http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 1,January 2026, Pg393-400
DOI: 10.35724/mjpes.v8i1.7467
Received: December 20, 2025, Accepted: January 20, 2026

Effect Of Compound Training According To Training Progression In Intensity On Some Physical Abilities And High Jump Scoring Accuracy In Handball Among Young Players

[1]Dhurgham Abd Baqir*, [2]Asaad Flaih Hasan

*Corresponding Author: (Dhurgham Abd Baqir) e-mail: dergham@shu.edu.iq
[1,2]Faculty of Physical Education and Sports Sciences, Al-Shatra University

Abstract

Sports training is a structured educational process based on scientific principles, aimed at preparing athletes according to their varying levels and capabilities. It strives for continuous improvement of their physical and technical skills to achieve peak performance in their chosen activity or specialized skill. Physical conditioning is a cornerstone of this process, playing a vital role in supporting gradual development of performance in accordance with demands of game and individual differences among players. Handball is characterized by a fast pace and constant changes between defense and attack, requiring development of several physical and motor skills that influence offensive performance, particularly skill of shooting from a high jump. Through field observations by the researcher while supervising training of local teams, it became clear that most clubs focus on specific preparation phase without adopting integrated training units that combine strength, speed, skill, and endurance in a progressive and comprehensive manner. This approach fails to achieve a scientifically sound increase in training load, reduce signs of fatigue, and contribute to optimal physical and technical adaptation. research aims to identify effect of compound training based on gradual increase in training load intensity on some physical abilities and accuracy of high jump shooting skill among handball players. the researcher started from hypothesis that there are statistically significant differences between results of pre- and post-tests of research sample. To achieve study's objectives, the researcher employed an experimental approach using a single experimental group. research sample consisted of six youth handball players from Al-Shatra Club. results demonstrated that integration of physical and technical aspects contributed to improved coordination and motor skills, facilitating transfer of physical training to technical performance during shooting. Based on these findings, the researcher recommended adopting a combined training program supported by diverse training methods and progressively increasing intensity, tailored to movement patterns of high jump shooting skill.

Keywords: Compound training, Training progression, Scoring, Handball.

Introduction

Sports training is a directed educational process based on scientific planning to prepare athletes according to their different levels and in accordance with their individual abilities. It is viewed as a continuous process aimed at improving and developing performance levels in various sports activities, ultimately achieving highest levels of mastery in specific sport or skill performed. Attention to physical aspect is a fundamental element of this process, given its active role in gradually raising level of achievement and performance, in line with requirements of chosen sport and individual differences among athletes.

Handball is a team sport that has gained significant popularity in recent years, despite being relatively new compared to some other sports. This surge in popularity is attributed to rapid development of game, particularly in speed and accuracy of executing basic skills, especially offensive ones. In this context, combined training is a key factor that has contributed to development of handball and its achievement of advanced performance levels.

Proper preparation of training programs based on systematic integration of a set of physical attributes is an influential factor in achieving goals of sports training, provided that this preparation is based on sound scientific foundations, foremost among which is precise regulation of intensity of training load and mechanisms for increasing it in a scientifically studied manner, and in accordance with correct stages of outstanding technical performance, which is reflected positively on effectiveness of training process and means used in it.

Based on this, importance of research is evident in adopting principle of gradual training loads within a well-thought-out scientific plan that allows player’s body to gradually adapt to physical and skill requirements of handball in general, and shooting skill in particular, while maintaining quality and continuity of performance.

2-1 Research problem

Handball is characterized by its fast pace, both in executing basic skills and in rapid transition from defense to attack. This necessitates focusing on developing physical and motor qualities that influence offensive performance, particularly skill of shooting from high jump. Through researcher's interest in and practice of game, in addition to supervising training of local teams, it became clear that most sports clubs enter preparation phase without allocating integrated training units that include diverse training methods, such as strength, speed, skill, and endurance, in a coherent and sequential manner where each reinforces others. This would achieve highly efficient physical and skill adaptations that suit individual abilities of players, while avoiding excessive training loads and relying on a scientifically studied increase in training load that aligns with requirements of handball.

Handball in general, and high jump shot in particular, demands a complex set of physical requirements, foremost among them being specific strength. exercises employed rely on principle of combined training, which links development of muscular strength with explosive skill performance, following principle of progressively increasing intensity of training load. This is considered one of most effective modern training methods. This approach has a clear impact on enriching both theoretical and practical aspects of handball, benefiting both handball coaches and players.

1-3 Research objectives

Preparing exercises to apply combined training effect according to training progression in intensity for skill of shooting from a high jump with a handball. Identifying effect of compound training according to training progression in intensity on some physical abilities and shooting accuracy from high jump with handball for research group. Identifying differences between pre-test and post-test in physical abilities and shooting accuracy from a high jump with a handball for research group.

