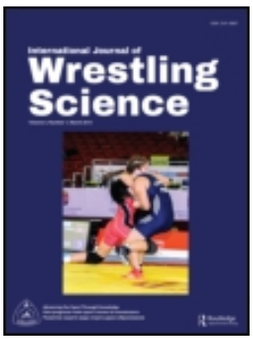

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Women's Wrestling: Some Observations From a Coach and a Scientist

Boris A. Podlivaev[1]

ABSTRACT. The regular participation of women in the Olympic Games, which began in 1952, has created the necessary prerequisites for in-depth research into the issues of women's sports. The influence of various phases of the ovulation and menstruation cycle on the condition of women and their performance in various sports has been a major research topic. An overview of the main issues in women's sports from a medical point of view by Grayevskaya, Petrov, and. Belyayeva (1987)—as well as works by Radziyevskiy and Shakhlina, in particular their 1990 article on the physiological basis of women's sports training management taking the menstrual cycle phases into account—can be said to summarize this trend in women's sports theory.

Keywords: administration, coach education, coaching, culture, gender, history, special populations

The regular participation of women in the Olympic Games, which began in 1952, has created the necessary prerequisites for in-depth research into the issues of women's sports. The current approach to the the training of women regardless of sport specialization, is derived from from the important research of Bershadskiy, 1976; Geselevich, 1981; Kruschev and Soboleva, 1996; Nikityuk, 1984; Pangelov, 1977; Yagunov and Startseva, 1959; Zaharieve, 1984; Zheleznyakene, 1964; and Zhovnovataya, 1959, 1962. Issues in women's sports from a medical point of view, have been presented by Grayevskaya, Petrov, and Belyayeva, 1987; Radziyevskiy, 2004; and Shakhlina, 1995. From these works, the following principles can be derived:

- The condition and performance of female athletes change periodically, depending on the ovulation and menstruation cycle;
- Female athletes achieve peak performance levels during postmenstrual and postovulatory phases;
- Women's body functional systems and performance capacity are at their lowest during the pre-menstrual, menstrual, and ovulatory phases;
- Ovulation and menstruation cycle frequency is usually the same; the 28-day cycle is the most common;
- Premenstrual syndrome, which negatively affects many women, requires close attention during women athletes' training;
- In any case, the sports doctor and coach must know the individual ovulation and menstruation schedule of every athlete, as well as the peculiarities of their body system responses throughout each phase of the cycle.

Since the middle of the 1980s, specifics of women's sports training have been reviewed in terms of sexual dimorphism (Borms, 1984; O'Brien, 1992; Tuttle, 1982).

In Russia, several researchers (e.g., Jordanskaya, 1999; Jordanskaya, Kuzmina, Muravyova, & Solovyov, 1991) have conducted a complex research of the dynamics and comparative evaluation of male and female athletes' functional capacity. The researchers emphasized that men and women differ in morphofunctional parameters and the specifics of the humoral regulation of hormone release.

Polish researcher Teresa Sokha (1995, 1999) was one of the first to focus on the need for a more in-depth analysis of the issue of dimorphism in sports activities. She noted that sports training theory contained insufficient data to train female athletes effectively, considering the specifics of the female body, not only regarding reproductive functions. There are many more differences between male and female bodies, which must to be taken into account when training female athletes to achieve higher performance results without any detriment to their health (Sokha, 2002a, 2002b).

American scientists Micheli and Banlien (1980) and the renowned Ukrainian researcher Shakhlina (1995) pointed

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out the connection between three negative issues faced by female athletes: *insufficient nutritional value of food*, *irregular menstruation*, and *increased risk of broken bones (osteoporosis)*. Prevention and timely elimination of negative consequences of these three points were later classified in sports medicine as major issues in women's sports.

Summarizing the data at this stage of women's sports theory development, T. Sokha (2001) presented results of the analysis of female athletes' morphofunctional peculiarities in terms of sexual dimorphism. The author highlighted the clear lack of available data on the specifics of the female body and its responses to intensive loads, and presented data from monitoring somatometric indications in men and women participating in various track and field disciplines. As a result of the research, the author established the following scientific facts:

- The structural and functional peculiarities of the female body influence sports technique, tactics and the results of competition activity;
- Accurate knowledge of how male and female morphofunctional systems differ allows us to effectively correct the process of women's sports training; and
- The specifics of the development of adaptation processes in a woman's body under the influence of training loads are predetermined by their parameters and the contents of recreational and prophylactic events.

