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Anthropometric measurements and their relationship to the digital achievement of the elevation of the Klein For first-level students ofthe Faculty of Physical Education and Sport Sciences

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ABSTRACT

This research aims to identify the physical measurements of first-level students at the Faculty of Physical Education and Sport Sciences, and to study the relationship between these measurements and digital achievement in the overall elevation. The researcher used the descriptive method to suit the nature and objectives of the research, and the research population included the first-level students at the Faculty of Physical Education and Sport Sciences at Samarra University, who were (81)(5) students were selected for the exploratory experiment by simple random method and excluded from the main experiment, while the research sample consisted of (63) students for the main experiment, and it was confirmed that it was homogeneous.

The results of the research showed that most of the longitudinal measurements were not significantly related to digital achievement, except for the full length of the body that appeared to be inversely significant, suggesting that taller students have more difficulty controlling the bar compared to shorter ones. Incidental measurements also showed significant inverse relationships in some variables such as waistline, pelvis, elbow, wrist, and knee, while other measurements did not show a significant relationship, reflecting the importance of technical competence and neuromuscular coordination more than relying on the transverse structure of the body.

As for the peripheral measurements, they showed positive significance in the palm circumference, wrist circumference, and the circumference of the fat, while the rest of the measurements remained insignificant, indicating the importance of grip strength and muscular stability in improving performance. The results of skin thickness also showed an insignificant inverse relationship, suggesting that fat ratios may negatively affect performance in sports that rely on relative strength.

1- Introducing the research:

1.1 Introduction and the importance of the research:

Physical measurements are one of the most important biological indicators that sports science professionals rely on to explain individual differences in athletic achievement, especially in strength-based and muscular explosive activities such as weightlifting. Body characteristics related to dimensions, masses, and mechanical abilities contribute to determining the physical potential that an individual possesses, which is directly reflected in his or her competence in the implementation of various technical skills (Carter & Heath, 1990).

Many studies have confirmed that physical measurements are a key factor in predicting physical performance and determining athletes' abilities, as they play a role in analyzing the mechanical and functional requirements of each sporting event. (Malina et al., 2004)

This factor is particularly important when studying skills that require a high overlap between muscular strength, speed and neuromuscular coordination, such as the Klein lift, which is a complex Olympic lift, due to its reliance on a combination of overlapping physical and technical abilities.

Given the specificity of this skill, there is a need to study the effect of physical measurements on the level of achievement in the junior groups, especially among first-level students in the faculties of physical education and sports sciences. This academic stage represents an important basis for the formation of motor abilities and is a suitable opportunity for the early detection and guidance of physical preparations in accordance with the requirements of the discipline and athletic effectiveness. Hence the importance of investigating the relationship between physical measurements and digital achievement in the elevation of the whole, in a way that contributes to the development of training and education environments and the design of training programs based on scientific foundations that take into account individual differences among students.

1-2 Research Problem:

The skill of lifting the Klein is one of the Olympic skills that requires a high integration between the physical qualities and the physical structure of the athlete, as the effective performance in it depends on the extent to which the muscle strength is compatible with the physical structure in terms of the relative lengths of the limbs, the size of the muscle mass, the center of gravity, and others. Although much research has looked at the explosive power aspects of this lift, the relationship between physical measurements and digital achievement still needs further study, especially in educational and academic training environments. During their field follow-up of the clinical skill training among first-level students at the Faculty of Physical Education

and Sport Sciences, the researcher observed clear differences in the level of digital achievement among students, despite the similarity of the exercises in the practical lectures they receive. These differences have raised scientific questions about whether physical measurements are a decisive factor in explaining this discrepancy in achievement, especially in light of the paucity of studies that have dealt with this aspect in a clear methodology within the local academic environment. The problem of the research lies in the following question:

What is the relationship between physical measurements and digital achievement in the skill of elevating the clin among first-level students at the Faculty of Physical Education and Sport Sciences?

1.3 Research Objectives:

The research aims to:

- Identifying the body measurements of first-level students of the Faculty of Physical Education and Sport Sciences.
- Getting to know the first-level students of the Faculty of Physical Education and Sport Sciences.
- Identifying the relationship between measurements and digital achievement in the elevation of the clinic among the first-level students of the Faculty of Physical Education and Sport Sciences.

