encircles the opponent's neck and places the opponent's forehead on the opponent's shoulder.

Main Stage

- **Penetration:** The wrestler changes the body as he advances, the man forward to place the knee between the opponent's legs and the back man on its entire stretch.
- **Preparation for the attack:** The wrestler encircles the opponent's legs from the middle of the thigh and joins them towards the chest with the back leg for lateral anchor, then gets up to stand with the opponent's load over the shoulder and encircles the opponent's thigh from the front and encircles his arm with the armpit and forearm from behind the back.
- **Execution:** The wrestler falls on the brutal front of the penetrating man's thigh and then pushes the opponent back and throws him to the mat.

Final Stage

- **Follow-up:** The wrestler encircles both arms of the opponent tightly while pressing the back against the opponent's chest.
- **Control:** The opponent dominates by lying on his back with his legs open and his shoulders firmly on the mat.

Validity of the tests

To verify the validity of the test, the discriminatory honesty method was used, where the test was applied to (8) of the distinguished juniors in wrestling who obtained the highest scores in the wrestling championship in Maysan governorate from outside the study sample, and (8) from the non-distinguished juniors in wrestling who obtained the lowest scores in the governorate wrestling championship, and the data for the two groups were collected according to the conditions preceding the test, and the (T) test was used for two independent groups in order to determine the differences between them and the results of Table 2 show this.

Table 2 clearly indicates statistically significant differences at the, α=0.05 level in the explosive force test and speed between distinguished and undistinguished juniors, favoring the distinguished group. This outcome substantiates the test's discriminatory validity and its effectiveness in measuring its intended parameters.

Table 2: Shows the results of the (v) test to indicate the differences between distinct and unmarked juniors on the explosive force test and the speed test for the legs

Testing	Distinguished		Indistinct		T	Sig
	M	SD	M	SD		
Distinctive Power	10.11	0.66	7.9	0.80	7.67	0.001
Explosive force	9.92	0.72	7.3	0.87	6.56	0.001

* Statistically at the level of (α=0.05) (v) tabular (2.22) with degrees of freedom (14)

Test Stability: To determine the stability of the test, it was applied twice to (8) wrestling juniors from outside the study sample with a time interval of (3) days between the two applications, and the method of applying and reapplying the test (Test-retest) was used to determine the stability coefficient using the Pearson correlation coefficient between the two applications and the results of Table 3 showed this.

Table 3: Shows the stability of the explosive force test and the characteristic speed of the two legs

Testing	First Application		Second Application		Stability (T)	Sig
	M	SD	M	SD		
Distinctive Power	9.3	0.86	9.4	0.99	0.95	0.001
Explosive force	8.9	1.01	8.11	0.95	0.84	0.002

At a significance threshold of (α=0.05), the t-value with 6 degrees of freedom is (0.63). Table 3 indicates that the stability coefficients for the explosive force and velocity tests of the two subjects were 0.94 and 0.84, respectively, which are deemed satisfactory according to the criteria established by Huang, Huang and Wu (2023).

Statistical Treatments: To process the data, use the Statistical Packages for Social Sciences (SBSS) software using the following statistical processors.

- Arithmetic averages and standard deviations.
- Pearson correlation coefficient.
- Gradient regression coefficient, (R2)
- T-test

Results

Presentation and discussion of the results:

First: Presentation and discussion of the first question:

What is the level of some of the selected physical and anthropometric measurements and the explosive and speed skills of the two men in beginner wrestling?

To answer the first question, the arithmetic averages and standard deviations of each of the study variables were used, and the results of Table 4 showed this.

Table 4: Shows the arithmetic averages and standard deviations of the selected physical and anthropometric measurements and skill level of the explosive power and speed of the two men in the beginners wrestling (N=30)

Variables	Unit of Measurement	M	SD
Age	Year	15.71	0.65
Length	meter	160.36	0.03
Weight	kg	59.77	4.16
Leg length	Cm	35.41	1,27
Thigh length	Cm	37.77	2.82
Trunk length	Cm	38.57	2.00
Arm length	Cm	57.57	1.39
Palm length	Cm	16.17	1.33
Forearm circumference	Cm	17.24	1.40
Upper arm circumference	Cm	20.87	1.20
Leg circumference	Cm	27.31	1.56
Hip circumference	Cm	36.87	1.60
Abdominal circumference	Cm	60.94	3.49
Long Jump	Cm	137.91	6.30
Back flexibility and quadriceps	Cm	15.94	2.72
30 meters sprint	Second	5.19	0.37
Muscle strength of the legs	kg	40.67	3.23
Distinctive Power	Degree	10.31	0.46
Explosive force	Degree	10.11	0.50

