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The Impact of the Use of Pivotal Training in Some Physical Abilities and Skill of Handball for Students of the Department of Physical Education and Sports Sciences

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Abstract: *Handball is one of the sports that receive wide attention in all countries of the world for its enthusiastic nature and skills,Therefore, the organizers strive to exert their thought and effort to try to develop and raise its level using all modern training methods and scientific methods, including the core Training method, which is one of the basic pillars in modern sports training, especially in handball sports that require balance and exceptional axial strength, and handball requires fast and explosive movements and sudden changes in direction, jumping, throwing, and physical collision, and the axial muscles (the core muscles in the trunk) a force carrier extremities, making them necessary to perform most sports skills in handball, has emerged As an attempt to develop performance and develop physical abilities and skills for students, a set of exercises using the axial training method has been developed as a comprehensive, intensive and scientifically studied training program that contributes significantly to increasing and developing physical abilities and improving their performance of skills in competitions, and the research problem crystallized around weakness in the body structure and the axial muscles of the players, and the researcher considered seeking to use a training method to increase the strength of the axial muscles of the trunk and limbs, which is a method aimed at developing muscle strength in the axial muscles of the trunk, abdomen, upper and lower limbs, as well as for working muscles, noting its reflections in the results of the research variables, the goal of the research is to identify The researcher adopted the experimental method as the most suitable for the nature of the research, with an experimental design, one group and a research community of students of the Faculty of basic education / Mustansiriya University, the sample number was (15) players and (3) players were excluded for not continuing training, so the sample became (12 players) continued training during the duration of the experiment, as they were chosen by the sample Method intentionally because of its suitability to the research conditions and goals, and the researcher concluded the gastric axial exercises.*

Keywords: *Core Training; Physical Abilities; Handball Skills; Explosive Strength; Sports Training.*

Introduction

Handball is one of the sports that enjoys widespread interest around the world due to its exciting nature and the skills it requires. Handball is characterized by its intensity and fast pace is a decisive factor in competitive results. The attacking phase, which culminates in a shot on goal, represents the pinnacle of all tactical formations and is the decisive factor between victory and defeat. Consequently, these actions require execution with maximum cognitive focus and peak physical effort. Therefore, training professionals and sports

practitioners continuously invest significant intellectual and material resources towards the systematic development and performance improvement of these critical technical elements.

Using all modern training methods and scientific techniques, including core training, which is one of the fundamental pillars of modern sports training, especially in handball, which requires exceptional balance and core strength. Handball requires fast, explosive movements and sudden changes in Direction, jumping, throwing, and physical contact, the core muscles (the muscles in the torso) act as a conduit for power between the upper and lower body, making them essential for performing most athletic skills in handball (Boraczynski & Urniaż, 2008).

Core training is a modern methodological approach in sports science, based on the concept of dynamic stability of the trunk as the cornerstone of integrated motor performance. This concept goes beyond the traditional view of isolated muscle strength towards a comprehensive model that focuses on neuromuscular integration between the superficial and deep muscles of the trunk and pelvis.

Akuthota & Nadler (2004) stated that core training is a training system that aims to develop the functional capacity of the musculoskeletal structure surrounding the spine and pelvis to achieve dynamic stability that allows for the efficient transfer of forces between the upper and lower limbs, while protecting the musculoskeletal structure from injury.

Kibler et al. (2006) also confirmed that the axial system transfers kinetic energy from the lower limbs (the primary motor) to the upper limbs (the point of application) with less energy loss, thereby improving movement efficiency.

A study conducted by Saeterbakken et al. (2011) showed that handball players who underwent an intensive 8-week axial training program achieved a significant improvement in throwing speed of 3.7% compared to the control group. The researchers attributed this to the efficient transfer of force from the lower limbs through the trunk to the throwing arm.

In a longitudinal study spanning two full seasons, Prieske et al. (2016) found that handball players who followed a preventive program focusing on core training had a 42% reduction in lower back injuries compared to those who did not follow the program.

A study conducted on junior handball players examined balance during the performance of advanced skills. The results showed a 23% improvement in dynamic balance indicators after 6 weeks of dedicated core training (Granacher et al., 2013).

Studies indicate that focusing on core training in the early stages (12-16 years) contributes to building a solid foundation that reduces injuries and improves long-term performance (Faigenbaum et al., 2009).

The importance of research into the use develop improve students' physical abilities and skills has emerged. A set of core training exercises has been, intensive scientifically designed that contributes significantly to increasing and developing physical abilities and improving the performance of competitive skills. in competitions.