1-4 Research hypotheses

There is a positive effect of compound training according to training progression in intensity on some physical abilities and shooting accuracy from high jump with handball for research group. There are statistically significant differences between pre-test and post-test in physical abilities and accuracy of shooting from a high jump for research group.

2-1 Research Methodology

the researcher used experimental method, with a single experimental group design . (Alsaeed et al., 2024). 6 young players were selected from Al-Shatra handball club study was conducted intentionally in order to achieve its objectives, and Table (1) shows characteristics of research sample.

Table 1. Sample homogeneity in terms of height, training age, and apparent weight variables

Variables	Measurement unit	Mean	St.d	Coefficient of variation
Height	cm.	146	2.55	1.746
Training age	Year	1.12	0.21	18.75
Weight	Kg.	43	1.13	2.627

2.2 Exploratory Experiment:

the researcher conducted exploratory experiment on [date] On 15/10/2025 , (3) players from outside research sample were tested to determine following:

- height of cameras.
- Identifying difficulties and obstacles that will arise during implementation and progress of tests.
- Identifying appropriate time to conduct tests and how long this procedure takes.
- ability of sample members to carry out tests and extent to which they are suitable for them.
- Identifying equipment and tools necessary to carry out experiment and tests.
- total time required for this experiment.
- Informing team about nature of experience and its requirements.

2-3 Pre-test and measurement:

Pre-tests and measurements were conducted for research group on 25/10/2025 in indoor sports hall at Al-Shatra Model Forum. Measurements of height, mass, and training age were taken, and then a test was performed . skill of shooting a handball from a high jump with a handball. the researcher established conditions related to test in terms of time, place, tools used, method of execution, and assisting work team in order to work on providing them in post-test.

2.4 Combined training, based on gradual increase in intensity was implemented by research group

the researcher prepared compound exercises according to training progression in intensity according to scientific principles by reviewing some specialized scientific references and previous studies, which is one of modern scientific methods that depends on systematic integration of more than one type of physical skill and physical training within training unit in line with players' abilities and level (Kadhim et al., 2020) . exercises were implemented as follows:

Table 2. Planning and implementing functional force training

Number of training weeks	8 weeks
goal of period	35-45 minutes
Time of Unity	Three training units
Number of units per week	Light load - medium load - high load
Training loads	80-85 %
Training method	Low-intensity pharyngeal
Number of groups	(6 - 4)

exercises used in this method are characterized by progressive intensity, reaching approximately 80 to 85% of individual's maximum level. duration of exercises was within specific preparation period of 8 weeks, with three training sessions per week. duration of each training session was (35-45 minutes). Below is a summary of how intensity is used for different exercises: For elastic rope training, total rope elongation is measured as a maximum limit, and then training intensity of ropes is adjusted accordingly. For additional weights used , maximum weight that player can overcome is determined, and intensity ratio is determined accordingly. For distance jumping training, distance is determined and intensity of vertical and horizontal distances or training heights is determined accordingly. For long-distance jumping training, maximum time to cover that maximum continuous distance is determined, and intensity of training time for those distances is determined.

2-5 Post-testing and measurement

post-test and measurement of research sample was conducted on Wednesday morning December 25, 2024 in indoor sports hall at Al-Nasr Youth Model Forum. the researcher ensured that conditions were similar to pre-test and its procedures after completion of educational exercises.

2-6 Statistical methods

the researcher used SPSS statistical program to process results.

3- Results

3-1 Presentation and discussion of results of differences in physical abilities for pre- and post-tests of research group:

Table 3. shows values of means, standard deviations, and t - test values for pre- and post-physical abilities of research group

Variables	Measurement unit	Pre-test		Post-test		(t) value	Sig. level	Result
		M.	St.d	M.	St.d			
Explosive power of legs	cm.	4,115,000	0.010690	4.157500	0.010351	9,378	0,000	Sig.
Explosive power of arms	cm.	2.298750	0.006409	2.318750	0.003536	-6.110101	0,000	Sig.
Speed-strength of arms	cm.	11.733750	0.042067	13.126250	0.515861	-7.912174	0,000	Sig.
Speed-strength characteristic	Rep.	11,800,000	0.074066	13.005000	0.466354	-7.609141	0,000	Sig.
Arm movement speed	Rep.	15.233750	0.042067	16.343750	0.050125	-42.837397	0,000	Sig.
Leg movement speed	Rep.	10.131250	0.003536	11.142500	0.017525	-174.184324	0,000	Sig.
Flexibility	cm	40.123750	0.011877	41,260,000	0.018516	-134.653474	0,000	Sig.
Agility	time	28.092500	0.034122	27.936250	0.090859	4.214091	0,000	Sig.