1-4 Research Areas:

1.4.1 Human Field: Students of the first level of the Faculty of Physical Education and Sport Sciences, Samarra University for the academic year (2024/2025).

1-4-2 Temporal Domain: For the period from (19/12/2024) to (6/4/2025)

1.4.3 Spatial Field: Faculty of Physical Education and Sport Sciences Stadium / Samarra University.

3- Research Methodology andField Procedure :

3-1 Research Methodology:

The researcher used the descriptive method to suit the problem and nature of the research.

3-2 Research Population and Sample:

The research population included (81) first-level students of the Faculty of Physical Education and Sport Sciences, Samarra University, and (5) students were selected for the exploratory experiment by simple random method and were excluded from the main experiment, while the research

sample consisted of (63) students for the main experiment and Table (1) shows the homogeneity of the sample.

Table (1)

Torsion coefficient	Standard deviation	Arithmetic mean	Unit of Measurement	Variables
-1.556	3.52	68.936	kg	Mass
-0.962	3.80	175.698	Poison	Length
-1.047	9.667	256.8	The month	Age

The torsion coefficient is limited to (+2) and this indicates the homogeneity of the sample.

3.3 Means, Devices and Tools Used:

3-3-1 Means of data collection (information):

✓ Arab and foreign references and sources.

✓ Note.

✓ Questionnaire of the opinions of experts and specialists on the validity of the tests for the variables to be addressed in the study.

✓ Registration and Downloading of the Results of the Tests for the Research.

3.3.2 Devices:

✓A Chinese-made HP laptop.

✓A Japanese-made Casio digital camera at a speed of (1000 images per second).

✓Sony Digital Video Camera (1) Made in Japan

✓ Medical scale.

3.3.3 Tools:

✓ Bar-iron (5).

✓ Weight Tablets.

✓ Locks for weight.

✓ Tape measure.

3-4 Compatibility Tests for the Research Sample:

4. Determine the height and body measurements

3.4.1 Determination of the Lifting Requirements under Consideration

The requirements for the success of the attempt to lift the clinic in terms of technique were determined by the professor of the subject to evaluate the attempt, or in terms of the percentage of weight lifted, it is 80%, according to the method.

3.4.2 Method of selection of body measurements

A set of physical measurements was presented to (5) experts to express their opinion on choosing the most important body measurements suitable for the nature of the research, and Table (2) shows the percentage of experts' agreement on the most important measurements that may be compatible with the skill of lifting Klein in the weightlifting game.

Table (2)
Favorable percentages not opinion experts

Percentage %	Physical Measurements		
90	Arm	1	Lengths
100	Upper arm	2	
100	Forearm	3	
90	palm	4	
95	Trunk of sitting	5	
100	The man	6	
100	Thigh	7	
100	Leg	8	
100	Full Body Length	9	
100	Chest	10	Offers
90	The middle	11	
90	The pelvis	12	
80	Annex	13	
80	Wrist	14	
100	palm	15	
80	Knee	16	
100	Chest	17	Oceans
90	The middle	18	
90	The pelvis	19	

100	palm	20	
90	Annex	21	
90	Wrist	22	
100	Shoulder	23	
100	Thigh	24	
80	Knee	25	
80	Obesity	26	
80	Foot	27	
100	Chest	28	Skin thickness
100	Shoulder board	29	
100	Abdomen	30	
100	Waist	31	
100	Obesity	32	

Measurements with an expert agreement of 80% or more were selected to be used under research.

3.5 Field Procedures:

3.5.1 Exploratory experiment

The exploratory experiment was conducted on (28/1/2025) at one o'clock in the afternoon in the stadium of the Faculty of Physical Education and Sport Sciences, Samarra University, by the researcher on the sample of (5) students and they were excluded from the main experiment, and the aim and purpose of this experiment was to identify the time taken to perform the test, divide the tasks, control the course of the tests, the suitability of the place of the test and its needs, as well as the validity of the tools used in the special test in the (clean) elevation and the time in which it will be carried out. The test and in the presence of the assistant work team [(1),] where the two researchers collected the two testers and took their measurements, and the students did a general warm-up, and then the warm-up for the lift, they went to the place of performing the lift in the stadium of the Faculty of Physical Education and Sport Sciences - Samarra University, and each student was given three attempts and the highest achievement was chosen for the successful attempt.