Research problem:

Handball requires players to possess the physical and technical attributes that enable them to face their opponents with strength and stability. The nature of handball rules allows

for contact with opponents, both in defense and attack, in order to gain or maintain possession of the ball. Although players have physical, motor and technical abilities, the ability to neutralize an attacker or get past a defender requires a certain amount of strength and rigidity in the torso and limbs.

Through the researcher's modest experience as a handball player and teacher, he noticed that there is a weakness in the physical build and core muscles of players. This is clearly evident when watching tournaments and implementing skills in lessons. He decided to seek a training method to increase the strength of the core muscles of the torso and limbs, a method that aims to develop muscle strength.

Research objective:

To effect of exercises based on the core training method on certain physical abilities and handball skills.

Research hypothesis:

There are statistically significant differences between the test results (pre- and post-test) in the physical abilities and basic skills under investigation.

Research areas

a. Human area: - Players of the Basic Education Faculty team / Department of Physical Education and Sports Sciences in handball, numbering 12 players.
b. Temporal domain: From 21/9/2025 to 21/12/2025.
c. Spatial domain: The sports hall at the Faculty of Basic Education, Al-Mustansiriya University.

Methodology

it was most appropriate for the nature of the research, with an experimental design involving a single group subject to strict control, through two tests (pre- and post-test) to measure the effect of the training program (the experimental factor) on the dependent variables (physical and skill abilities). The research community was defined as students .The sample size was 15 players, but three players were excluded for not continuing with the training, leaving a sample of 12 players who continued with the training during the experiment. They were selected using a purposive sampling method due to its suitability for the nature and objectives of the research.

Tests used in the research:

Physical tests:

a. Explosive strength of the legs: (vertical jump test (Sargent) (Ali Samoum 2004)
b. Explosive strength of the arms: (medicine ball throw test (2 kg) with both hands above the head from a seated position on a chair) (Mahmoud Ismail Al-Hashimi: 2015).
c. Speed strength test for men: (30 m sprint test in a straight line (Alaa Jassim Makhailf Isa Al-Sheikhani: 2006)
d. Speed strength test for the arms:-(30-second front support test). (Qasim Hassan and Bashtouisi Ahmed: 1997)

Skill tests:

a. Handling and receiving: Handling and receiving test on the wall from a distance of 3 m (Luay Ghanem Al-Sumaydi et al.: 2010).
b. Dribbling: Continuous dribbling test in a zigzag pattern for a distance of 15 metres back and forth (Ahmed Khamis and Jamil Qasim: 2011).
c. Shooting: High jump shooting skill test: (Khalida Abdul Zeid Al-Dulaimi: 2006).

Exploratory experiment:

The researcher conducted the first exploratory experiment on Sunday, 21 September 2025, in the closed indoor hall of the Faculty of Basic Education on an exploratory sample of five players from within the research community. The researcher also conducted a second exploratory experiment for the pivotal training exercises on Tuesday (23/9/2025) to determine the duration of work and rest for each exercise, to determine the heart rate resulting from the required intensity for each exercise, to ensure and to confirm the time of implementation.

Main experiment:

Preliminary experiment:

Preliminary tests were conducted on the research sample on Wednesday and Thursday, 24-25 September 2025, at 11 a.m. in the closed indoor hall of the Faculty of Basic Education.

Second: Application of exercises using the pivotal training method:

1. Begin implementing the training units for the research sample, drawing on modern scientific sources and experience in this field.
2. Prepare exercises using the pivotal training method, which were included in the main section of the training units.
3. The exercises were implemented within the training units using low- and high-intensity interval training methods.
4. The training program began on Sunday, 28 September 2025, and will continue until 14 December 2025.
5. The training program lasts for 12 weeks, with three training units per week and a total of 36 training units.
6. Training unit duration (30-120) minutes.
7. Main part duration in the training unit (30-70) minutes.
8. Intensity used ranged (65-95%) from the first training unit to the last training unit.
9. The total number of repetitions (3-10) and sets (3-4) within the training unit varied.
10. These exercises are characterized by the presence of an interval between exercises in the form of positive rest (jogging or stretching exercises).
11. Post-tests: The post-tests were conducted on Wednesday and Thursday (17-18/12/2025) at 11 a.m. in the closed indoor hall of the Faculty of Basic Education.
12. Statistical methods: SPSS version 26 was used to extract the arithmetic mean, standard deviation, skewers coefficient, and t-test.

Result and Discussion

After completing the pre- and post-tests for the research sample, the researcher processed the results statistically and presented them in Tables (1) and (2). Table (1)

Table (1). Shows the results of physical tests (pre- and post-intervention) for the research sample.

