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## Development of Professionally Important Qualities of Cadets by Means of Handball

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**Abstract.** The basis for the reliability of professional knowledge, skills, and abilities is a high level of development of physical, psychological, and psychophysiological qualities, which are formed in the process of studying at the flight academy by complex means, one of which is physical training. Targeted physical training classes can not only improve health and emotional tone, but also develop professionally important psychophysiological qualities. The purpose of the study is to theoretically substantiate the importance of handball for the development of professionally important qualities of Future Flight Academy specialists. To achieve this purpose, methods of theoretical analysis, synthesis, generalisation of scientific and educational literature on the research problem were used. The article reveals the importance of handball in the development of physical and psychophysiological qualities of cadets, as well as presents exercises and focused training for the development of physical qualities of future specialists who master aviation specialisations. The characteristic features of the influence of handball on the comprehensive development of cadets' personality are determined. It was established that systematic handball classes develop cadets' basic physical and psychophysiological qualities, important for professions of operator profile: emotional and vestibular stability; volume, distribution and switching of attention; the ability to extrapolate the development of the situation; the ability to quickly make decisions, and a number of other qualities that determine success in professional training of cadets of the academy. It is proved that handball is of great importance for the comprehensive development of future specialists, as well as their professionally important qualities. It is confirmed that the physical training of cadets of the flight academy using game sports, in particular handball, is an active method of successful implementation of their professional training. The results obtained will serve as a perspective for an empirical study of the relevance of the problem

**Keywords:** physical fitness, physical qualities, sports games, volitional qualities, training

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## INTRODUCTION

The acceleration of social and economic development of Ukraine has posed a number of important problems for pedagogy, one of which is the training of highly qualified, socially active, professionally reliable specialists. The scientifically based organisation of professional training opens up great opportunities in the development of professionally reliable specialists in various fields based on the integration of all training tools and creates conditions for the development of individual structural units that should

have purposeful functions, in particular – by means of physical training in a professional direction [1].

The professional activity of aviation specialists places increased demands on the level of physical fitness. Research carried out by R.N. Makarov [2] and A.V. Mahlovanyi [3], proved that people with a high level of physical fitness, more successfully master flight professions. As an example, empirical studies of R.N. Makarov confirm that “physically trained pilots have a much lower level of emotional reactions

to the failure of navigation devices and aircraft systems, and piloting the aircraft and performing actions are more confident, which indicates that pilots are trained to act in special cases during the flight" [2]. For his part, A.V. Mahlovanyi argued that "students with a high level of physical fitness adapt well to the educational process" [3]. As a result, the researcher suggested that during physical education classes, students should form a thorough belief in the use of general development game exercises that allow them to maintain an optimal level of physical fitness, improve qualitative and quantitative indicators of mental performance, and also form resistance to stress during exam periods [3].

A high level of physical fitness is a factor that determines the level of general and special performance of aviation specialists, the state of dynamic health, which are directly related to professional longevity. This level should properly meet the requirements of accelerating scientific and technological progress in aviation, which makes it necessary to carry out a set of measures to improve general physical fitness, and in some cases the development of qualities that determine the successful development of the flight specialty, the reliability of professional knowledge, skills and abilities, a high level of efficiency and maintaining professional longevity. Thus, the basis for the reliability of professional knowledge, skills, and abilities is a high level of development of physical, psychological, and psychophysiological qualities, which are formed in the process of studying at the flight academy by complex means, one of which is physical training [4].

Modern requirements for the professional activity of aviation specialists in the educational process require the search for new ways, forms, methods, and means for training cadets. Insufficiently developed psychophysiological qualities (emotional stability, coordination of movement, resistance to overload, vestibular stability, etc.) are the main obstacles to successful mastering of the flight training programme by cadets. Experimental scientific research in the field of aviation by T.S. Plachinda [1], H.A. Leshchenko [5], N.A. Orlenko [6], I.I. Halimska [4], and others proved the high effectiveness of physical training tools in the development of such professionally important psychophysiological qualities as emotional stability, distribution and switching of attention, the ability to work at a high forced pace and perform additional work against the background of the main activity, etc. All in all, systematic physical education classes not only improve the emotional and physical state of health, but also develop certain psychophysiological qualities that are later necessary in the process of professional growth.

An analysis of scientific works of D.V. Bondarev [7], Zh.L. Kozina [8], T.Yu. Krutsevych [9], Yu.Yu. Muskharina [10] and S.M. Romanii [11] showed that sports games are the most popular among the tools recommended for the comprehensive development of students and the development of physical qualities since they contribute to solving educational problems in the process of physical training. However, very little attention is paid to the importance of sports games in the development of professionally significant qualities of future aviation specialists, improving their

performance and reliability. Therefore, *the purpose of the study* is to theoretically justify the importance of sports games, in particular handball, for the development of professionally important qualities of future flight specialists of an academy.

