

# ТЕОРІЯ І МЕТОДИКА ПІДГОТОВКИ СПОРТСМЕНІВ

## FUNDAMENTALS OF ACROBATIC TRAINING OF TAEKWONDO (POOMSAE) ATHLETES



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### **Abstract.**

**Introduction.** The question of training athletes engaged in poomsae as a non-Olympic direction of taekwondo becomes the most important for the further formation of knowledge and skills at various stages of multi-year improvement. **Methods:** the research used the method of analysis and generalization of scientific-methodical literature and program-normative documents, control testing, pedagogical experiment and mathematical statistics. The research was conducted at the base of the SC «Olimp TKD» in Dnipro. Young taekwondo players aged 10-12 took part in the study. The duration of the pedagogical experiment is five months. **The results.** The initial level of acrobatic training made it possible to establish the readiness of taekwondo players for the process of its improvement. The author's technique provided for 11 complexes of acrobatic elements of 5-7 physical exercises. Acrobatic elements were additionally performed with simulated kicks, or legs simultaneously, or alternately in different directions (forward, sideways, backward, up, down, diagonally, etc.), while the landing can be performed in different positions (on two legs, on knee, lunge, etc.). Control testing at the end of the pedagogical experiment testifies to the effectiveness of the implementation of the author's methodology, since in the experimental group the technical skill became better when performing acrobatic exercises that are more complex in structure («rondat», forward and backward flips, «tempo» flips), which is confirmed by the t-criterion Student' at  $p \leq 0.05-0.001$ . **Conclusions.** The results of the pedagogical experiment show that the author's technique can be recommended for the training of young taekwondo players of 2-3 years of training at the stage of preliminary basic training who specialize in non-Olympic taekwondo-POOMSAE.

**Keywords:** technical readiness, young taekwondo players, stage of preliminary basic training, acrobatic readiness, acrobatic training, athletes 10-12 years old, author's method.

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### **Анотація.**

**Вступ.** Питання підготовки спортсменів, які займаються тхеквондо-Пумсе як неолімпійським напрямком тхеквондо, стає найбільш важливим для подальшого формування знань і вмінь на різних етапах багаторічної вдосконалення. **Методи:** в дослідженні використовувалися метод аналізу і узагальнення науково-методичної літератури та програмно-нормативних документів, контрольне тестування, педагогічний експеримент та методи математичної статистики. Дослідження проводилися на базі в СК «Олімп ТКД» м. Дніпро. В дослідженні брали участь юні тхеквондисти віком 10-12 років. Тривалість педагогічного експерименту – п'ять місяців. **Результати.** Вихідний рівень акробатичної підготовленості дозволив встановити рівень готовності тхеквондистів до процесу її вдосконалення. Авторська методика передбачала 11 комплексів акробатичних елементів по 5-7 фізичних вправ. Акробатичні елементи додатково виконувалися з імітаційними ударами

ногою, або двома ногами одночасно, або поперемінно в різні сторони (вперед, в сторону, назад, вгору, вниз, по діагоналі тощо), при цьому приземлення може бути виконано в різні положення (на дві ноги, на коліно, у випад тощо). Контрольне тестування наприкінці педагогічного експерименту свідчить про ефективність упровадження авторської методики, оскільки в експериментальній групі технічна майстерність стала більш якісною при виконанні більш складних за структурою акробатичних вправ («рондат», перевороти вперед та назад, «темпові» перевороти), що підтверджується t-критерієм Стьюдента при  $p \leq 0,05-0,001$ . **Висновки.** Результати педагогічного експерименту свідчить, що авторська методика може бути рекомендована в тренування юних тхеквондистів 2-3 років тренування етапу попередньої базової підготовки, які спеціалізуються в неолімпійському тхеквондо-Пумсе.

**Ключові слова:** тхеквондо, технічна підготовленість, юні тхеквондисти, етап попередньої базової підготовки, акробатична підготовленість, акробатична підготовка, спортсмени 10-12 років, авторська методика.