3.5.2 Main Experience:

The main experiment was conducted on Sunday and Monday (9-10/2/2025) in the stadium of the Faculty of Physical Education and Sport Sciences, Samarra University, by the researcher on the main experiment sample and with the help of the assistant work team, where the course of the experiment was similar to the course of the exploratory experiment in terms of the application of physical measurements and tests under research, but each variable was done on a specific day in order to maintain the organization, after which the researchers turned to unloading the data and performing statistical treatments on it.

4. Presentation and discussion of the results

4.1 Presentation and discussion of results for certain body measurements (lengths)

The results related to the longitudinal measurements of the research sample showed that most of the lengths did not show a significant relationship with the numerical achievement in the height of the whole, except for the full length of the body, which appeared in reverse significance. This reflects that the lengths of the body parts of the first stage students were not a decisive factor in determining their level of performance, which is consistent with the nature of the skin and physical variables in this age stage, which are considered close and very similar. The data of the arm, upper arm, forearm, palm, torso, leg, and thigh showed They are insignificant, suggesting that the effect of these lengths is limited, and does not represent enough difference to make a clear difference in skill performance or power produced during the lifting stages.

The full length of the body was inversely significant, which meant that taller players were less able to achieve a high achievement compared to shorter. The explanation for this result is due to the obvious biomechanical considerations in the first and second pulls, as the higher center of gravity in taller individuals makes it more difficult to control the path of the bar and makes the process of fixing it more complicated, in addition to increasing the length of the lever around the hip and knee joints, which requires the production of more force to bypass the acceleration phase. A longer body needs a greater range of motion to reach the final stage of lifting, while those with shorter lengths are more efficient in control and balance during the transition between lifting phases, which Stone et al. (2006) have pointed out that differences in the lengths of body parts can directly affect the ability to generate momentum and control its directions.

The lack of significance in the rest of the lengths clearly indicates that the performance in the elevation of the Klein in the students of this stage depends more on the technical aspect and the level of neuromuscular coordination

rather than on the precise anthropometric composition. Also, the homogeneity of the sample and the lack of training experience makes the effect of the lengths limited, as the learners are still at the beginning of the stage when the skill foundation of the movement is built, and therefore the anatomical differences do not appear as clearly as in the case of advanced or professional athletes.

Accordingly, it can be said that longitudinal measurements, except for the full length of the body, were not a direct factor in the level of achievement, and that the inverse relationship of the full length reflects the clear mechanical effect of body length on the difficulty of bar control and performance efficiency during the different lifting stages, which is consistent with the scientific explanation that confirms that shorter objects are often more economical in movement and more able to control balance compared to tall objects.

Table No. (3) N = 63

Moral Significance	T tabular	T Calculated	on	Going to	Measurements	t
Reverse morale	0.25	-0.2475	3.8042	175.698	Full Body Length	1
Insignificant	0.25	-0.0304	2.4979	71.952	Arm length	2
Insignificant	0.25	-0.0530	2.1172	28.746	Length of the upper arm	3
Insignificant	0.25	-0.1888	1.9651	27.761	Forearm length	4
Insignificant	0.25	0.2452	0.6126	18.698	Palm length	5
Insignificant	0.25	-0.0698	3.1145	55.761	Trunk length	6
Insignificant	0.25	0.0788	3.9873	89.857	Leg Length	7
Insignificant	0.25	-0.0117	3.3551	43.746	Thigh length	8
Insignificant	0.25	0.1849	3.0478	43.253	Leg length	9

4.2 Presentation and discussion of the results of some physical measurements (presentations)

The results of cross-sectional measurements showed that some variables did not show a significant relationship with numerical achievement in the lift of the skin, such as chest width and palm width, which indicates that these dimensions do not represent a direct factor affecting the student's ability to perform the lift efficiently. These measurements are often related to the

overall structure of the body, but they do not clearly contribute to the generation of force or bar control during the pull-and-push phases, especially in first-level students who are still in the construction phase Basic motor and muscular foundations.

