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"The effectiveness of compound exercises based on kinetic coordination in learning the handstand skill on the parallel bars for students"

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Abstract

The research aims to know the effectiveness of compound exercises based on kinetic coordination in learning the handstand skill on the parallel bars in men's artistic gymnastics, and to determine the superiority between the experimental and control groups in the study. The student used the experimental method as it is suitable for the research process. The experiment was conducted on second-year students in the DoPESS, College of Basic Education, University of Diyala, in the academic year 2023-2024. The sample consisted of 30 students, divided into two groups: 15 students in the experimental group and 15 students in the control group. Each group followed its specific guidelines and instructions. The experiment lasted for 8 weeks, with one educational unit per week. In conclusion, the compound exercises had a significant and clear effect on learning the handstand skill on the parallel bars in artistic gymnastics, and the mechanism of linking compound exercises with kinetic coordination was highly beneficial and advantageous in improving the students' learning of the handstand skill on the parallel bars.

Keywords: compound exercises, kinetic coordination, parallel bars

Introduction:

The civilization and progress of societies are measured by how well they utilize human resources and direct their healthy energies towards contributing to human advancement and serving the community. Sports are considered a fundamental means of advancing nations and a truthful reflection of their level of civilization and renaissance. The international arenas witness rapid scientific and practical developments in all sports activities in general and in gymnastics in particular. This did not happen by chance but as a result of extensive development and numerous researches and studies conducted by specialists and researchers to find new and modern educational and training methods aimed at improving performance levels and achieving the best accomplishments (Gleaves,2014).

The use of modern educational means has led researchers, experts, and specialists in the field of learning to work to find the best training and educational methods that match the individual capabilities and available resources of the trainee and learner in their surrounding environment, taking into account individual differences and the age stage of the trainee and learner during the learning and training process. This includes preparing compound exercises according to kinetic coordination (Suvendu and Deb,2023).

The importance of the research lies in designing and preparing compound exercises based on kinetic coordination. These exercises facilitate students' performance by providing organized cues and well-studied steps. The student prepares these exercises to motivate students and evoke their strong desire for learning (Al-Batel et al, 2019). The mechanism of kinetic coordination is very important as it ensures the students to perform with maximum concentration and attention, which is necessary for good kinetic transfer and coordination as the student is working with gymnastics equipment and tools require a high level of concentration and attention, often dealing with factors of fear, anxiety, and confusion. Gymnastics, in particular, demands a high degree of coordination and speed in performance as it deals with a series of complex and interrelated movements. Therefore, it is essential for the instructor to develop such exercises accompanied by kinetic coordination to enhance students' learning and performance (Yvonne et al. 2023).

Research Issue:

Through the researcher field experience as a former, coach, referee, and teacher, it has been noted that the weak performance levels are due to a lack of understanding of the correct technique for skills and the inability to visualize the appropriate movement path for performing the skill. Additionally, manual assistance from the coach or teacher poses a significant burden, preventing the observation and diagnosis of performance errors. The force exerted in providing assistance during the initial attempts in the educational unit differs from when assistance continues for the rest of the players and for multiple repetitions for each student.

This situation led the student to consider the necessity of independent performance, ensuring the learner's safety, and avoiding failure and falls during skill execution, especially since the parallel bars are elevated from the ground and require all safety measures. It also demands strength, speed, and concentration from the student during performance, along with good kinetic coordination and control over the parallel bars' grips by strengthening the arms and ensuring quick motor transfer (Kohl and Cook ,2013).

Research Objectives:

1. **To prepare compound exercises based on kinetic coordination for learning the handstand skill on the parallel bars for students.**
2. **To identify the impact and suitability of compound exercises in learning the handstand skill on the parallel bars for students.**

Research Hypotheses:

1. **Compound exercises accompanied by kinetic coordination have a positive role in transferring body parts and learning the handstand skill on the parallel bars for students.**
2. **Combining compound exercises with kinetic coordination results in a high percentage of learning the handstand skill on the parallel bars for students.**

Research Fields:

Human Field: Second-year students in the DoPESS.