## MATERIALS AND METHODS

To achieve this purpose, the study was conducted in two stages. The first stage involved the development of scientific and educational literature on the chosen issues of developing professionally important qualities of Cadets by means of handball. The second stage of the study was conducted on the basis of the developed scientific and methodological literature. Its essence was to provide focused training sessions aimed at developing the physical qualities of cadets of the Flight Academy of the National Aviation University.

During the study of the development of professionally important qualities of cadets by means of handball, such general scientific theoretical research methods as analysis, synthesis, generalisation of scientific and educational literature, as well as systematisation of the obtained data were used. In particular, based on the scientific works of Ukrainian and foreign researchers, the method of analysis was used to study the physical, psychophysiological, and psychological qualities that are necessary for future aviation specialists, and the importance of sports games, in particular, handball, for their development. The method of synthesis made it possible to collectively consider the components of the development of physical and psychological competencies of cadets of the aviation academy, provided that handball is used. At the same time, the generalisation method was used to systematise the theoretical base and provide an exhaustive justification for the need to introduce sports games, in particular handball, in physical training classes. All in all, the systematisation method helped to study approximate examples of exercises during handball classes to improve the professional qualities of future specialists in the field of aviation and form samples of training programmes in order to develop the strength, speed, endurance, and flexibility of cadets. Also, the paper presents graphic images that form the logical perception of the material under study using visualisation tools. The use of this method made it possible to demonstrate the material on approximate exercises for the development of certain physical qualities in a structured way.

In general, the conducted research is formed based on structural, functional, and systematic approaches. Thus, according to the structural and functional approach, the development of physical and psychological competencies of future aviation specialists by means of handball in the context of improving their overall professional development was considered. For its part, a systematic approach was used at the stage of reviewing scientific and methodological literature in order to identify the features of the development of professional qualities of pilots, as well as to select examples of physical exercises to guide approximate training of academy cadets.

Eventually, the methodological basis of the research

is characterised by the choice of the relevant topic, the analysis of modern scientific provisions of this topic. The methods used made it possible to analyse the selected problems in a relevant and deep way at each stage, which later helped determine the purpose and main objectives of the study of the development of professionally important qualities of cadets by means of handball. The results obtained will serve as a perspective for an empirical study of the relevance of the problem.

## RESULTS AND DISCUSSION

### ***The development of psychophysical qualities of cadets in the course of handball classes***

One of the means of educating physical and psychophysiological qualities of aviation specialists is the use of sports games, in particular handball. Handball is a high-speed, fast-paced game where one needs to make the right decision in short periods of time, quickly respond to the referee's whistle, see the movements of team and the opponent's players, and so on. Handball players develop the following professionally significant psychophysiological qualities: volume, switching and distribution of attention, short-term memory and thinking, fine muscle sense, reaction speed, the ability to quickly reorganise, and so on. It is worth noting that the activity of a handball player in terms of psychophysiological characteristics is similar to the profession of aviation industry specialists, which is manifested in the need to quickly make decisions and think through all the changes in game moments. Eventually, it was found that specialists who are engaged in handball make the right decisions in difficult situations much faster than those who are not engaged in this sport. During handball classes, the mobility of the main processes of inhibition and excitation increases, as well as their balance, which is one of the key aspects of activity in conditions of time deficit and changes in its structure [12].

As is known, handball is an emotional sport, and this should not be ignored in the training of aviation specialists. Emotional arousal in handball occurs primarily as a result of:

- high speed of players' movement, the need to act quickly and suddenly with the ball, a wide variety of movements;
- dynamics of wrestling, sharpness of game positions, changes in game superiority, variable success, constant change of score, rapid change of various game situations;
- collective nature of game actions;
- the presence of martial arts.

Finally, as is obvious, players, as well as aviation specialists, have a need to develop emotional stability. If a person cannot contain their emotions, in handball this can lead to violations, exemption, in particular, to non-fulfillment of the task, and in flight practice to panic during an unforeseen situation. The success of practical actions of handball players in the game is a high level of development of such qualities as the distribution and switching of attention, the volume of the field of vision, reaction speed and response actions focused on speed of decisions, tactical thinking, speed of movement, etc. This level provides orientation for handball players in difficult game situations.