While researching various issues in women's sports, T. S. Soboleva (1996, 1999) singled out three groups of main reasons for deviations in the development of female athletes:

- Physiological aspects, including the different degree of expression of morphological masculinization and the high frequency of reproductive function pathology;
- Psychological aspects, including the female athletes' psychological masculinization, difficult adaptation to married life and frequent psychosexual development malfunctions; and
- Social aspects, including rapid emancipation of women's sports and gender conflicts in modern-day sports.

Recent studies (Eider and Boychenko, 2004; Futorny, 2004; Kalinina, 2004; Khutsinskiy, 2004; Radziyevskiy, 2004; Vrublevskiy, 2005) have noted that it is possible to adapt men's training methods for elite female athletes whose gender identity is similar to that of males and who have the masculine somatotype. However, these methods must be strictly individual for each athlete, taking into account her current functional state. It is necessary to pay attention to the timely diagnostics of hyperandrogenism symptoms, which put the athletes' reproductive system under high risk.

Balakhnichev, Vrublevskiy, and Mirzoyev (2007) analyzed in detail the matters regarding the selection and training of track and field athletes in terms of sexual dimorphism and determined that speed-strength sports are dominated by individuals with a muscular somatotype, which possesses all the morphofunctional and psychoemotional prerequisites for performing intense physical loads. Moreover, direct comparison of male and female groups often lacks perspective because the exposure of gender differences must be performed based not only on morphological factors taking genetic gender into account, but also on identifying the hormonal status, which defines the degree of masculinity and femininity.

While analyzing gender differentiation in athletes of various skills, Artamonova (2007) concluded that athletes with the masculine type are invariably prevalent in elite sports, and not just women, but also men. Men and women with an increased level of male hormones achieve the highest results in sports.

A number of researchers (Kalinina, 2003; Nerobeyev & Tarakanov, 2012; Rodomanova, 2007; Soboleva, 1997; Vrublevskiy & Kostyuchenko, 2009) have noted that women with a high level of male hormones were found among the general population of elite athletes have a gender identity similar to that of males and a masculine somatotype, which, in turn, give them an advantage in developing speed-strength abilities.

As a result, high-achievement sports form a rigid model of activity, attracting masculine somatotype women and using men's training methods combined with strict individual control of every athlete's current functional state.

This phenomenon has both opponents and proponents. Regardless of this, we should admit that the significant expansion of women's participation in the Olympic Games program, including weightlifting, freestyle wrestling, and boxing, has a great positive effect, largely increasing women's opportunities for self-fulfillment and making the competitions more exciting.

Experts who work with these athletes, should develop effective programs for achieving high performance results with a minimal risk to the athletes' health, rather than complain about the negative tendencies of women's sports development. The following is a review of various aspects of women's freestyle wrestling training.

Research (Korzhenevskiy & Podlivaev, 2011; Korzhenevskiy et al., 2014; Korzhenevskiy et al., 2014a, 2014b; Podlivayev & Shakhmuradov, 2013) shows that there is a close relation between functional fitness factors and performance results of elite wrestlers (men and women). Prizewinners of serious competitions compared with nonprizewinners are characterized by a higher level of aerobic, central nervous system and neuromuscular system functions in adapting to nonspecific loads. Functional fitness indications in women are a little lower than in men (see Table 1), but the condition of the central nervous system and neuromuscular system has a higher influence on the development of aerobic functions in women (see Table 2).

A direct relation is observed between the activities of motor and vegetative functions (cardiorespiratory and analytical

TABLE 1 Energy Ability Adaptation of Wrestlers to Cardiac Stress Loads ($M \pm m$)

