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STRENGTH INDICATORS OF SHOCK ACTIONS BY THE HANDS AND THE LEGS OF CADETS OF HIGHER EDUCATION INSTITUTIONS OF THE MINISTRY OF INTERNAL AFFAIRS OF UKRAINE

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Abstracts

Relevance of Research Topic. It is important for the cadets to be able to perform high speed and strength attacks (taking into account vulnerable points on the human body), as it allows to effectively overcome the offender's actions and to negatively affect his ability to work if there is a direct threat to the life and health of a police officer or a citizen. **Purpose and Methods of Research.** The purpose of the work is to investigate the strengths of the shock actions by the hands and the legs of cadets at different stages of training. **Methods:** theoretical analysis and generalization of data of scientific-methodical literature and empirical materials of scientific research; control tests – testing, using the shock chronodynamometer «SPUDERG», which allows to measure the strength of shock actions; methods of statistical processing. **Results of Work and Key Conclusions.** The power indices of single shock actions were researched. A comparative analysis of the strength indices of individual types of shock actions by the hands and the legs of cadets at different stages of training was conducted. The obtained research results allowed to find reserves for the improvement of the level of special physical training of the cadets, as well as to increase the efficiency of the process of studying and improving the technique of shock actions in the educational process in the discipline «Special Physical Training».

Key words: special physical training, obtainers of higher education, manifestations of the strength in shock actions, stages of training, comparative analysis.

Марина Червоношапка, Галина Шутка, Оксана Чичкан. Силові показники ударів руками й ногами в курсантів закладів вищої освіти МВС України. Актуальність теми дослідження. Одним із важливих показників підготовленості курсантів є здатність виконувати удари з високою швидкістю та силою (з урахуванням вразливих точок на тілі людини), оскільки це дає змогу ефективно випереджати дії правопорушника та чинити негативний вплив на його працездатність за умови прямої загрози життю й здоров'ю працівника поліції або громадян. **Мета й методи дослідження. Мета роботи** – дослідити показники сили ударів руками та ногами в курсантів на різних етапах навчання. У роботі застосовували такі **методи:** теоретичний аналіз й узагальнення даних науково-методичної літератури та емпіричних матеріалів наукового дослідження; контрольні випробування – тестування з використанням ударного хронодинамометра «СПУДЕРГ», який дає змогу вимірювати силу ударів; методи статистичного опрацювання. **Результати роботи та ключові висновки.** Досліджено показники сили поодиноких видів ударів. Проведено порівняльний аналіз показників сили ударів у курсантів на різних етапах навчання. Отримані результати досліджень дали змогу виявити резерви для покращення рівня спеціальної фізичної підготовленості курсантів, а також підвищення ефективності процесу вивчення й удосконалення техніки ударних дій у навчальному процесі з дисципліни «Спеціальна фізична підготовка».

Ключові слова: «спеціальна фізична підготовка», здобувачі вищої освіти, прояви сили в ударних діях, етапи навчання, порівняльний аналіз.

Марина Червоношапка, Галина Шутка, Оксана Чичкан. Силовые показатели удары руками и ногами в курсантов высших учебных заведений МВД Украины. Актуальность темы исследования. Одним из важных показателей подготовленности курсантов является способность выполнять удары с высокой скоростью и силой (с учетом уязвимых точек на теле человека), поскольку это позволяет эффективно опережать действия правонарушителя и оказывать негативное влияние на его работоспособность при прямой угрозы жизни и здоровью работника полиции или граждан. **Цель и методы исследования.** Целью работы является исследовать показатели силы ударов руками и ногами у курсантов на разных этапах обучения. В работе применялись следующие методы: теоретический анализ и обобщение данных научно-методической литературы и эмпирических материалов научного исследования; контрольные испытания – тестирование с использованием ударного хронодинамометра «СПУДЕРГ», который позволяет измерять силу ударов; методы статистической

обработки. **Результаты работы и ключевые выводы.** Исследованы показатели силы отдельных видов ударов. Проведен сравнительный анализ показателей силы ударов у курсантов на разных этапах обучения. Полученные результаты исследований позволили выявить резервы для улучшения уровня специальной физической подготовленности курсантов, а также повышение эффективности процесса изучения и совершенствования техники ударных действий в учебном процессе по дисциплине «Специальная физическая подготовка».

Ключевые слова: «специальная физическая подготовка», соискатели высшего образования, проявления силы в ударных действиях, этапы обучения, сравнительный анализ.