Time Field: From February 15, 2023, to April 16, 2024.

Place Field: Gymnastics hall in the DoPESS.

Research Methodology and Field Procedures:

The student used the experimental method, as it aligns with the nature of the problem and helps achieve the research objectives. The experimental plan was designed with two equivalent groups, experimental and control, as defined by (Duong et al,2022), "It is a method of thinking and working adopted by the student to organize, present, and analyze the idea to achieve the best results."

Table No. (1) Experimental design of the research sample.

Groups	First step	Second step	Third step	Fourth step	Fifth step
	Pre-test	Ind. Variable	Post-test		
Experimental group	Handstand skill on the parallel bar	Compound exercises with kinetic coordination	Handstand skill on the parallel bar	The difference between the pre-test and post-test of the experimental and control groups	The difference between the experimental and control groups in the post-test
Control group	Handstand skill on the parallel bar	Method used	Handstand skill on the parallel bar		

Research Population and Sample:

Accurately defining the research population is a decisive factor in the success of the study and achieving its objectives (Al-Hawri and Ali, 2016). The research consisted of second-year students in the DoPESS, College of Basic Education, University of Diyala, in the academic year 2023-2024, of twenty students. They were divided into two groups, control and experimental, with ten students in each group.

Steps for Preparing and Applying the Experiment:

To implement the steps related to the independent variable (compound exercises based on kinetic coordination) on the experimental group, the following steps shall be followed:

- **Preparation of research equipment and tools.**
- **Conduct the pilot experiment.**
- **Conduct the pre-test for the sample.**
- **Implement the main experiment.**
- **Conduct the post-test.**

Methods of Data Collection, Tools, and Equipment:

- **Arabic and foreign sources**
- **Assistant staff for the student**

Tools Used in the Research:

The student used the following tools:

- **Men's parallel bars**
- **Low parallel bars**
- **Foam mats**

Skill Performance Evaluation:

The skill was evaluated by referees for both groups, with the highest possible score for a student being ten and the lowest being zero. The evaluation was highly objective, and each student was given two attempts, with the best attempt being counted. The evaluation was done by four referees, according to gymnastics judging rules, and the final score was calculated by taking the average of the middle two scores from the four referees ((Al-Zubaidi and Al-Hussainat, 2021).

Pilot Experiment:

The student conducted the pilot experiment on Tuesday, February 14, 2023, on a sample of five students from the research population, but not from the main sample. The purpose was to identify any difficulties the student might face during the execution of the basic skill tests.

Application of the Research Experiment:

Pre-test:

The pre-test was conducted on the research sample on Wednesday, February 15, 2023, in the gymnastics hall, under the same conditions as the actual test. The tests were explained beforehand to ensure that the members understood them. All necessary preparations were made, and the test results were recorded according to the specific instructions for each test.

Steps for Applying Compound Exercises Based on Kinetic Coordination:

The steps for applying compound exercises can be summarized as follows: (Yvonne et al. 2023).

1. **Prepare the exercises according to correct scientific steps.**
2. **Demonstrate the exercise multiple times to the learner by providing a complete and detailed explanation.**
3. **Link the exercises with the feature of kinetic coordination.**
4. **Link the positions specific to the compound exercise with kinetic coordination.**
5. **Develop a method for kinetic coordination with organized cues.**
6. **Identify, monitor, and correct errors.**
7. **Consider individual differences among students in performing the exercise.**
8. **Provide rest periods during the exercise sessions.**
9. **Allow the student multiple attempts to perform the exercise.**
10. **Use multiple methods in applying the exercises with kinetic coordination.**

Main Experiment:

The research experiment was conducted in the gymnastics hall of the department during the first semester in the academic year 2022-2023, from February 16, 2023, to April 16, 2023.

Post-tests:

The post-tests were conducted on Tuesday, April 17, 2023, in the rhythmic gymnastics hall after completing the educational curriculum, which included eight educational units. All conditions were the same as in the pre-test.