Tests	Unit of measurement	Preliminary test		Post-test		F	F H	Calculated T	value sig	Level of significance
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
Explosive strength of the arms	CM	6.17	0.50	7.48	0.33	1.96-	0.33	5.84-	000	moral
Explosive strength of the legs	meter	36.29	0.37	38.25	1.13	1.31-	0.15	8.35-	000	moral
Speed-specific strength of the arms	Number	24.16	1.11	28.33	1.07	4.16-	0.42	9.84	000	moral
Speed-specific strength of the legs	meter	4.97	0.12	4.26	0.36	0.70	0.10	6.66	000	moral

Sig: (Sig) > (0.05) at a significance level (0.05) and degrees of freedom (n) -1 = (11).

The researcher and the various exercises, tools and new aids contained in this program, which were used on the research sample in an organized and continuous manner. The implementation of these exercises contributed effectively to abilities with the skills performed by athletes, which aim to develop the muscles specific to the type of skill and sporting activity practiced. The development in muscle strength The legs and arms, as shown in research tests, and as pointed out by Evington and Edgerton, **(Edington, and Edgerton. , 1976, pp. 8-10)**. Adel Hamid Obeid also points out that training the trunk muscles increases the explosive muscle strength required for certain activities that depend on explosive strength in the trunk. Furthermore, trunk muscle exercises develop strength endurance, leading to better performance and giving athletes significant moral and psychological motivation to enter competitions that require great physical strength whether in the muscular strength of the legs or arms**. (Akuthota & Nadler, 2004)** that it is a training system aimed at developing the functional capacity of the musculoskeletal structure surrounding the spine and pelvis to achieve dynamic stability that allows for the efficient transfer of forces between the upper and lower limbs, while protecting the musculoskeletal structure from injury **(Akuthota & Nadler, 2004).**

Table (2). Shows the results of pre- and post-test skill assessments.

Tests	Unit of measurement	Post-test		Preliminary test		Calculated T	F H	F	value sig	Level of significance
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
Handling and stealing	degree	19.83	1.26	15.41	1.31	8.35-	0.52	4.41-	000	moral
Tapping	Second	23.00	1.12	26.22	0.40	9.93	0.32	3.21	000	moral
Scoring	degree	5.50	0.52	3.41	0.66	25.00-	0.08	2.08-	000	moral

Table (2) shows that there is an improvement in skill tests in favor of the post-test, which the researcher attributes to the effect of the core training exercises prepared by the researcher, which contain exercises similar to the motor performance of handball skills. 'Leith Ibrahim points out that athletic movements that are similar in their composition in terms of the nature of motor performance, strength, speed, and the time course of strength, as well as the direction of muscular action, are similar to those movements performed during a match.' **(Leith Ibrahim Jassim: 2010)**

The researcher believes that a player cannot master the motor performance of a particular skill without possessing the physical and motor characteristics specific to that skill. Therefore, the axial system transfers motor energy from the lower limbs (the primary motor) to the upper limbs (the point of application), with minimal energy loss, which improves movement efficiency and develops players' abilities in all sports skills that require combining physical and motor qualities and integrating them into a single motor framework characterized by precision and fluidity of performance, according to Mufti Ibrahim Hammad. 'Training contributes greatly to the acquisition and mastery of motor skills' **(Mufti Ibrahim Hammad: 1996).** Ibrahim Khalil Al-Hassani also states that 'the level of skill develops with the development of physical and motor abilities' **(Ibrahim Khalil Al-Hassani: 1992).** This is consistent with This was confirmed by Laila Al-Sayed Farhan, who stated that 'the performance of any skill is related to physical fitness components' **(Laila Al-Sayed Farhan: 2001).** A study conducted by **Saeterbakken et al. (2011)** showed that 'handball players who underwent an intensive 8-week core training programme achieved a significant improvement in throwing speed of 3.7% compared to the control group, which the researcher attributed to the efficient transfer of force from the lower limbs through the trunk to the throwing arm.' This was also indicated in a study conducted on junior handball players on the effect of core training on balance during the performance of advanced skills. The results showed a 23% improvement in dynamic balance indicators after 6 weeks of dedicated core training. **(Granacher, U., et al. (2013). Talha Hussein (1994)** also points out that 'there are several variables that affect performance accuracy, the most important of which are the sense of direction, distance and timing, as well as the amount of force required and the ability to control and master neuromuscular action.

Conclusion

1. The prepared pivotal training played an effective role in developing physical and technical abilities.
2. The development of physical abilities had a clear impact on the performance of the players in the research sample.

Recommendations:

1. Use core training to develop the motor and skill abilities of handball players.
2. Use core training for different age groups and sports.
3. Use core training for female players and in other sports.
4. Research the effect of pivotal training on defensive skills in handball
5. Integrate pivotal training into all stages of athletic preparation.
6. Customize programmers according to the player's position and training stage
7. Use functional exercises that simulate the requirements of the game

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