Problem statement and its connection with important practical tasks. Future professional activity of cadets of higher education institutions of the Ministry of Internal Affairs of Ukraine is often associated with the arrest of an armed criminal, lack of information and time for decision-making, constant change of the situation, unexpected behavior of the detainee, etc. [9 etc.]. The educational discipline «Special Physical Training» at higher education institutions of the Ministry of Internal Affairs of Ukraine is aimed at training cadets with a high level of comprehensive physical preparedness, able to effectively solve operational service tasks, to permanently endure neuropsychiatric and muscle loadings without reducing their professional ability, while fully mastering techniques of physical impact and self-defense skills. One of the important components in the structure of special physical training of cadets is the possession of shock actions by the hands and the legs. In this case, it is important for the cadets to be able to perform kicks actions with high speed and strength (taking into account vulnerable points on the human body), since this allows to effectively prevent the offender's actions and to negatively affect his ability to work, when there is a direct threat to the police officer's or the citizens' life and health. At the same time, scientific and methodological sources do not pay much attention to the issues of the strength of kicks and special methods of improving them in the educational course for cadets of the discipline «Special Physical Training».

Analysis of recent researches and publications. A list and description of the implementation of special techniques and actions [9 etc.] are given and the issues of general physical training [2 etc.] are mainly considered in the scientific and methodological developments on the problems of the cadets' preparedness of higher education institutions of the Ministry of Internal Affairs of Ukraine. A number of specialists consider the problem of studying the strength of hand and feet kicks as important indicators of preparedness: in boxing [4, 5 etc.], kickboxing [3, 10 etc.], in Thai boxing [1 etc.], in karate [7, 8 etc.] in the scientific and methodical literature on martial arts. In our opinion, it is relevant to carry out similar studies concerning cadets of higher education institutions of the Ministry of Internal Affairs of Ukraine at various stages of studying the discipline «Special Physical Training».

The purpose of the research is to investigate the strength indicators of hand and feet kicks of cadets at different educational stages.

The following methods were used in the work: theoretical analysis and generalization of data of scientific-methodical literature and empirical materials of scientific research; control tests – testing, using the shock chrono-dynamometer «SPUDERG» [6], which allows to measure the speed-power indicators of the performance of shock actions; the methods of statistical processing.

In order to research the strength indicators of single hands and feet hits, the control tests (testing) of cadets of the Lviv State University of Internal Affairs were conducted. The group of cadets that took part in the research included 33 people from Ist, IInd, IIIrd, IVth year-studying students. Male cadets from approximate weight classes – from 60 to 75 kg were selected for the research.

Cadets that took part in the research performed the shock actions from the battle rack from a convenient distance in a boxing pear in the middle of which a recording sensor was contained. At the same time, the indicators of the strength of each shock action were registered in the conditional units (c.u.). For the research, the following types of shock actions by the feet were selected: a round kick, a front kick, a sidekick, and also types of shock actions by the hands: direct hit, side hit and hit from the bottom. Three attempts were made for each shock action, one of which was registered like the best. Duration of rest intervals between attempts was determined individually, according to the subjective feelings of cadets that took part in the research and regarding their readiness for the next performing.

Presentation of the main material of the research. The analysis of the results of the research of the strength of the feet kicks (See Table 1) showed that among the researched types of kicks, the highest strength

indicators were observed in frame of the round kicks («mawashi geri»), somewhat smaller – in sidekicks («yoko-geri») and even smaller – in front kicks («mae-geri»). This, in our opinion, is due to the fact that the technique of foot round kick assumes a combination of the movement of the impact limb with a powerful body torsion, which provides relatively high rates of strength of this type of hit, similar to the strength of the hands kicks of boxers [4].

Table 1

Strength indicators of feet kicks

Type of kick	Strength indicators of kicks by the legs of cadets			
	I course	II course	III course	IV course
	M ± m, conditional units	M ± m, conditional units	M ± m, conditional units	M ± m, conditional units
Left round kick	130,6 ± 8,1	158,3 ± 6,9	163,4 ± 10,2	166,3 ± 9,8
Right round kick	149,3 ± 5,1	187,4 ± 7,7	188,5 ± 9,9	190,3 ± 8,2
Left front kick	110,5 ± 5,4	122,7 ± 6,1	130,7 ± 5,1	131,9 ± 10,1
Right front kick	121,7 ± 8,9	130,3 ± 6,8	132,5 ± 7,1	134,1 ± 9,8
Left sidekick	126,3 ± 6,8	140,4 ± 7,7	142,3 ± 6,9	145,1 ± 10,1
Right sidekick	133,4 ± 7,9	152,4 ± 6,2	156,3 ± 8,2	159,7 ± 9,3

As a result of the research of strength indicators of the hands kicks, it was revealed (See Table 2) that among the three types of kicks being researched, the strongest are the sidekicks, somewhat weaker – front kicks, and the lowest strength indicators – the kicks from the bottom.