Statistical Methods:

The SPSS statistical package was used to obtain the research results (Al-kanani, 2020).

Results and Discussion:

The results obtained by the student through the application of the experiment were presented to determine the impact of compound exercises with kinetic coordination on learning the handstand skill on the parallel bars. The results were analyzed and discussed in light of the statistical laws used in the research, which are appropriate for this data, to achieve the research hypotheses based on the practical field procedures adopted by the student to obtain this data. The results were then discussed according to scientific references.

Handstand Skill Test Between Pre-test and Post-test:

Table (2): the means and standard deviations for the handstand skill test of the experimental group between the pre-tests and post-tests.

Deviations	Pre-test		Post-test	
	M	SD	M	SD
Handstand skill on the parallel bars	2.25	0.64	4.12	0.70

From Table (2), the calculated T-value for basic skills test is higher than the tabled T-value at the 0.05 significance level. This indicates significant differences between the pre-tests and post-tests, favoring the post-tests.

The student enhances the development in the experimental group to the use of compound exercises with kinetic coordination

By applying compound exercises with kinetic coordination, it was noted that these exercises significantly enhanced the learning process among students (Baquet et al, 2002). The organized and correct method of performance led to active participation and a strong desire to perform well, allowing students to execute multiple kinetic tasks within a single exercise. This enabled student to develop the capability to perform compound exercises with kinetic coordination using assisting devices before executing them

directly on the main apparatus. Once these exercises were mastered, students transitioned to performing them directly on the official apparatus (Hackman and Katz, 2010).

These exercises develop flexibility, speed, strength, concentration, and attention among learners, driving them towards learning with high positivity by simplifying and facilitating the skill through performance without equipment to using the low parallel bars and finally to the official apparatus. Therefore, the adherence to the compound exercises with kinetic coordination in an organized manner leads to good results as mentioned by (Al-Dulaimi,2012). who emphasized that applying exercises in an organized manner helps learners achieve good performance according to the skill's performance path, giving them the freedom to execute the kinetic task in various ways to reach the final goal.

Handstand Skill Test on Parallel Bars Between Pre-test and Post-test:

Table (3): the means and standard deviations for the handstand skill test on the parallel bars for the control group between the pre-tests and post-tests.

Deviations	Pre-test		Post-test	
	M	SD	M	SD
Handstand skill on the parallel bars	2.15	0.57	3.29	0.47

The calculated T-value was higher than the tabled T-value for the control group. This indicates that the control group showed improvement due to the method applied by the instructor. This improvement resulted from adhering to lecture time, paying attention to the instructor, following organized commands and repetitions, explaining more than once, and providing feedback. (Aboud ,2011). who states that correctly and sequentially implementing the curriculum leads to a certain level of development and learning. Therefore, continuously applying this method contributes to its enhancement.

Post-tests for the Control and Experimental Groups for the Handstand Skill on Parallel Bars:

Table (4): the means for the post-tests of the control and experimental groups for the handstand skill on the parallel bars.

Deviations	Control group		Experimental group		Calculated t-values	Tabled t-values	Statistical significance
	M	SD	M	SD			
Handstand skill on parallel bars	3.29	0.47	4.12	0.70	3.8	2.04	Moral

Table (4) shows that the calculated T-value was 3.8, while the tabled T-value was 2.04. This confirms that the calculated T-value is greater than the tabled T-value, indicating significant differences in favor of the experimental group.

The results showed clear and significant improvements in the experimental group between the pre-test and post-test, suggesting that the experimental group achieved good results due to the compound exercises, which effectively enhanced the students' strength and speed in an organized and good manner. This helped the students develop a keen interest in performing the exercises correctly and efficiently according to kinetic coordination on the parallel bars, which require good arm strength (Mohammed, 2013).

The fluidity of movement with coordination between arms and legs in executing the kinetic tasks, speed, and precision in the performance of the skill's initiation, contributed to improving the students' focus and attention (Gentile, 1998). These exercises, being decisive for transferring body parts accurately and with high concentration on the apparatus, helped prevent injuries and ensured correct skill execution (Bonilla et al. 2022). The element of excitement and challenge increased the students' motivation and performance speed.