*At a significance level ≤ 0.05

Table (3) shows values of arithmetic means and standard deviations, along with test values. (t-test) Wilcoxon signed-rank test was used for biomechanical variables of anchorage and propulsion phases in both pre- and post-tests of research sample. results show that calculated t- values were statistically significant at a significance level of ≤ 0.05 for all variables. Variables studied one, Which It indicates to presence Differences moral clear between two measurements Tribal And after that, For benefit of Measurement next step.

the researcher attributes these significant differences to effectiveness of combined training methods used by research sample. This type of training contributed to organizing training process scientifically and had a substantial impact on improving physical performance levels by relying on principle of gradually increasing training load, in accordance with players' physical and technical capabilities. Furthermore, proper preparation of training facility and provision of necessary equipment and tools contributed to achieving positive results, which included improving physical abilities of handball players. (Kadhim & Jabar, 2020)

Compound training is implemented through systematic integration of strength training exercises with speed, power, or game-specific skills exercises, which directly impacts development of studied variables. These results align with findings of Mohsen Ali Nassif's study, which confirmed that systematic training based on sound scientific principles has a significant effect on improving physical and skill test results. (Hani, 2024)

improvement in explosive power of arm muscles is also attributed to use of compound exercises in which athletes perform strength training immediately followed by precisely designed skill or explosive drills. This has contributed to improved motor performance efficiency and positively impacted execution of high jump shooting skill. This suggests that using medicine ball throwing exercises with varying intensities and repetitions throughout training program contributes to strengthening muscles involved in throwing by activating a greater number of fast-twitch muscle fibers, improving function of accessory muscles, and increasing inhibition efficiency of antagonistic muscles . (Kharkan et al., 2019)

combined training methods were implemented according to principle of progressively increasing intensity of training load. This approach relies on fundamentals of distributing exercises between physical and technical aspects, while considering impact of training load on targeted muscle groups. This method is essential for achieving highly efficient physical and technical adaptations, particularly in competitive performance. It represents a training system based on scientific principles derived from analysis of training load and its accompanying adaptation processes, thus contributing to improved performance levels among athletes . (Rashid, 2025)

3-2 Presentation and discussion of results of differences in shooting accuracy in handball between pre- and post-tests for research group

Table 4. shows values means, standard deviations, and value of (t) for accuracy variable in handball game and post-research group

Variables	Measurement unit	Pre-test		Post-test		(t) value	Sig. level	Result
		M.	St.d	M.	St.d			
Handball scoring accuracy	Rep.	3.875	0.353	6.125	0.834	7.179	0.000	Sig.

*At a significance level ≤ 0.05

Table (4) shows arithmetic means and standard deviations, in addition to t- test value, for handball shooting accuracy variable in pre- and post-tests for research sample. results show that calculated t- value was statistically significant at a significance level of ≤ 0.05. Which It indicates on presence differences moral clear between two measurements for benefit of measurement next step.

the researcher attributes this improvement in shooting accuracy to nature of combined training exercises research sample underwent. These exercises were implemented according to principle of progressively increasing intensity and training loads, which contributed to a gradual and continuous development in skill performance, particularly in shooting accuracy from high jump in handball. These exercises also contributed to developing explosive power in lower limbs, in addition to developing muscular strength of throwing arm. This enabled players to jump at an appropriate height and achieve a good degree of stability during flight phase, which helps them adopt optimal movement position and execute correct trajectory for shooting. (Van Valkenburgh et al., 2025)

Integrated link between physical and technical aspects is one of main factors that contributed to improving transfer of effect of acquired strength to actual skill performance, which was reflected positively in shooting accuracy, and this is consistent with what was indicated development of leg and arm muscle strength, as well as strength in other parts of body, indicates effectiveness of using weight training with various weights, medicine balls, and resistance bands, along with a performance that combines strength and speed. This contributes to developing speed-strength required for shooting skill, thus improving overall skill level of players. (Kharkan et al., 2019)

4-1 Conclusions

A clear improvement was observed in level of accuracy of technical performance of high jump shooting skill in handball, as a result of remarkable development in integration between physical and technical aspects of players. All exercises implemented within combined training program contributed to enhancing explosive power of both upper and lower limbs, which positively impacted stability and performance of players during flight phase of jumping and shooting. integration of physical and skill aspects helped to achieve coordination and motor harmony, which led to transfer of effect of physical training to skill performance of player during shooting. combined training, applied according to principle of gradual increase in intensity of training load, contributed to development of neuromuscular coordination and improved timing of performance, which are key factors in enhancing shooting accuracy.

4-2 Recommendations

Emphasis is placed on adopting compound training methods using diverse training tools and with gradual intensity and volumes, in accordance with movement path of shooting skill from high jump in handball. principle of gradual training load and training adaptation should be observed when applying compound training, with aim of developing physical and skill capabilities and improving accuracy of shooting from high jump. Taking into account individual differences between players, based on specific physical and skill indicators, especially when identifying weaknesses in physical attributes related to performance. Using additional training methods to develop physical and skill abilities, and improve shooting accuracy from high jumps, while taking into account anatomical axes of movement. Conducting similar research and studies on different age groups, with aim of generalizing results and utilizing them in various training programs.

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