**Introduction.** Recently, sports that are not included in the program of the Olympic Games have gained intensive development in the international sports arena, and in the future they will become competitors for their inclusion. Taekwondo-POOMSAE is one of these sports.

Taekwondo-POOMSAE (freestyle) is a non-contact complex coordination sport, which is associated with the performance of certain competitive combinations to musical accompaniment, which include attacking kicks and defensive actions with the hands. Attacking kicks are performed in a supported or unsupported position, in particular during jumps or acrobatic elements of varying complexity.

In the system of training athletes, in particular, Taekwondo-POOMSAE, technical training acquires great importance. Specialists in theory and methods of sports training H. Sozański, J. Sadowski, J. Czerwiński (2015), S.N. Bubka, V.M. Platonov (2018) and others. note that regardless of the type of sport, technical training is of great importance, as it forms the background of the athlete's technical and tactical preparation. In complex coordination sports, in particular taekwondo-POOMSAE (freestyle), general technical training, or «technique school» or «basic» technical training, as well as special technical training are distinguished.

A number of scientists, namely O.S. Koshcheyev (2021), O.V. Lukina and others. (2009, 2021)

and others. studied the problems related to the system of training athletes specializing in WTF taekwondo. They considered issues of increasing the level of physical fitness of taekwondo players [12, 14], peculiarities of building the training process in the pre-competitive process, etc. [15, 16].

Taekwondo-POOMSAE (freestyle) contains coordination-complex and intense movements that include elements of acrobatics, gymnastics and basic kicks from WTF taekwondo. In the process of training taekwondo athletes, the richest arsenal of movement skills is formed, from acrobatics and classic kicks, which differ in coordination complexity, but must be performed accurately and have a folded structure, namely an element of acrobatics with a parallel imitation of a kick. In addition, the more complex the acrobatic exercise and the exact imitation of the blow, the higher the level of complexity of the acrobatic component in the competitive composition are estimated. At the stage of initial and preliminary basic training (the first year of training), taekwondo players must perform a basic level of acrobatic training. A high level of technical mastery of basic acrobatic training will allow young taekwondo players to quickly learn and form new skills in acrobatic exercises that are more complex in structure.

POOMSAE (freestyle) is a direction of taekwondo as a sport, which refers, on the one hand, to complex

coordination sports, and on the other - to martial arts. However, taking into account the specifics of competitive activity, it can be said that it has a gymnastic-acrobatic orientation, which is associated with high requirements for performing acrobatic exercises. Therefore, the choice of a scientific study on improving the basic acrobatic training of young taekwondo athletes who specialize in the non-Olympic program of taekwondo-POOMSAE (freestyle) is relevant today.

**The aim of the study.** To scientifically substantiate the author's method of improving the basic acrobatic training of young taekwondo players who specialize in the non-Olympic program of taekwondo-POOMSAE (freestyle) and to determine its effectiveness.

**Material and methods.** The following research methods were used when solving the set goal: analysis and generalization of scientific and methodological literature and program and normative documents, control testing, pedagogical experiment, methods of mathematical statistics.

The research was conducted at the base of the SC Olimp TKD in Dnipro. Young taekwondo players aged 10-12 took part in the research. Two groups were formed: control group (n=10), experimental group (n=10). Both groups practiced according to the program of the sports school and generally accepted methodology, the author's methodology for improving basic acrobatic training was addi-

tionally introduced into the training program of the experimental group. The duration of the pedagogical experiment is five months. Informed consent to participate in the research was obtained from all the research participants.

**The results.** In order to develop the author's method of improving basic acrobatic training, its initial level was determined, which made it possible to establish the readiness of taekwondo players for the improvement process.

Due to the fact that today there are no regulatory documents, primarily the curriculum for the Taekwondo-POOMSAE for junior high schools, the selection of control tests for assessing the level of acrobatic training of taekwondo players was carried out on the basis of related sports, such as gymnastics and acrobatics, as well as with taking into account age characteristics, stage of training (stage of preliminary basic training, first year of training) and features of competitive composition (Table 1). The assessment of acrobatic readiness was carried out according to a 5-point system, this is due to the fact that in the process of competitive activity, namely the acrobatic component, in accordance with the rules of Taekwondo-POOMSAE (freestyle) competitions, the judges evaluate according to this scale. The evaluation of the technical skill of

performing acrobatic exercises was carried out by experts: 5 taekwondo trainers of the highest category.