The compound exercises with kinetic coordination created an interactive environment that motivated students to continue performing, making multiple attempts in a well-organized manner while considering time and effort factors (Khalaf et al, 2014). These exercises also increased flexibility

and concentration accuracy among the students, providing extra effort for those struggling compared to their peers, allowing them to perform kinetic tasks gradually and smoothly. Kinetic coordination helped organize these cues effectively, transferring body parts according to the skill or exercise required, thus facilitating the learning process (Patra et al. 2022).

Since the learners were beginners and the apparatus and skill were difficult, requiring high effort and concentration, these exercises were particularly effective. (Mahmoud, 2020) stated that compound exercises improve sensory receptors in muscles, especially in the arms, which send nerve and sensory signals compatible with brain functions, which help the student to perform these movements in organized and coherent manner. (Mahmoud, 2020) confirmed that compound exercises provided repeated information from the brain for coordinated functioning between the nervous and muscular systems, sending cues to body muscles to perform kinetic tasks.(Abdul Matar and Abdul Zahra,2009). also emphasized that compound exercises facilitate the kinetic task and transition body movements according to performance stages, ensuring correct behavior.

The control group also showed a learning improvement much less than the experimental group. This improvement was attributed to the instructor's use of learning method and steps within the educational unit, and the imperative style he used with the students related to a simple organizational approach and a straightforward method with fewer parts of the educational unit(Pereira.et al, 2016).

Conclusions:

1. **The nature of the exercises had a very high positive impact, enhancing the learners' concentration.**
2. **The exercises created an atmosphere of excitement and interest in the learners' performance.**
3. **The link mechanism of compound exercises with the feature of kinetic coordination was beneficial and advantageous in transferring body parts and skill steps.**
4. **Provide the student with the full opportunity and variety in performing the exercises gave them the freedom in their performance.**

Recommendations:

1. **Utilize compound exercises in other skills that require strength, precision, and concentration in performance.**
2. **Use exercises with the feature of kinetic coordination in sports that require a combination of exercise and coordination.**
3. **Give students the freedom in the process of performing and applying exercises, which helps achieve the best performance.**
4. **Choose exercises with direct impact related to coordination and balance, especially for gymnastics and the more difficult apparatus.**

References:

- **Abdul Matar, Shaima. Abdul Zahra, Yaqoub Yousef. (2009). Basic principles for learning motor skills in artistic gymnastics (boys and girls), House of Books and Documents, Baghdad.**
- **Aboud, Majid Haider (2011). The effect of hypermedia according to the kinematic variables to learn the left straight punch skill / Master's thesis, University of Diyala, College of Basic Education / Iraq.**
- **Al-Batel, Faten Ibrahim. Rashad, Yasra Ali. Nasr El-Din, Hanan. Nouby, Shahenda. (2019). The effect of training using the HOPZ tool on the level of motor performance in rhythmic gymnastics. Scientific Journal of Specialized Physical Education and Sports Sciences - Faculty of Physical Education - Aswan University - Volume 14, Issue 3**
- **Al-Dulaimi, Nahida (2012). Methods of motor learning / (Beirut, Dar Al-Kotob Al-Ilmiyah).**
- **Al-Hawri, Aqla Suleiman and Ali, Hind Salman (2016). A Guide to Scientific Research and its Methods in Educational and Human Sciences (1st ed., Cairo / Modern Books Center, p. 113).**
- **Al-Kanani, A. A. (2020). Introduction to statistics and spss applications; Amman, Al-Yazouri Publishing House. 142-157**
- **Al-Zubaidi, A. K. , Al-Hussainat, N. A. (2021). Describing and evaluating the skill performance of basic movements in artistic gymnastics for men. Dar Al-Rafah for Printing and Publishing. Iraq Baghdad.100-110**