In contrast, the results of the research showed inverse significant relationships in a number of measurements such as waist width, pelvic width, elbow, wrist, and knee, which is an important biomechanical finding. The inverse relationship means that an increase in these widths is associated with a lower level of achievement, which can be explained by the fact that an increase in the width of these areas may lead to changes in the mechanics of movement that make it more difficult to control the bar and perform the lifting phases ideally. For example, an increase in the width of the center may affect the speed Transition between the first and second drag stages, reducing bar acceleration efficiency due to increased internal resistance or reduced vertical thrust effectiveness.

Increasing the width of the pelvis or knee can also alter the consistency of the movement path, and affect the student's ability to maintain a correct position of the knees and hip during descent and ascent, reducing the ability of the neuromuscular system to produce consistent force that allows for a high numerical achievement. As for the width of the wrist and elbow, increasing them may reduce the efficiency of the grip and control, especially in the final stage of the lift when the bar is fixed to the shoulders, which makes the stabilization process more difficult for the Individuals who possess a larger spindle structure.

These relationships are in line with biomechanical explanations that suggest that performance in Olympic lifts depends on the harmony of body parts and the consistency of the lines of force that travel from the feet to the hands, and that any imperfect increase in certain measurements may adversely affect the trajectory of motion and the student's ability to control the bar. This is consistent with what Stone et al. (2006) have stated about the importance of proper anatomical composition to ensure the generation of effective motor momentum and maintain stability during the drag and acceleration phases.

Accordingly, it can be concluded that the cross-sectional measurements that appeared with an inverse relationship may represent a mechanical challenge for students when performing the Klein lift, and that their effect becomes more pronounced compared to other cross-sectional measurements, while the insignificance of some other measurements confirms that performance at this stage depends more on the level of technical mastery and not only on the anatomical dimensions of the body.

Table No. (4) N=63

Moral Significance	T tabular	T Calculated	on	Going to	Measurements	t

Insignificant	0,632	0.77	3,213	42,1	Chest width	1
Insignificant	0,632	0,468	0,483	11,7	Palm width	2
Reverse morale	0,632	-0,41	2,025	41,9	Mid width	3
Reverse morale	0,632	-0,14	1,476	45,2	Aquarium width	4
Reverse morale	0,632	-0,04	0,876	12,9	View Attachment	5
Moral Reverse	0,632	-0,09	0,483	8,7	Wrist width	6
Reverse morale	0,632	-0,69	1,317	18,2	Knee width	7

4.3 Presentation and discussion of the results of some of the physical measurements (oceans)

The results of the peripheral measurements showed that most of the variables such as chest circumference, midsection, elbow circumference, shoulder circumference, thigh circumference, knee circumference, and foot circumference did not show significant relationships with the numerical achievement in the elevation of the first level students, which indicates that the sizes of these parts do not represent a direct factor in improving or weakening the performance at this stage. It seems that the homogeneity of the sample and the convergence of the strength levels of the students made the effect of these measurements limited, especially since the effectiveness itself depends heavily on the technical competence and the extent of the learner's ability to control the path of the bar during the stages of pulling, accelerating and stabilizing, rather than on the muscle circumference or the size of the limbs in this educational stage.

On the other hand, a positive significant relationship appeared in three measurements: palm circumference, wrist circumference, and obesity circumference. These results can be interpreted from a biomechanical perspective associated with the requirements for the elevation of the klein. Increasing the circumference of the palm and wrist often reflects greater strength in the forearm and grip muscles, which contributes to improving the student's ability to control the bar, especially in the first and second pull-ups and when receiving the bar on the shoulders, which is a sensitive stage that requires high stability and great resistance to the shear force resulting from the weight of the bar. Thus, students who possess a larger perimeter in these areas may show higher proficiency in mechanical control of the bar and more balanced movement execution.

The appearance of a significant relationship in the obese circumference also indicates the role of the lower leg muscles in stabilizing the body during push-ups and ascensions, as Olympic lifts depend significantly on the strength of the ankle extensor muscles, as they play an important role in the full extension phase at the end of the second pull-up, which is directly related to the generation of the final momentum of the bar. Thus, increasing the circumference of the obese, which usually reflects better muscle development, can contribute to increasing vertical thrust and improving achievement.

