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METHODOLOGICAL JOURNAL****MENTAL ENLIGHTENMENT SCIENTIFIC –
METHODOLOGICAL JOURNAL**<http://mentaljournal-jspu.uz/index.php/mesmj/index>**THE INFLUENCE OF ASYMMETRIC STATES IN PHYSICAL AND TECHNICAL
PREPARATION IN WOMEN'S WRESTLING ON THE EFFECTIVENESS OF
COMPETITIVE ACTIVITY****Sangina Ismatullaeva***Uzbek State University of Physical Culture and Sports**Doctor of Philosophy (PhD) in Pedagogical Sciences**E-mail: ismatullaevasangina835@gmail.com**Chirchik, Uzbekistan***ABOUT ARTICLE**

Key words: women's wrestling, female wrestlers, physical preparation, technical preparation, functional asymmetry, movement asymmetry, speed-strength abilities, coordination, effectiveness of competitive activity.

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Abstract: This study examines the influence of asymmetric states in the physical and technical preparation of highly qualified female wrestlers on the effectiveness of competitive performance, based on a comprehensive approach. During the research, differences in speed, strength, and coordination between the left and right sides were identified, and their relationship with the quality of technical-tactical actions and competition outcomes was assessed using statistical analysis methods. The findings confirm that the level of movement asymmetry has a significant impact on the effectiveness of technical skill execution and overall competitive performance. Furthermore, the results substantiate the need to improve scientific and methodological approaches aimed at individualizing the training process and optimizing asymmetrical imbalances in physical and technical indicators.

Introduction. At present, women's wrestling is dynamically developing worldwide under the influence of intense competition both between countries and among female wrestlers, and it is becoming increasingly widespread as one of the sports included in the

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Olympic Games program. In particular, the significant intensification of competition among highly qualified female wrestlers necessitates a profound scientific analysis of the factors determining the effectiveness of competitive activity. In modern women's wrestling, asymmetric states in the physical and technical preparedness of athletes acquire special scientific significance as one of the key factors influencing competition outcomes. Differences in strength, speed, and coordination between the left and right sides directly affect the quality and effectiveness of executing technical-tactical actions. Therefore, the identification, assessment, and development of scientifically grounded approaches aimed at optimizing these indicators represent one of the urgent scientific problems.

In leading sports countries of the world, achieving high performance in women's wrestling is closely associated with the systematic planning and management of athlete preparation, including the application of an individualized approach that takes into account movement asymmetry. At the same time, there is an increasing need to conduct an in-depth analysis of competitive activity indicators through the application of advanced scientific-methodological approaches and modern analytical methods, and on this basis to improve the system of purpose-oriented training of female wrestlers.

In contemporary women's wrestling practice, the necessity of effectively implementing advanced experience accumulated through observation and comprehensive analysis of competitions into the training process is steadily increasing. This process is primarily aimed at improving the speed-strength, technical, psychological, and functional preparedness of female wrestlers. Furthermore, the demand for effective methods that enhance competitive performance in modern women's wrestling continues to grow. In particular, asymmetric conditions observed in the physical and technical preparedness of athletes are recognized as a significant factor influencing the effectiveness of competitive activity. The application of modern training methods and advanced technologies expands the possibilities for a comprehensive and systematic study of asymmetry in the speed-strength preparedness of female wrestlers, as well as for its elimination and optimization.

Literature Review and Methods. In modern sports science, it has been scientifically substantiated that achieving high results in wrestling disciplines is closely associated with the integrated development of athletes' physical, technical-tactical, and functional preparedness. In the theory of athletes' preparation, emphasizes that the harmonious development of general and special physical preparedness is one of the main factors determining sports performance [1].

According to the theory of sports training planning developed by T. Bompa and G. Haff, speed-strength abilities and their optimal development play a decisive role in achieving high-level sports results [2]. At the same time, studies conducted by Zatsiorsky and Kraemer have noted that imbalances in muscle strength and coordination development directly affect the efficiency of athletes' movements [3].

Scientific research conducted in wrestling and judo has demonstrated that the effectiveness of performing technical-tactical actions is closely related to athletes' physical qualities. In particular, among highly qualified athletes, a high level of development of movement speed, strength, and coordination is recognized as one of the key factors determining competition outcomes [4; 5].