Thus, in order to achieve professionalism in handball, a player must be able to concentrate on the game, monitor the rapid movement of the ball and players on the court, quickly respond to the referee's whistle and, knowing the rules of the game, quickly understand where the ball will be played, and where it should be at this time – in attack or defense, quickly be able to run into the lead after an opponent's mistake. During the delivery, the handball player must assess in a matter of seconds, or even fractions of a second, where the goalkeeper is, where his players and the opponent's players are in order to successfully complete the attack. It is important for the player to be able to quickly switch central vision to peripheral vision, especially when there is a transition from defense to attack, in order to choose the right action in game situations. It is worth noting that in flight training there might be the same unpredictable situations as in handball. For example, if the tactical combination that was conceived was not completed, then one needs to quickly navigate and find the best completion of the attack. The stability of motor skills in handball is mainly due to vestibular stability. Precise coordination of movements is important for making shots at the goal from any position, for deceptive movements and for maintaining balance in conditions of unstable body positions that occur in the fight for the ball with an opponent. The goalkeeper's ability to accurately estimate the distance and speed of a player helps to give him an accurate pass into the lead [13].

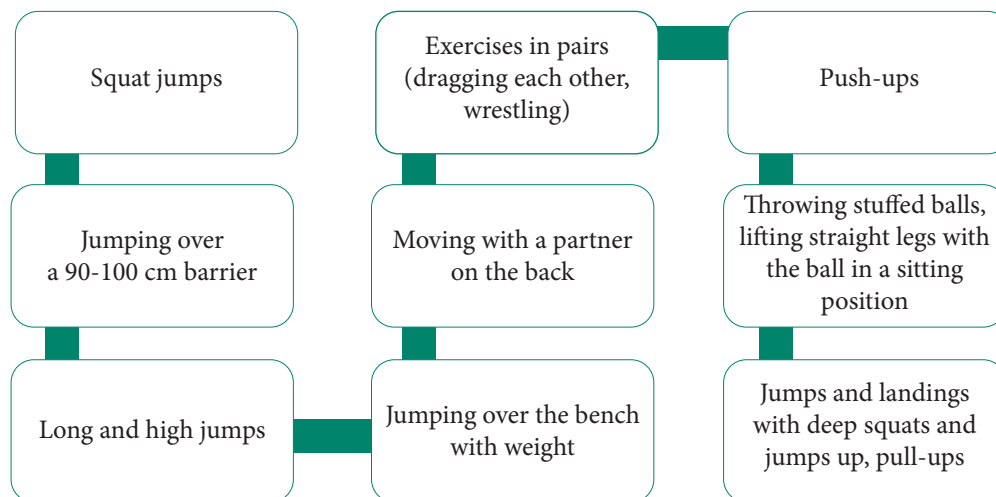
It is very important that all these qualities have a positive impact on the professional activities of aviation specialists. During the training, an aviation specialist, as well as a handball player, faces difficulties that he must overcome in order to achieve a certain result. He performs complex actions that require a lot of willpower. At the same time, willpower is characterised by a whole complex of volitional qualities: discipline, perseverance, purposefulness, courage, determination, endurance, self-control, etc. Overcoming difficulties, cadets are guided by certain motives, motives that form the moral and intellectual basis of their volitional actions. The task of psychological training is to create a state of certain mental readiness by maximising the conditions of the educational and training process to the conditions of further work of cadets, form the correct orientation of the individual, the necessary qualities of character, develop intelligence, positive emotions.

### ***The development of physical qualities of future aviation specialists by handball methods***

Modern handball develops by increasing the intensity of the game. Increasing the pace of the game requires increasing the volume and intensity of training loads. In the process of competitive play, the body of handball player is affected by large loads, which require a certain motivation of the functional capabilities of the body and establish high requirements for the physical fitness of the athlete. Systematic handball classes develop such basic physical qualities as strength, endurance, speed, agility, and flexibility, as well as increase the body's resistance to the effects of many other factors (hypoxia, vestibular irritation, fatigue), which should be considered in the context of approximate training.

