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Some coordination abilities and their relationship to the accuracy of the serve in volleyball players

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Abstract
This research aims to study the relationship between certain coordination abilities, their accuracy, and their impact on the serving performance of young volleyball players. This is due to the significant importance of coordination abilities such as balance, agility, and motor coordination in executing basic skills with high precision. The research employed a descriptive-analytical approach, and the sample consisted of players from Al-Mahawil Sports Club. Tests of balance, coordination, and agility were administered, in addition to a test of serving accuracy. The results showed a statistically significant positive correlation between coordination abilities and serving accuracy, with a correlation coefficient of 0.948 for the adjusted balance test. This indicates that players with higher coordination abilities are better able to control their bodies and execute serves with greater accuracy. The researcher attributes these results to the fact that improved neuromuscular coordination contributes to trunk stability, body posture control, and movement coordination during serving. This aligns with the findings of previous studies that indicated the impact of balance and agility on skill performance in team sports. The study concludes with the necessity of including balance and coordination development exercises in training programs and conducting periodic tests to measure the development of these abilities. It also recommends conducting similar studies in other sports that require high-precision performance.

Keywords: Balance, coordination, serving accuracy, volleyball

Introduction
The development of sports in our modern era has been based on several areas, the most important of which is the development of coordination skills. Physical education has benefited greatly from this development, achieving significant successes and accumulating expertise. These successes and experiences were not accidental but rather the result of sound scientific planning through the application of various knowledge, sciences, methods, and modern techniques to find the most effective ways to develop motor skills and achieve optimal athletic performance [1].
Every sport requires specific physical demands and motor skills, and coordination is one of those essential requirements for athletes at a high level, particularly balance and agility [2]. These abilities help athletes integrate various motor skills systematically. Volleyball, on the other hand, is the world's most popular sport, attracting a large segment of society due to its exciting nature and numerous characteristics, including defense, attack, teamwork, strategic play, and the use of diverse skills at a high level. Therefore, all countries strive to develop this sport to achieve the best possible results internationally. As a result of the link between physical and technical preparation in volleyball, it has become necessary to focus on elements of physical fitness, especially coordination.

Research Problem
Through the researcher's observations and review of numerous studies, it was found that there is a lack of attention given to the topic of coordination abilities (coordination, balance, and agility), despite their significant impact on the accuracy of the serve, especially in its successive stages to achieve the correct movement path. Therefore, the research problem is defined by answering the following question
a) Is there a relationship between coordination abilities and the accuracy of the serve?

Research Objectives

1. To identify the relationship between coordination abilities and the accuracy of the serve among volleyball players.
2. To identify the relationship between motor coordination and the accuracy of the serve among volleyball players.
3. To identify the relationship between motor balance and the accuracy of the serve among volleyball players.
4. To identify the relationship between agility and the accuracy of the serve among volleyball players.

Research Hypotheses

1. There is a statistically significant relationship between some coordination abilities and the accuracy of the serve among young volleyball players.
2. There is a statistically significant relationship between motor coordination and the accuracy of the serve among young volleyball players. A statistically significant relationship exists between motor balance and serve accuracy among young volleyball players.
3. A statistically significant relationship exists between agility and serve accuracy among young volleyball players.

Research Areas

- **Human Area:** Players of Al-Mahawil Sports Club
- **Temporal Area:** Research tests were conducted on motor coordination and the accuracy of serving performance between March 22-24, 2025.
- **Spatial Area:** Babylon Club Stadium

Theoretical and Similar Studies

Theoretical Studies

- **Motor Coordination:** Coordination between the nervous system and skeletal muscles, on the one hand, and between the center and internal organs, on the other, plays a distinctive role in athletes reaching high levels. The process of motor coordination is linked to the capabilities of the motor system, the forces acting upon it, and the internal changes. All of this is completely connected to the nervous system, where information, methods, and objectives are understood and absorbed after the movement is performed [3].

  Coordination is important as a motor ability for reaching high levels and achieving optimal performance in many sports [4].

  The serve... Volleyball relies on coordination skills and understanding the relationship between these skills and the player's body position during performance.
- **Motor Balance:** Balance means that an individual can maintain body stability in both stillness and movement. This requires complete control of the body's systems, both neurological and muscular, and a close connection to neuromuscular coordination. Motor balance is also linked to agility [5].
- The health of the nervous system is one of the important factors in achieving balance. The coordination between the muscular and nervous systems also plays a significant role in maintaining body equilibrium. The movements a person makes, such as walking, running, jumping, or athletic movements performed in a confined space, like walking on a balance beam or standing on the tip of an airplane, all depend on the individual's control over their muscular systems to maintain body position without losing balance [6].

Experts have divided balance into

- **Organized balance:** In this type, the shape of the balance does not change but narrows according to the position of the torso and the supporting leg. It can be vertical, frontal, lateral, or posterior. This type is directly related to the body's contact with the ground.

Compound Balance: In this type of balance, the balance pattern changes depending on the position of the torso, the free leg, or both. In both cases, the supporting leg cannot change its position but can perform a slight movement by alternating between raising the heels or bending and extending the knee of the supporting leg. This type of balance is related to the loss of contact with the ground [7].

Results and discussions

Table 1: Show changes in the number of new students and graduates in undergraduate and graduate programs across different colleges

College	New students Undergraduate	Graduating students	Change
Cedar University	110	103	+7
Elm College	223	214	+9
Maple Academy	197	120	+77
Pine College	134	121	+13
Oak Institute	202	210	-8
Graduate			
Cedar University	24	20	+4
Elm College	43	53	-10
Maple Academy	3	11	-8
Pine College	9	4	+5
Oak Institute	53	52	+1
Total	998	908	90

Source: Fictitious data, for illustration purposes only

The table above, showing the correlation coefficient between the motor coordination test and the accuracy of the serve, reveals a significant positive correlation. The coefficient for the modified Bass test was 0.948, a significant value at the 0.5 level. This indicates a genuine positive relationship between the test and the accuracy of the serve in volleyball. In other words, higher test scores correlate with higher serve accuracy.

The researcher suggests that this result is since players with better motor coordination are better equipped to respond appropriately to the demands of the game. A player with better balance is more likely to perform the serve effectively. This result aligns with the findings of several reference studies, which confirmed that balance influences motor performance. The motor balance affects muscular strength and the performance level of basic skills [8].

This result is consistent with the observations of volleyball coaching experts. A player with strong motor balance skills can control the muscles involved in executing a serve, thus maintaining control over their body, especially when kicking the ball towards the goal with high precision. The kick is tactically ideal and presents a greater challenge for the goalkeeper [9]. The motor balance as a crucial component in performing basic skills such as standing, walking, running, throwing, and other fundamental abilities. It is a key component in most activities that require standing or

movement during skill execution [10]. This finding aligns with the research's initial hypothesis, which established a statistically significant relationship between coordination abilities and the accuracy of volleyball players' serve.

Conclusion

Based on the research sample, the researcher reached the following conclusions, a positive correlation exists between players' coordination abilities and the accuracy of their volleyball serve.

Recommendations

1. Focusing on motor balance due to its significant importance in player performance through a training program designed to improve balance.
2. Conducting periodic coordination tests to assess the extent to which players benefit from the training program aimed at improving their motor coordination.
3. Conduct similar studies in other games that require precision, deliberation, and an assessment of player capabilities.

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