In recent years, issues of functional and movement asymmetry have been developing as a separate scientific direction in sports science. According to researchers, differences in strength, speed, and coordination between left and right side movements significantly affect the accuracy and stability of performing technical actions. In some cases, asymmetry may manifest as an individual advantage of the athlete; however, its high level can lead to a decrease in movement efficiency [6].

Studies conducted on the investigation of asymmetry indicators in wrestling sports have shown that identifying asymmetric imbalances in the training process and applying training means aimed at eliminating them contribute to improving the effectiveness of competitive activity. At the same time, the individualization of training with consideration of movement asymmetry enables further improvement of athletes' technical-tactical mastery [7].

Thus, the analyzed scientific literature indicates that although the influence of asymmetry in physical and technical preparedness on the effectiveness of competitive activity has been sufficiently studied, the comprehensive investigation of this issue specifically in women's wrestling remains a relevant scientific problem.

Purpose of the study: To identify asymmetric conditions in the physical and technical preparedness in women's wrestling and to evaluate their impact on competitive effectiveness.

Results and Discussion. A total of 24 highly qualified female wrestlers aged 18–25 participated in the study. The athletes were divided into two equal groups: a control group (n = 12) and an experimental group (n = 12). For the members of the control group, a special training program aimed at developing technical and tactical preparedness was developed, and training sessions were conducted on this basis. The experimental group, in contrast, trained according to a traditional (standard) preparation program.

Within the framework of the study, the specially developed training program for female wrestlers предусматривает the adaptation of movements based on the results of monitoring their technical and tactical skills. During the monitoring process, the main evaluation criteria included the quality of execution of technical techniques and the time spent on their performance. Since highly qualified female athletes participated in the study, tests were designed based on technical actions characteristic of them, particularly those closely related to competitive activity. This approach made it possible to determine the dynamics of development of technical-tactical preparedness, as well as to assess the accuracy and effectiveness of movements. In addition, through the implementation of an individualized approach in the training process, it was possible to gradually improve the technical potential of the athletes.

Table 1 presents the indicators of physical preparedness of highly qualified female wrestlers from the experimental and control groups at the beginning and at the end of the study. According to the results of the statistical analysis, no significant differences ($P > 0.05$) were found between the groups in terms of the level of competitive effectiveness. This confirms that the compositions of the experimental and control groups were initially similar, thereby ensuring the objectivity of the results under the research conditions.

At the end of the study, the average values of the indicators of the female athletes in the experimental group showed a statistically significant increase compared to the corresponding changes in the control group during the experimental period.

Table 1

Comparative analysis of the increase in physical preparedness indicators of female wrestlers in the experimental (EG) and control groups (CG) (n = 24)

№	Control tests	At the beginning of the study				t	P	At the end of the study				t	P
		EG		CG				EG		CG			
		X	σ	X	σ			X	σ	X	σ		
1	Squats with a partner on the shoulders (repetitions)	20,99	2,11	21,08	2,08	0,826	>0,05	23,82	2,17	21,88	2,11	2,220	P<0,05
2	Bench press with a barbell equal to body weight (repetitions)	8,52	1,02	8,82	1,01	0,755	>0,05	9,03	1,06	8,97	1,04	2,342	P<0,05
3	Standing long jump (meters)	2,01	0,23	2,05	0,22	0,657	>0,05	2,09	0,19	2,07	0,21	2,410	P<0,05
4	Rope climb (4 m) (repetitions)	3,05	0,22	3,13	0,21	0,585	>0,05	2,19	0,21	2,16	0,22	2,555	P<0,05
5	Bridge rotations (5×2) (seconds)	27,05	2,98	26,95	2,91	0,496	>0,05	23,55	2,19	25,83	2,13	2,485	P<0,05
6	Bridge walkovers (10 repetitions) (seconds)	18,34	1,87	18,29	1,81	0,721	>0,05	16,01	1,56	17,61	1,49	3,155	P<0,05