Pelvic circumference was shown to be insignificant, which may indicate that increasing the size of the pelvis may negatively affect the flexibility of movement in the hip area, leading to difficulty in smooth transition between lifting stages, especially when dropping under the bar or when trying to control the angles of the hip joint during pulling. However, the insignificance of the correlation indicates that this effect is insufficient to lead to a clear difference in performance.

Overall, these results reflect that the peripheral measurements most closely related to performance are those directly related to control, grip, and grip mechanisms, while most other measurements remain without a clear effect, which is consistent with what Stone et al. (2006) have pointed out that effectiveness in Olympic lifts is based more on strength, neuromuscular coordination, and technique than on anatomical size alone, especially in non-specialists or early-stage trainees.

Table (5) N = 63

Moral Significance	T tabular	T Calculated	on	Going to	Measurements	t
Insignificant	0,632	0,297	7,743	95,8	Chest circumference	1
Insignificant	0,632	0,181	6,43	86,1	Perimeter	2
Insignificant	0,632	0,293	1,687	26,2	Circumference of the Facility	3
Insignificant	0,632	0,083	5,582	113,6	Shoulder circumference	4
Insignificant	0,632	0,361	4,028	56	Hip circumference	5
Insignificant	0,632	0,609	2,066	37,4	Knee circumference	6
Insignificant	0,632	0,327	0,789	23,8	Foot circumference	7

Moral	0,632	0,837	1,337	25,3	Palm circumference	8
Moral	0,632	0,681	1,075	17,6	Wrist circumference	9
Moral	0,632	0,719	4,473	38,3	Obesity Ocean	10
Insignificant Reverse	0,632	-0,09	4,28	98,1	Perimeter of the pelvis	11

4.3 Presentation and discussion of the results for some body measurements (skin thickness)

Physical measurements of skin thickness showed an inverse insignificant correlation at a significance index of 5%

Table (6) n=63

Reverse Immorality	0,632	-0,28	7,323	11,92	Skin thickness	1

- The relationship between skin thickness and body composition with achievement

The thickness of the skin associated with the percentage of fat may negatively affect performance in sports that rely on relative strength.

Students who are thin tend to achieve better results, which is consistent with studies such as Kraemer & Fleck, 2004 that have linked lower fat to increased performance efficiency in weightlifting. Baechle, T. R., & Earle, R. W. (2008)..

Chapter Five

5. Conclusions and recommendations

5.1 Conclusions

The researcher concluded the following

- The presence of a positive significant correlation for some physical measurements that are directly related to control and strength: palm circumference, wrist circumference, and obesity circumference.
- There is no significant correlation in most other measurements, whether longitudinal, transverse or peripheral, including:

Full body length (except inverse relationship), arm length, arm, forearm, forearm, palm, torso, leg, thigh, chest width, palm, center, pelvis, elbow, wrist, chest circumference, center, elbow, shoulder, thigh, knee, foot, pelvis.

- The existence of a significant inverse correlation:

The full length of the body appeared to have a significant inverse relationship with the achievement.

Skin thickness has been shown to be inversely inverse, suggesting that fat ratios may negatively affect performance in relative strength.

Performance in the level of Klein among first-level students depends more on technical proficiency, neuromuscular coordination, grip strength, and stability than on accurate physical measurements, due to the homogeneity of the sample and their small training experience.

5.2 Recommendations

In light of the previous conclusions, the researcher recommends the following:

1. Relying on physical measurements as an auxiliary indicator in selecting talented people:
   The need to adopt the muscle circumference (arm, thigh, shoulder) as part of the selection criteria and early guidance for weightlifting athletes in the early stages of school, as it is positively correlated with achievement.
2. Developing technical and technical programs accompanying physical training:
   It is recommended to incorporate technical training dedicated to the elevation of Klein into the practical curriculum, especially for students who possess appropriate physical physiques but whose digital achievement is low.
3. Adopting a comprehensive multidimensional assessment of athletes:
   The need to link physical measurements, technical performance, neuromuscular endurance, and training level when assessing competitiveness in weightlifting, not just relying on measurements.
4. Applying the research to a specialized sample in the National Weightlifting Federation.

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