- **Baquet G, Berthoin S, Dupont G, Blondel N, Fabre C, Van Praagh E.(2002). Effects of high intensity intermittent training on peak VO(2) in prepubertal children. International Journal of Sports Medicine. 23(6):439. [PubMed]**
- **Bonilla DA, Cardozo LA, Vélez-Gutiérrez JM, Arévalo-Rodríguez A, Vargas-Molina S, Stout JR, Kreider RB, Petro JL.(2022). Exercise Selection and Common Injuries in Fitness Centers: A Systematic Integrative Review and Practical Recommendations. Int J Environ Res Public Health. Oct 5;19(19):12710. doi: 10.3390/ijerph191912710. PMID: 36232010; PMCID: PMC9565175.**
- **Duong H. T, Bui, P. U, Lu, K. N. (2022). The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane, Heliyon,Volume 8, Issue 12,2405-8440, https://doi.org/10.1016/j.heliyon.2022.e12657.**
- **Gentile, A. M. (1998). Movement Science: Implicit and Explicit Processes during Acquisition of Functional Skills. *Scandinavian Journal of Occupational Therapy*, *5*(1), 7–16. https://doi.org/10.3109/11038129809035723**
- **Gleaves, J. (2014). Manufactured Dope: How the 1984 US Olympic Cycling Team Rewrote the Rules on Drugs in Sports. *The International Journal of the History of Sport*, *32*(1), 89–107. https://doi.org/10.1080/09523367.2014.958667.**
- **Hackman, J.R. and Katz, N. (2010). Group Behavior and Performance†. In Handbook of Social Psychology (eds S.T. Fiske, D.T. Gilbert and G. Lindzey). https://doi.org/10.1002/9780470561119.socpsy002032**
- **Khalaf, Ali Muhammad. Musleh, Hussein Habib. Asal, Fouad Hammad. (2014). The effect of specific complex exercises according to specific areas to develop the level of some physical abilities and defensive rules for football players. Journal of Physical Education Sciences, Volume 7, Issue 3.**
- **Kohl H.W and Cook H, D.(2013). Committee on Physical Activity and Physical Education in the School Environment; Food and Nutrition**

Board; Institute of Medicine. Washington (DC): National Academies Press (US).

- **Mahmoud, Naseem Murtadha. (2020). The effect of neuromuscular facilitation exercises for sensory and ballistic receptors on force balance and the most important biomotor abilities and the achievement of weight-pushing effectiveness for under 17 years. Master's thesis. College of Physical Education and Sports Sciences, University of Karbala / Iraq.**
- **Mohammed, Malik Rasim. (2013). The effect of a proposed training program on some physical and skill variables in gymnastics for students of the Department of Physical Education at Palestine Technical University / Khadouri. Master's thesis, College of Graduate Studies, An-Najah National University. Nablus/ Palestine.**
- **Patra, I., Alazemi, A., Al-Jamal, D. *et al.* (2022). The effectiveness of teachers' written and verbal corrective feedback (CF) during formative assessment (FA) on male language learners' academic anxiety (AA), academic performance (AP), and attitude toward learning (ATL). *Lang Test Asia* 12, 19. https://doi.org/10.1186/s40468-022-00169-2**
- **Pereira J, Araújo R, Farias C, Bessa C, Mesquita I.(2016). Sport Education and Direct Instruction Units: Comparison of Student Knowledge Development in Athletics. J Sports Sci Med. Dec 1;15(4):569-577. PMID: 27928201; PMCID: PMC5131209.**
- **Suvendu Ray and Deb Prasad Sikdar. (2023). Trending Scenario of Teaching Method in the Modern Education. *International Journal of Teaching, Learning and Education.* Vol-2, Issue-3.**
- **Yvonne, R, Dan .B, Stefan. P, Maria, S., Tammy, L, Marvin, H., Christine, S, K. W. (2023). Gymnastic skills on a balance beam with simulated height, Human Movement Science, Volume 87 ,103023,, https://doi.org/10.1016/j.humov.2022.103023.**