A comparison was made between the cadets' strength indicators from the different courses. Cadets of the IInd year study have higher rates of impact ($p < 0,05$) compared with the cadets of the Ist year study. At the same time, the conducted studies did not reveal reliable significant improvements of strength indicators of single hits of the IIIrd and IVth year-study cadets.

Table 2

Strength indicators of hands kicks

Type of kick	Strength indicators of kicks by the hands of cadets			
	I course	II course	III course	IV course
	M ± m, conditional units	M ± m, conditional units	M ± m, conditional units	M ± m, conditional units
Front kick by the left hand	128,3 ± 5,6	149,8 ± 6,1	153,2 ± 5,6	155,8 ± 8,7
Front kick by the right hand	158,7 ± 6,7	182,3 ± 5,5	186,1 ± 8,4	189,2 ± 9,4
Kick from the bottom by the left hand	90,4 ± 5,4	109,4 ± 6,2	115,3 ± 7,9	119,6 ± 7,5
Kick from the bottom by the right hand	105,7 ± 6,1	130,7 ± 4,9	134,8 ± 7,1	139,4 ± 6,1
Kick from the side by the left hand	180,3 ± 6,8	197,6 ± 7,1	199,4 ± 10,5	200,6 ± 10,1
Kick from the side by the right hand	201,2 ± 5,9	224,9 ± 6,9	230,2 ± 9,5	231,1 ± 10,3

Discussion. The data obtained by us regarding the strength of the feet kicks differ from the data of similar studies conducted in Kyokushin Karate [8], where it was found out that athletes specializing in Kyokushin Karate, frontkicks («yoko-geri») are stronger than a round kick («mawashi geri»), which can be explained by the specific features of the technical training of athletes in this form of karate.

The results of the research of the strength of the hands kicks are consistent with the data of similar studies conducted in Kyokushin Karate [7]. At the same time, the receiving data are different from the results of studies of the strength of boxers' single hands kicks. So, the power of the hands kicks of boxers is greater than the kicks from the bottom, and the strength of kicks from the bottom, in turn, is greater than front kicks [5]. The results obtained by us confirm the phenomenon of functional asymmetry (that is

expressed in the fact that the indices of strength indicators of left hand and foot kicks are lower than the similar strength indicators of kicks with the right hand and foot).

The dynamics of the researched strength indicators of kicks in the different educational phases, in our opinion, can be explained by the structure and content of the teaching of the discipline «Special Physical Training» (program provides the study of kicks techniques for cadets of the Ist year-study, and their further improvement for cadets of the IInd year-study). It is obvious that in practical classes for cadets of the IIIrd–IVth year-study the main attention is paid to the improvement of other methods and actions, and special methods of improvement of kicks are used to a lesser extent. This may indicate obvious reserves for the improvement of the structure of special cadets' physical preparedness, as well as the expediency of using a wide range of special tools and methods to improve the characteristics of the kicks technique at all stages of education.

The scientific novelty of the work is to expand and supplement scientific data on the strength indicators of certain types of the hands and feet kicks. For the first time, the dynamics of cadets' strength indicators of the hands and feet kicks at different stages of their education was researched.

Conclusions and prospects of further researches. A comparative analysis of the strength indicators of individual types of cadets' strength indicators of the hands and feet kicks at different stages of their education was conducted. Among the studied types of kicks, the highest strength indicators are observed in the roundhouse kicks («mavashi-geri»), somewhat smaller – in the sidekicks («yoko geri»), and even lower – in the front kicks («mae-geri»). Among the types of the hands kicks the strongest were the cadets' kicks from the side, somewhat weaker – the front kicks, and the lowest strength indicators were marked in the kicks from the bottom. It was found that the strengths of individual types of the hands and the feet kicks of the IInd year-studying cadets were higher ($p < 0,05$) than those of the I year-studying cadets. At the same time, cadets of the IIIrd–IVth year study demonstrate a stabilization of the strength indicators of single hands and feet kicks.

In the future, it is envisaged to research the performance of other kicks actions (single and combined kicks), as well as the development of special tools and methods complexes for use in the educational process of the «Special Physical Training» discipline.

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