First of all, the practice of training proves that strength is the main quality of an athlete. The development of two other qualities depends on it: speed and endurance, as a result of which the development of strength should be preferred. To do this, the exercises that affect the muscles with maximum load should be used. Those exercises that load the muscles to a lesser extent, even if repeated, do not give the desired effect. For the most part, they develop

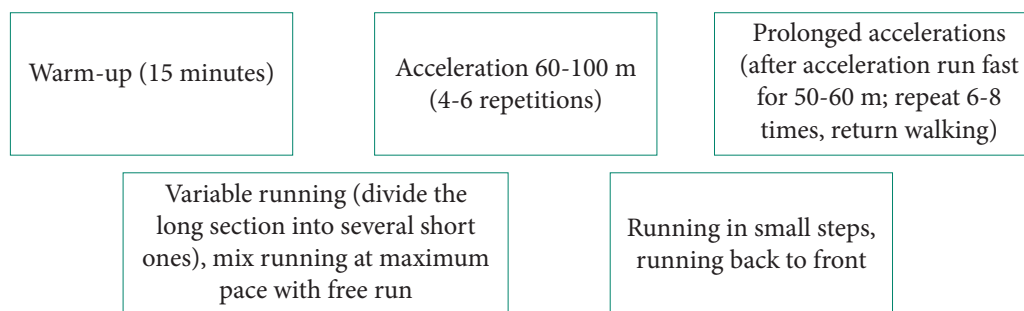
strength endurance, not strength. However, they can partially develop strength if performed at high speed. However, their effectiveness decreases with the increase in the number of repetitions. The best way to develop strength is to increase the load by gradually increasing the number of repetitions and the pace of exercises performed [14]. To achieve these goals, it is recommended to use the following exercises (Fig. 1):



**Figure 1.** Examples of exercises for developing strength during handball training

It is worth noting that strength training should be carried out after high-speed exercises. Modern trends in the development of handball are aimed at significantly improving the speed of performing game techniques, both in attack and defence. By speed qualities, the ability to perform motor actions with a certain efficiency for a minimum time is meant. To improve the speed abilities of a handball player, a game method is used that affects the

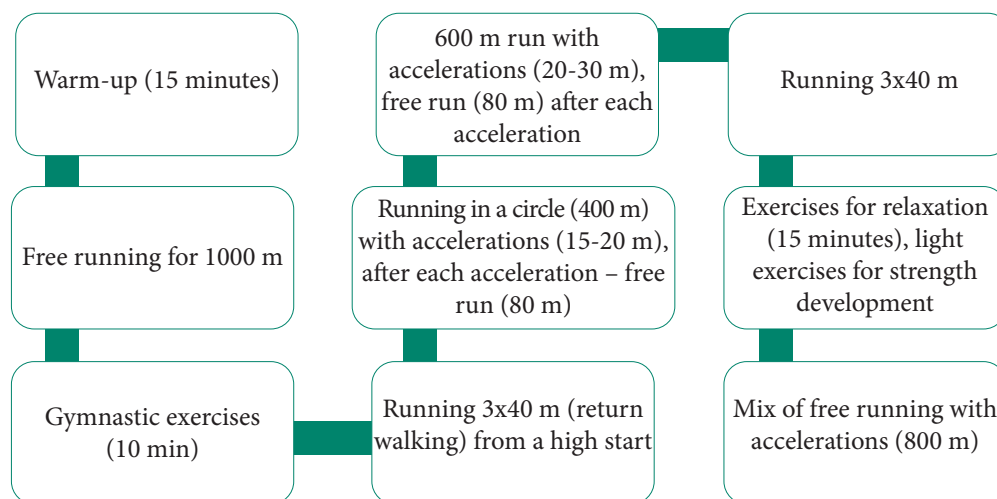
speed of motor reaction, the speed of movements and actions associated with the perception and processing of information, followed by a quick response. The main factor in speed training is the maximum intensity of movement. Speed development exercises are performed at the beginning of a training session, after a warm-up session [13]. As an example, training aimed at developing speed may consist of the following exercises (Fig. 2):



**Figure 2.** Examples of speed development exercises during handball classes

At the same time, one of the main qualities of a handball player is endurance, since he must be ready for a long-term action with constant effectiveness. This ability is characterised by the time (during cyclic loads) or the number of repetitions (during acyclic loads), during which the maximum intensity of movements is being developed. Endurance is limited by other qualities of the player that determine their training, especially by strength and speed. The overall endurance of an athlete is characterised by his ability to perform movements for a long time, in which a large number of muscles are involved, as well as the state

of his cardiovascular and respiratory systems. It develops continuously, evenly and for a long time, but with relatively few intense loads. Mostly, long-term running at a given pace and running at a variable speed are used for this purpose [15]. High-speed endurance is a crucial quality for a handball player, the lack of which leads to a decrease in running speed and jumping height, slowing down the point shots, loss of accuracy, and so on. An approximate training session lasting 1 hour and 30 minutes, aimed at developing high-speed endurance, consists of the following exercises (Fig. 3):