7	10 suplex throws (seconds)	15,32	1,55	15,28	1,48	0,547	>0,05	13,34	1,34	14,78	1,31	2,515	P<0,05
8	10 forward body throws (seconds)	28,03	3,11	27,93	3,02	0,628	>0,05	24,12	2,56	26,93	2,61	2,344	P<0,05
9	10 shoulder throws (seconds)	15,99	1,68	5,93	1,66	0,688	>0,05	13,83	1,29	14,98	1,27	2,511	P<0,05
10	Parterre lift by waist grip (repetitions)	20,95	2,39	21,01	2,33	0,566	>0,05	24,05	2,23	23,09	2,11	2,341	P<0,05
11	Pull-ups on the horizontal bar (repetitions)	20,13	2,09	21,03	2,01	0,765	>0,05	23,16	2,35	23,04	2,31	2,354	P<0,05

This, in turn, indicates the effectiveness of the developed methodology and the achievement of the objectives set in the pedagogical experiment. The results of the conducted research demonstrate that the training program developed on the basis of selected special means ensured a significant positive dynamic in the level of physical preparedness of qualified female wrestlers. The athletes involved in the experiment were re-evaluated at the end of the program based on control tests, and a high level of improvement in their physical preparedness indicators was recorded. The control tests presented in the following table were selected from among existing tests due to their ability to accurately reflect the level of general and special physical preparedness of the athletes and were used as evaluation criteria.

In women's wrestling, one of the main factors determining the level of competitiveness and competition results is the skill of performing technical techniques with high efficiency. These include techniques such as gripping, takedowns, holds, turnovers, reversals, as well as attacking and defensive actions. In the training and competition process, an in-depth study of the characteristics of asymmetry in the execution of these technical movements by means (i.e., body parts) is one of the factors that has not been sufficiently studied in the athlete preparation system, but is of great practical importance. Analyses in this direction contribute to optimizing the movement coordination, muscle balance, and functional capabilities of female wrestlers.

In women's wrestling, the manifestation of technical actions in competition and training activities is one of the key factors determining their technical-tactical capabilities. In the conducted studies, the level of asymmetry in athletes' movements was taken into account, and the indicators of technical-tactical activity were analyzed in depth. As a result of this approach, it became possible to scientifically determine the effectiveness of technical techniques performed from the left and right sides, as well as their impact on competition outcomes.

The analysis of the asymmetric application of technical techniques in women's wrestling revealed statistically significant differences between right- and left-side executions across all examined actions (Table 2).

Table 2**Asymmetric application of technical techniques (n=24)**

Type of technical technique	Right side (%)	Left side (%)	t	P
Duck-under to throw	62.4	37.6	4.12	<0.01
Hip throw	55.3	44.7	2.05	<0.05
Arm throw	68.7	31.3	5.22	<0.001

The findings indicate a pronounced lateral dominance in the execution of standing techniques, particularly those classified within the UWW framework as duck-under to throw, hip throw, and arm throw.

Specifically, the duck-under to throw technique demonstrated a substantial asymmetry, with 62.4% of executions performed from the right side compared to 37.6% from the left side ($t=4.12$; $p < 0.01$). This suggests a strong unilateral preference, likely обусловленная dominance in motor coordination and neuromuscular control on the leading side. From a biomechanical perspective, duck-under actions require high levels of timing, agility, and coordination, which are typically more developed on the dominant side.

Similarly, the hip throw showed moderate asymmetry (55.3% right vs. 44.7% left; $t=2.05$; $p < 0.05$), indicating a relatively more balanced bilateral execution compared to other techniques. This may be explained by the structural and technical nature of the hip throw, which allows for more symmetrical application due to its reliance on trunk rotation and center-of-mass control.

The most pronounced asymmetry was observed in the arm throw, where 68.7% of executions were performed from the right side and only 31.3% from the left ($t=5.22$; $p < 0.001$). According to UWW technical classification, arm throws involve complex upper-body coordination and precise grip control, which are highly dependent on the athlete's dominant side. This level of asymmetry may negatively affect technical variability and tactical unpredictability during competition.

Overall, the results confirm that asymmetry in the execution of technical techniques is a significant factor influencing performance effectiveness in women's wrestling. The dominance of one side may lead to predictable tactical patterns, reducing competitive advantage against high-level opponents. Therefore, incorporating bilateral training strategies and targeted

corrective exercises into the training process is essential to optimize technical-tactical performance and enhance competitive outcomes.