The data presented in Table 4 indicates that the average age, height, and body mass of the junior wrestlers were 15.71 years, 160.36 cm, and 59.36 kg, respectively. The average lengths of the leg, thigh, torso, arm, and palm were 35.41 cm, 37.67 cm, 38.47 cm, 47.47 cm, and 16.07 cm, respectively. The average circumferences of the forearm, upper arm, leg, thigh, and abdomen were 16.14 cm, 20.87 cm, 27.31 cm, 36.87 cm, and 60.84 cm, respectively. In terms of physical performance, the averages for the long jump, flexibility, lower back, posterior thigh muscles, 30 m sprint, and leg muscle strength were 127.91 cm, 15.94 cm, 4.09 s, and 41.67 kg, respectively. Regarding skill performance in open and joint jumping, the averages were 10.21 and 10.11 degrees, respectively. The anthropometric measurements were found to be comparable to those in Masanovic *et al.* (2018) [27] for fourth and fifth-grade pupils, as well as Masanovic, Popovic and Bjelica, (2019) [26] study (1997) for primary school students aged 9-10 years.

The physical measurements of jumping distance, lower back flexibility, and 30-meter running time were found to be below the average for novice wrestlers, as classified by Aksoy, Aslan and İmamoğlu (2020) [1], with respective averages of 138 cm, 17.5 cm, and 3.74 seconds. The researchers attribute this deficiency to the nature of the physical conditioning and skill level of the juniors, as well as their chronological age and the appropriateness of the sports selection process for initiating wrestling practice. The strength of the leg muscles is classified as average good, according to Çimen Polat *et al.* (2018) [8], with a range of 39.50-44.50 kg.

Second: Presentation and discussion of the second question

What is the relationship between the physical and anthropometric measurements under study and the performance level of the explosive force and speed skills of the two men in the beginner wrestler, and what are the most important measurements that contribute to the explosive power and speed of the two men in the beginners of wrestling?, To answer the first part of the question, use the Pearson correlation coefficient, or in order to answer the second part of the question, the gradient regression coefficient is used, and Table 5 shows this.

Table 5: The results of the Pearson correlation coefficient show the relationship between anthropometric physical measurements and the performance level of the explosive force and speed skills of the two legs in wrestling beginners.

Variables	Unit of Measurement	Distinctive Power	Explosive force
Age	Year	0.034	-0.176
Length	meter	-0.082	-0.182
Weight	kg	-0.396	-0.375
Leg length	Cm	-0.079	-0.176
Thigh length	Cm	-0.050	-0.248
Trunk length	Cm	0.099	-0.116
Arm length	Cm	-0.116	-0.338
Palm length	Cm	-0.082	-0.223
Forearm circumference	Cm	0.092	-0.144
Upper arm circumference	Cm	-0.015	-0.196
Leg circumference	Cm	-0.123	-0.241
Hip circumference	Cm	-0.068	-0.229
Abdominal circumference	Cm	-0.593	-0.553
Long Jump	Cm	0.093	-0.138
Back flexibility and quadriceps	Cm	0.034	-0.034
30 meters sprint	Second	0.042	-0.062
Muscle strength of the legs	kg	0.691	0.573

*Statistically significant at the level of ($\alpha \leq 0.05$), tabulated p-value (r) (0.44), with (29) degrees of freedom.

Physical Measurements

Table 5 indicates that there is no statistically significant link among the long jump, lower back and hamstring flexibility, the 30-meter sprint, and the performance levels of explosive power and speed-strength leg skills in juvenile wrestlers. A statistically significant positive association was identified between leg muscle strength and the performance level of explosive power and speed-strength leg skills in juvenile wrestlers. The association was more pronounced for explosive power, with a Pearson correlation coefficient of 0.70, and for speed-strength, it was 0.57.