The analysis of indicators made it possible to establish that the level of acrobatic training is at an average or above average level. This is confirmed by the fact that the evaluation score of the control tests was within 3.3-4.9 points (Table 1). The total score for all control tests was 4.2 points, which corresponds to an above average level.

At a sufficiently high level, young taekwondo players perform forward and backward flips, «bridges», side flips, this is due, firstly, to the fact that these exercises are not difficult in terms of their execution structure, and secondly, these exercises are studied in general educational institutions at in physical education lessons in the «gymnastics» section.

At the same time, lower scores were given when performing more complex acrobatic exercises, such as; rondat, forward flip on one leg, flip back on one leg, «pace» forward flip on one leg and two legs. The observation made it possible to establish that the performance of complex acrobatic exercises is not the same in terms of their technical skill level. This is also confirmed by the correlation coefficients, which ranged from 12.8% to 33.3%. The obtained results can be explained by the fact that these acrobatic exercis-

es have not been formed as a skill that requires a lot of attention from children, in some cases children perform exercises under the supervision of a coach or using a gymnastic mat, which is caused in some cases by fear of performance.

Thus, we state that the initial level of acrobatic training of taekwondo players allows starting the process of improving the technique of performing acrobatic exercises, which are related to basic acrobatic training.

In order to solve the task of developing the author's methodology for improving the basic acrobatic training of young taekwondo athletes who specialize in the non-Olympic taekwondo-POOMSAE (freestyle) program and determining its effectiveness, an analysis of scientific-methodical and educational-methodical literature was performed to determine the most effective methods and means of training and improving the technique of performing individual acrobatic elements of taekwondo according to the individual level.

The basis of the author's methodology for improving the basic acrobatic training of taekwondo athletes specializing in the non-Olympic taekwondo-POOMSAE program was:

- the main provisions and regularities of the general theory and methodology of sports training (H. Sozańskiego, J. Sadowskiego, J. Czerwińskiego, 2015; S.N. Bubka, V.M. Platonov, 2018; V.M. Kostyukovich, 2018; A.V. Koshura, 2021);
- theoretical and practical provisions of the general system of training athletes from related sports (acrobatics and taekwondo-WTF);
- features of the system of acrobatic training of young athletes in complex coordination sports (V.N. Baloban, 2010; Khudolii, S. Iermakov, etc., 2020; Doldyseva N., Buzoverya A., etc., 2022),
- the basics of learning and improving the technique of performing acrobatic exercises (A.G. Mykhailienko, 2019; Doldyseva N., Buzoverya A. and others, 2022);

Table 1

**Indicators of acrobatic training of young taekwondo players**

Control test	Statistical indicators (n=20)		
	$\bar{x}$	$\pm S$	V
Roll forward, points	4,9	0,01	0,2
Roll back, points	4,8	0,02	0,4
Handstand, points	4,0	0,20	5,0
Side flip, points	4,6	0,08	1,7
«Rondat», points	3,9	0,73	18,7
«Bridge», points	4,8	0,20	4,2
Forward flip on one legs, points	4,1	0,40	9,8
Forward flip on two legs, points	3,7	0,75	20,3
Backflip on one leg, points	3,3	1,10	33,3
«Tempo» flip forward on two legs, points	3,8	0,88	23,2
«Tempo» flip forward on one leg, points	3,7	0,90	24,3
General indicators:	4,2	0,48	12,8

– peculiarities of the organization and implementation of the educational and training process at the stage of preliminary basic training (V.M. Platonov, 2015);

– peculiarities of preparation and construction of the educational and training process of taekwondo players at the stage of preliminary basic training (O.S. Koscheev, 2021; O.V. Lukina et al., 2012);

– the starting level of acrobatic young taekwondo players.