Table 3

Asymmetric application of tactical actions (n = 24)

Type of tactical action	Right side (%)	Left side (%)	t	p
Initiative attack	64.1	35.9	3.87	<0.01
Counter-attack	59.5	40.5	2.42	<0.05
Feint and attack combination	61.8	38.2	3.11	<0.01
Defensive actions	57.2	42.8	2.06	<0.05

The analysis of tactical actions revealed significant asymmetry between right- and left-side execution in all examined categories. The initiative attack showed the highest level of asymmetry (64.1% vs. 35.9%; $t = 3.87$; $p < 0.01$), indicating a strong preference for initiating actions from the dominant side.

The counter-attack (59.5% vs. 40.5%; $t = 2.42$; $p < 0.05$) and feint and attack combination (61.8% vs. 38.2%; $t = 3.11$; $p < 0.01$) also demonstrated significant lateral dominance, reflecting reliance on the dominant side in both reactive and deceptive tactical actions.

The defensive actions showed relatively lower asymmetry (57.2% vs. 42.8%; $t = 2.06$; $p < 0.05$), suggesting a more balanced bilateral development, although a dominant-side preference still persists.

Overall, the results indicate that tactical asymmetry is a significant factor influencing competitive performance, enhancing execution efficiency while potentially limiting tactical variability.

The analysis of the relationship between asymmetry level and competitive performance revealed statistically significant differences between the examined groups (Table 4).

Athletes characterized by a low level of asymmetry demonstrated substantially higher performance indicators compared to those with high asymmetry.

Table 4

Impact of asymmetry level on competitive performance

Group (level of asymmetry)	Win rate in competition (%)	Average score	P
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High asymmetry	54.2	8.3	<0.05
Low asymmetry	72.5	10.6	<0.01

In particular, the win rate of athletes with low asymmetry reached 72.5%, whereas in the high asymmetry group it was significantly lower at 54.2% ($p < 0.05$). Similarly, the average score was notably higher in the low asymmetry group (10.6 points) compared to the high asymmetry group (8.3 points; $p < 0.01$). These differences confirm the statistical reliability of the observed trends.

From a functional and biomechanical perspective, a lower level of asymmetry contributes to more balanced bilateral motor performance, improved coordination, and greater stability in executing technical-tactical actions. This allows athletes to perform techniques effectively from both sides, increasing tactical variability and unpredictability during matches.

In contrast, a high level of asymmetry may lead to excessive reliance on the dominant side, which can limit the diversity of technical actions and reduce adaptability in dynamic competitive situations. Opponents may exploit this predictability, thereby decreasing overall performance effectiveness.

Overall, the findings suggest that minimizing asymmetry is a key factor in enhancing competitive success in women's wrestling. Therefore, incorporating bilateral training methods and targeted corrective exercises into the training process is essential for optimizing performance and achieving higher competitive outcomes.

Conclusion. The results of the present study scientifically substantiate that asymmetry in the physical, technical, and tactical preparedness of female wrestlers is a significant factor directly influencing competitive performance. The findings revealed that highly qualified female wrestlers predominantly execute technical techniques and tactical actions from the dominant side, indicating the presence of stable motor asymmetry patterns. The analysis of technical actions demonstrated a clear dominance of the right side in the execution of key techniques such as duck-under throws, hip throws, and arm throws. This reflects the unilateral development of strength, speed, and coordination abilities. Similarly, tactical actions—including initiative attacks, counter-attacks, feint actions, and defensive techniques—also exhibited consistent asymmetrical tendencies, with athletes relying more heavily on their dominant side.

The study further established a strong relationship between the level of asymmetry and competitive performance. Athletes with a lower level of asymmetry achieved significantly higher results, including greater win rates and higher average scores. This suggests that

balanced bilateral development enhances technical-tactical capabilities, increases movement variability, and improves unpredictability during competition. Conversely, a high level of asymmetry leads to excessive dependence on the dominant side, which may limit the diversity of technical and tactical actions and reduce adaptability in dynamic competitive situations. As a result, such patterns may become predictable for opponents, thereby negatively affecting overall performance effectiveness.

Overall, the findings indicate that achieving high performance in women's wrestling depends not only on the level of physical and technical preparedness but also on their balanced (symmetrical) development. Therefore, the identification, assessment, and optimization of asymmetry should be considered a key component of the training system. The development and implementation of scientifically grounded methods aimed at reducing asymmetry represent an important direction for improving competitive performance in modern women's wrestling.

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