Anthropometric Measurements

The data shown in Table 5 indicate an absence of statistically significant link between the lengths of the leg, thigh, trunk, arm, hand, forearm, and upper arm, and the performance levels of explosive power and speed-strength leg skills in juvenile wrestlers. A statistically significant positive link was identified between abdomen circumference and the performance level of explosive power and speed-strength leg skills in juvenile wrestlers. The correlation was most pronounced with abdominal circumference, as evidenced by Pearson's correlation coefficients of 0.61 for speed-strength and 0.56 for explosive power. The results in Table 5 represent the initial phase of stepwise regression analysis, revealing statistically significant relationships that aim to ascertain the impact of anthropometric body measurements on the explosive power and speed-strength leg skills performance in young wrestlers. The one-way ANOVA findings indicate the correlation between physical and anthropometric measurements and the performance levels of explosive power and speed skills in two individuals to ascertain the regression coefficient. Explosive power and speed in the legs served as dependent factors, whereas physical and anthropometric measurements functioned as independent variables. Stepwise regression analysis indicated that leg muscle strength was the sole physical variable influencing the performance level of explosive power and speed in the legs of young wrestlers, whereas abdominal circumference was the exclusive anthropometric variable affecting the same performance metrics. The regression coefficients (R^2) were 0.736 for explosive power and 0.560 for speed, as indicated in Table 6. A t-test was employed to ascertain the components of the regression equation, with the findings presented in Table 7.

Table 6: Shows the results of the one-way ANOVA of the relationship between physical and anthropometric measurements and the performance level of explosive power and speed skills for both men, to determine the regression coefficient.

Variables	Source of variance	Sum of squared deviations	Degrees of freedom	Mean of squares	F	Sig
Distinctive Power	Total Error Regression	5.372 3.672 7.933	2 27 29	2.242 0.096	22.577	0.000
	(R^2)		0.736			
Explosive force	Total Error Regression	4.426 4.023 8.338	2 27 29	1.768 0.156	11.547	0.000
	(R^2)		0.568			

Table 7: Shows the results of the t-test and the beta coefficient of the regression equation

Variables	Value of equation components		Standard error	Beta coefficient	T	Sig
Distinctive Power	Constant Leg Strength Abdominal Circumference	8.344 0.0871 -0.06795	1.588 0.020 0.018	0.666 -0.518	5.588 4.552 -3.387	0.000 0.000 0.003
Explosive force	Constant Leg Strength Abdominal Circumference	8.767 0.0797 -0.0684	1.962 0.035 0.032	0.541 -0.511	4.788 2.977 -2.778	0.000 0.009 0.0012

* Statistically significant at the ($\alpha \leq 0.05$) level

The results in Table 7 show that the value of (t) was statistically significant at the ($\alpha \leq 0.05$) level. Regarding the components of the two equations.

- **Explosive force (degrees)=**8.344 + (0.0971×leg strength (kg) + (-0.06785 × abdominal circumference (Cm).
- **Speed characteristic (degrees)=**8.767 + (0.0797×leg strength (kg) + (-0.0684 × abdominal circumference (Cm).

Analysis of the two equations revealed a regression coefficient of (0.736) for explosive power and (0.561) for speed. Leg muscular strength and belly circumference account for 53.4% of explosive power and 46.6% of speed proficiency. This outcome validates the significance of kinetic transfer and the use of lower limb muscle strength in the jumping mechanism, facilitating the transition from horizontal to vertical motion and surmounting gravitational forces. This necessitates rapidity during takeoff to prevent power loss and to sustain velocity integrity. The study revealed an inverse correlation between abdominal circumference and skill performance, explosive power, and leg speed, indicating that an increased percentage of abdominal fat corresponds to diminished skill performance and reduced lower back flexibility. The study by Bölükbaşi *et al*. (2025) [5] demonstrated the significance of lower back flexibility in skill performance, explosive power, and leg speed.

Conclusions

Based on the study findings and their analysis, the researchers draw the following conclusions

- The most significant link between physical measurements and performance levels in explosive power and speed-strength leg skills among juvenile wrestlers was seen with leg muscle strength, particularly for explosive power.
- Anthropometric assessments indicated a robust association between belly circumference and performance levels in explosive power and speed-strength leg skills among juvenile wrestlers.
- Leg muscle strength and belly circumference account for roughly 63.6% of explosive power ability and 46.4% of speed-strength leg capability.

Recommendations

Based on the study's aims and findings, the researchers provide the following recommendations:

- Prioritizing physical metrics, especially lower limb muscular strength, in the selection and training of young wrestlers.
- Prioritizing anthropometric measurements, especially waist circumference, in the selection and training of young wrestlers.
- Executing analogous research on several forms of wrestling.

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