Educational and training classes at the stage of preliminary basic training in Taekwondo-POOMSAE are held four times a week for 90 minutes [7], the structure of which meets the general requirements of the theory and methodology of sports training. The

author's method was implemented from January 2022 and was planned until June 2022 inclusive, namely during the preparatory and competitive period. However, in connection with the introduction of martial law in Ukraine, the educational and training process did not take place during March. And adjustments were made regarding cyclicality, namely, until the end of June 2022, only a preparatory period was planned.

The author's methodology provided for the development and implementation of 11 sets of acrobatic exercises. Each set of acrobatic exercises includes 5-7 physical exercises (Table 2). Taking into account the specifics of the sport, during the performance of the acrobatic

element, imitation kicks were additionally performed, or with the legs at the same time, or alternately in different directions (forward, sideways, backward, up, down, diagonally, etc.), while the landing can be performed in different positions (on two legs, on the knee, in a lunge, etc.). In addition to planning complexes with an emphasis on improving basic gymnastic exercises, which allowed taekwondo players to learn more complex acrobatic exercises faster and more effectively. For example, forward and backward flips contributed to the learning of forward and backward somersaults; a back flip – mastering, a sideways flip – mastering the «rondat», etc.

Table 2

**Characteristics of complexes of physical exercises of acrobatic training**

A set of acrobatic exercises	Content of physical exercise
Complex 1 «Flip Forward»	Three forward flips without stopping
	From standing
	Flip forward in flight
	Flipping forward in flight with imitation of kicking upwards
	Flipping forward in flight with imitation of sidekicks at the same time
Complex 2 «Flip back»	Three back flips without stopping
	Flip back into straight splits
	Backflip with a jump of 360°
	Backflip with an imitation of a kick back (right and left alternately)
	Backflip with an imitation of kicking to the side (alternately right and left)
Complex 3 «Handstand»	Performing an exercise with support
	Walking in a handstand
	Handstand with jumps
	Handstand with imitation of forward kicks (alternately left and right)
	Handstand with alternating imitation of kicks to the side (alternately left and right)
Complex 4 «Flip sideways»	Flip sideways two/three/four times in a row
	Side flip on one arm
	Flip to the side with the flight phase
	Flip to the side with imitation of kicking up (alternately right and left)
	Flip to the side with imitation of kicking forward (alternately right and left)
Complex 5 «Bridge»	«Bridge» walking in this position
	«Bridge» with jumps
	«Bridge» with imitation of forward kicks (right and left alternately)
	«Bridge» with imitation of upward kicks (right and left alternately)
Complex 6 «Rondat»	«Rondat» in one step
Complex 7 «Flip forward on two legs»	«Rondat» from the start
	«Rondat» from a run with a jump up
	«Rondat» with hatching and rotation 360°

Complex 7 «Flip forward on two legs»	«Rondat» with an imitation of a back kick landing on one knee
	«Rondat» with a rebound and an imitation of kicking or kicking forward
	«Rondat» with a rebound and an imitation of kicking or kicking to the side
	«Rondat» with a rebound and an imitation of a back kick
	Flip forward on two legs with the help of a trainer
	Flip forward on two feet independently
	A forward flip from performing an imitation of a kick to the side
	A forward flip from the imitation of an upward kick
Complex 8 «Flip forward on one leg»	A forward flip from the execution of an imitation of a kick
	Flip forward on one leg with the help of a trainer
	Flip forward on one leg independently
	Forward flip on one leg two/three/four times in a row
	Forward flip with one leg held at a 90° angle
	Forward flip by changing legs
	A forward flip with an imitation of an upward kick
Complex 9 «Flip back on one leg»	A forward roll with an imitation of kicking the legs to the side at the same time
	Flip back on one leg with the help of a trainer
	Backflip on one leg independently
	Backflip on one leg two/three/four times in a row
	A back flip with a change of legs in a handstand
	Backflip with imitation of forward kicks (right and left alternately)
	Backflip with simulating kicks to the side at the same time
Complex 10 A «pace» flip forward on two legs	Back flip with imitation of kicks back (right and left alternately)
	«Tempo» forward flip with the help of a trainer
	«Tempo» flip forward with one step
	A «pace» flip forward from a run
	A «pace» forward flip from a run with the legs apart in different ways
Complex 11 A «pace» flip forward on one leg	«Tempo» flip forward with the execution of «scissors» legs.
	«Tempo» forward flip with the help of a trainer
	«Tempo» flip forward with one step
	A «pace» flip forward from a run
	A «pace» roll forward from a run with a change of legs in the flight phase
	A «tempo» flip forward with an imitation of an upward kick.