**Figure 3.** Approximate training for the development of high-speed endurance

Finally, the focus should be on developing agility as the ability to perform complex coordinated movements, quickly go from one movement to another, and the ability to control the actions depending on changing conditions and new tasks. General agility is developed through acrobatic exercises (somersaults, flips, handstands), exercises with gymnastic apparatus and on gymnastic apparatus, various types of wrestling, running with obstacles and cross-country, and so on. A handball player must solve complex game tasks during the game, which implies the presence of a certain speed of thinking and the ability to quickly implement the decision made in a complex of movements. In the game, some actions require special mobility and game agility due to the complexity of performing in unusual conditions. These include: special shots in a jump (with a half-turn, with a jump), shots with a jump on target (with an evasion), shots in a fall after turns, passes and throws with the left hand (for “right-handed”), processing inaccurate handoffs, acrobatic feints of the goalkeeper and defensive players, and so on.

Finally, it is advisable to consider such a physical quality of a handball player as flexibility. “Flexibility” is usually understood as the ability to perform movements with a large amplitude. Since most actions of handball players are performed with a significant range of motion, sufficient flexibility of the spinal column and joint mobility are important for a handball player. Exercises that develop flexibility should be used during each session – they can be added to an independent part of the workout, lasting 5-10 minutes. More effective development of flexibility occurs if these exercises alternate with strength exercises. The development of flexibility in the joints should be gradual, and the performance of movements – with the maximum amplitude and with sufficient preliminary warm-up.

“Exercises are performed in series of 16-20 times, usually at a dynamic pace, the movements are smooth or swinging, at the extreme point of the amplitude, additional efforts are applied. Flexibility exercises are performed with gymnastic apparatus (gymnastic stick), with a partner, with or without weights” [13].

## CONCLUSIONS

Sports games, such as handball, in higher education as an integral component of physical training are one of the most important components of the development of professionally important qualities of future aviation specialists, as well as ensuring a healthy lifestyle, improving the level of performance, maintaining and strengthening health. It is worth noting that during the development of professionally significant qualities in cadets of aviation higher educational institutions, it is first of all important to pay enough attention to the education of those qualities that lag behind in their development, on the one hand, and on the other – those that are related to the specifics of future professional activities and are important for improving labour productivity. Thus, reasonable, appropriate, and constant use of handball classes helps to fully form such physical qualities in cadets as strength, endurance, speed, agility, and flexibility, psychological qualities as emotional stability and balance, and also allows the teacher to diversify classes, increase its emotional climate and density. All of the above proves that the physical training of cadets of the flight academy using game sports, in particular handball, is an active method of carrying out their professional training. The authors of this study see the *prospects for further research* in improving the existing comprehensive training programmes, the use of which will contribute to improving the level of development of professionally important qualities of cadets of the academy.

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### Формування професійно важливих якостей курсантів засобами гандболу

**Анотація.** Основою надійності професійних знань, навичок і вмінь є високий рівень розвитку фізичних, психологічних і психофізіологічних якостей, які формуються в процесі вивчення в льотній академії комплексними засобами, одним з яких є фізична підготовка. Цілеспрямовані заняття фізичною підготовкою дають змогу не лише поліпшити стан здоров'я та емоційний тон, а й розвинути професійно важливі психофізіологічні якості. Мета дослідження – теоретично обґрунтувати значення гандболу для формування професійно важливих якостей майбутніх фахівців льотної академії. Для досягнення мети були використані методи теоретичного аналізу, синтезу, узагальнення наукової та навчально-методичної літератури з проблеми дослідження. У статті розкрито значення гандболу у формуванні фізичних і психофізіологічних якостей курсантів, а також представлено вправи й орієнтовані тренування для розвитку фізичних якостей майбутніх фахівців, які освоюють авіаційні спеціальності. Визначено особливості впливу гандболу на всебічний розвиток особистості курсантів. З'ясовано, що систематичні заняття гандболом, розвивають у курсантів основні фізичні якості, важливі для професій операторського профілю психофізіологічні якості: емоційну та вестибулярну стійкість; обсяг, розподіл і переключення уваги; здатність екстраполювати розвиток ситуації; здатність швидко приймати рішення й цілу низку інших якостей, які визначають успіх у професійному навчанні курсантів академії. Обґрунтовано, що гандбол має велике значення для всебічного розвитку майбутніх фахівців, а також їхніх професійно важливих якостей. Підтверджено, що фізична підготовка курсантів льотної академії з використанням ігрових видів спорту, зокрема гандболу, є активним методом успішного здійснення їхньої професійної підготовки. Отримані результати слугуватимуть перспективою емпіричного вивчення актуальності проблеми

**Ключові слова:** фізична підготовка, фізичні якості, спортивні ігри, вольові якості, тренування