Thus, the distinctive features of the author's method included:

- eleven complexes of acrobatic training, each complex includes up to 5-7 acrobatic elements. The selection of acrobatic exercises was carried out taking into account methodological approaches: «from easy to difficult» and «from known to unknown», as well as providing a differentiated or individual approach;

- acrobatic exercises not complex in their structure were performed in the preparatory part of the training (exercises of complexes 1, 2, 3, 4, 5) and more complex in structure in the main part of the training, with an emphasis on their study, repetition and improvement (exercises of complexes 6, 7, 8, 9, 10, 11);

- all proposed acrobatic exercises, regardless of the complexity of the structure, must be performed with imitation of various types of blows, supported or unsupported positions with different initial and final positions.

To determine the effectiveness of the implementation of the author's methodology for improving basic acrobatic training, repeated control testing was conducted to assess the level of acrobatic training of taekwondo players.

Indicators of acrobatic training before the beginning and at the end of the pedagogical experiment, we note that at the beginning of the implementation of the author's method, the level of acrobatic training, both in the control and in the experimental

group, was at an average and above average level, and there were no differences between them (Table 3).

It should be noted that in the experimental group, the technical skill became better when performing acrobatic exercises that are more complex in structure («rondat», forward and backward flips, «tempo» flips), and in the control group - less complex in the structure of execution (handstand and side flip). This is also confirmed by Student's t-test calculation. Thus, in the experimental group, the reliability of indicators was determined in all control tests at  $p \leq 0.05-0.001$ , and in the control group only in the above-mentioned control tests at  $p \leq 0.001$ .

To confirm the effectiveness, we calculated the percentage increase in indicators. Thus, in the control group,

Table 3

Indicators of acrobatic training of young taekwondo players

Control tests	Group	CG <sub>1</sub> (n=10)		p, t <sub>calc</sub>	EG <sub>1</sub> (n=10)		p, t <sub>calc</sub>
	statistical indicators	before	after		before	after	
Roll forward, points	$\bar{x}$	4,8	4,9	$\geq 0,05$ ; 2,21	5,0	5,0	-
	S	0,01	0,01		0,01	0,01	
Roll back, points	$\bar{x}$	4,8	4,9	$\geq 0,05$ ; 2,21	4,8	5,0	$\leq 0,05$ ; 2,98
	S	0,01	0,01		0,03	0,01	
Handstand, points	$\bar{x}$	3,8	4,2	$\leq 0,001$ ; 4,58	4,2	4,8	$\leq 0,001$ ; 4,45
	S	0,19	0,18		0,2	0,4	
Side flip, points	$\bar{x}$	4,7	4,8	$\leq 0,001$ ; 3,49	4,5	4,9	$\leq 0,001$ ; 9,86
	S	0,07	0,05		0,09	0,1	
«Rondat», points	$\bar{x}$	3,8	4,3	$\geq 0,05$ ; 1,19	4,0	4,8	$\leq 0,01$ ; 2,97
	S	0,89	0,90		0,81	0,60	
«Bridge», points	$\bar{x}$	4,9	4,9	-	4,7	4,9	$\leq 0,05$ ; 2,67
	S	0,23	0,08		0,20	0,10	
Forward flip on one legs, points	$\bar{x}$	4,2	4,6	$\geq 0,05$ ; 2,17	4,0	4,8	$\leq 0,001$ ; 5,34
	S	0,38	0,40		0,41	0,28	
Forward flip on two legs, points	$\bar{x}$	3,6	4,2	$\geq 0,05$ ; 1,69	3,7	4,6	$\leq 0,05$ ; 2,90
	S	0,71	0,80		0,9	0,50	
Backflip on one leg, points	$\bar{x}$	3,4	4,2	$\geq 0,05$ ; 1,46	3,2	4,6	$\leq 0,001$ ; 3,46
	S	1,30	1,01		1,2	0,6	
«Tempo» flip forward on two legs, points	$\bar{x}$	3,8	4,2	$\geq 0,05$ ; 1,070	3,8	4,5	$\leq 0,05$ ; 2,45
	S	0,93	0,99		0,86	0,40	
«Tempo» flip forward on one legs, points	$\bar{x}$	3,6	3,8	$\geq 0,05$ ; 0,88	3,8	4,6	$\leq 0,001$ ; 3,99
	S	0,87	0,79		0,85	0,25	

regardless of the absence of significant differences, the increase was from 2.08% to 23.5%. No increase in the «bridge» control test. Both at the beginning and at the end of the pedagogical experiment at the general group level, the score was within 4.9 points. The greatest increase is observed when performing the control test of a flip back on one leg, which amounted to 23.53%, since at the beginning of the pedagogical experiment it was performed on average with 3.4 points (this is the lowest of all tests), and at the end it was performed on average by 4.2 points.

The analysis of indicators of acrobatic training of the experimental group shows that the percentage increase was from 4.17% to 43.75%. The lack of increase was in the control test forward roll, because both at the beginning and at the end of the pedagogical experiment, young taekwondo players on average performed the exercise by 5 points. The

highest increase, as in the control group, was determined in the control test - a flip back on one leg. It should be noted that a fairly significant increase was made in the control tests: forward flip on two legs (20.0%), forward flip on one leg (24.32%), «paced» forward flip on two legs (18.42%) and «pace» flip on one leg.

Thus, the results of technical training obtained after the implementation of the author's technique for improving basic acrobatic training testify to its effectiveness. This technique can be recommended for the training of young taekwondo players of 2-3 years of training at the stage of preliminary basic training, who specialize in non-Olympic taekwondo-poomsae.

**Conclusions.** 1. Analysis of scientific and methodical literature, Internet resources allowed establishing that the neo-Olympic Taekwondo-POOMSAE (freestyle) program is gaining significant popularity not

only in the world, but also in Ukraine. Having studied the program and regulatory documents, we found out that there are no regulatory documents at the state level regarding the training of taekwondo athletes who specialize in the non-Olympic taekwondo-PUMSE program. The conducted analysis of scientific articles allows us to state that technical training, in particular acrobatic training, occupies a significant place in the training of taekwondo players.

2. The results obtained in the ascertainment experiment indicate a sufficient level of acrobatic preparation, which was noted at the «average» and «above average» level. Such results allowed us to conduct a pedagogical experiment on the implementation of the author's methodology for improving the acrobatic training of young taekwondo players who specialize in the non-Olympic program taekwondo-POOMSAE (freestyle).

3. The author's method of improving the acrobatic training of young taekwondo players who specialize in the non-Olympic taekwondo-POOMSAE program involved performing acrobatic exercises. Acrobatic exercises were formed into eleven complexes. The peculiarity of the technique was that each acrobatic exercise was performed with the imitation of different types of kicks, which are classified in Taekwondo-POOMSAE.

4. Research shows the effectiveness of the implemented author's

method of young taekwondo players, as the results of repeated control testing on acrobatic readiness. Thus, in the experimental group there were significant changes at  $p \leq 0.05$  to  $0.001$  in all acrobatic tests, with the exception of the forward roll, which was performed both at the beginning and at the end of the pedagogical experiment for a maximum of 5 points. Thus, this author's technique can be recommended for the training of young taekwondo players who specialize in the non-Olympic taekwondo-POOMSAE program.

**Prospects for further research may be the development** of complexes of acrobatic exercises of a higher level of complexity for the training of cadets in Taekwondo-POOMSAE.

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**Conflict of interest.** The authors declare the absence of any conflict of interest.

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