Athletes	*n*	*Activity Duration (Minutes and Seconds)*	*VO_2 ml/min/kg*	*Respiratory Minute Volume (1/min)*	*O_2 (%)*	*Heart Rate Anaerobic Threshold (bpm)*	*Heart Rate Max (bpm)*	*Lactate (mmol/L)*
Greco-Roman wrestling	20	8.82 ± 0.54	50.15 ± 0.82	142 ± 1.7	3.67 ± 0.01	147 ± 0.90	168 ± 1.40	11.3 ± 0.52
Prizewinners	4	8.9 ± 0.75	50.0 ± 1.40	152 ± 2.80	3.60 ± 0.09	154 ± 1.50	167 ± 1.90	12.0 ± 0.57
Nonprizewinners	16	8.7 ± 0.58	50.3 ± 1.25	133 ± 1.50	3.63 ± 0.01	133 ± 1.40	169 ± 1.35	11.0 ± 0.48
Freestyle wrestling	24	9.64 ± 0.52	53.20 ± 0.75	148 ± 1.50	4.25 ± 0.01	156 ± 0.80	172 ± 1.25	12.2 ± 0.45
Prizewinners	8	9.82 ± 0.65	54.00 ± 0.95	156 ± 1.90	4.30 ± 0.05	162 ± 1.20	170 ± 1.62	13.1 ± 0.36
Nonprizewinners	16	8.92 ± 0.94	52.8 ± 1.02	136 ± 1.20	3.82 ± 0.01	148 ± 1.05	168 ± 1.24	11.8 ± 0.52
Women's wrestling	20	7.84 ± 0.52	40.6 ± 1.24	138 ± 1.94	3.24 ± 0.11	146 ± 1.40	162 ± 2.15	10.6 ± 0.54
Prizewinners	6	8.00 ± 0.65	46.5 ± 1.65	142 ± 1.78	3.42 ± 0.09	152 ± 1.84	165 ± 2.10	12.1 ± 0.72
Nonprizewinners	14	7.58 ± 062	38.4 ± 1.82	134 ± 1.68	3.18 ± 0.10	142 ± 1.66	158 ± 1.94	9.5 ± 0.65

systems) and contributes to maintaining a stable efficiency in competitive wrestling events. Insufficient development of various functional systems (usually the cardiorespiratory system) leads to a decrease in efficiency and limits the effectiveness of technical and tactical actions in competition conditions. Therefore, the indications of prizewinners' adaptation to maximum nonspecific loads can be used as criteria for managing the athletes' condition during training for high-level events. In particular, when planning training, it is necessary to consider the optimal sequence of performing various types of training loads. Performing large loads of high and moderate intensity contributes to an increase in aerobic potential; moreover, large loads provide the opportunity to systematically increase the heart cavity volume and myocardium power, form adequate peripheral vascular reactions, and successively improve slow and fast twitch muscle fibers.

As a result of using such loads, the efficiency of the mitochondrial apparatus of muscle cells also increases, which in total provides an increase of power in the aerobic mechanism of the energy supply for performing intensive loads, that is, anaerobic threshold increase (Pivovarova, Radziyevskiy, & Fomin, 1984).

At the same time, it is necessary to increase maximum the aerobic capacity to perform in competitions. High-intensity loads in maximum and sub-maximum intensity zones not only increase maximum breathing and blood circulation reserves and maximum aerobic functions, but also contributes to an increase in anaerobic (alactic and glycolytic) abilities.

Using complex control with female freestyle wrestlers of varying age groups revealed different levels of functional fitness and intensity of adaptation to competition stress (see Table 3). Adult athletes have high vital capacity levels, can hold their breath for a longer period during inhalation and have stronger capabilities in wrist dynamometer tests. Compared to adult athletes, juniors display significantly lower respiratory system indicators (vital capacity, Gench breath holding test), as well as strength capabilities. The lowest functional and strength training level appears in cadets (vital capacity, Gench test, maximum strength).

Analysis of the blood circulation recovery in female athletes of various ages immediately after competition stress (see Table 4) and during the later phases of recovery (see Table 5) shows that only adult athletes exhibit an adequate response to the stress. If the indications of the cardiovascular system were a little above the norm in the evening after a competition (heart rate, blood pressure, Ruffier index above the norm), they were completely normalized the next morning.

TABLE 2 Adaptation of Wrestlers' Analytical Systems to Cardiac Stress Loads ($M \pm m$)

Athletes	*n*	*Activity Duration (Minutes and Seconds)*	*M-response, mlA*		*Sensorimotor Reaction Speed (mls)*	
			M-1	*M-2*	*Simple Reaction*	*Selective Reaction*
Greco-Roman wrestling	20	8.82 ± 0.54	9.80 ± 0.64	24.5 ± 0.78	284 ± 1.40	372 ± 1.75
Prizewinners	4	8.90 ± 0.75	9.00 ± 0.72	21.0 ± 1.02	260 ± 1.80	337 ± 1.90
Nonprizewinners	16	8.70 ± 0.58	9.50 ± 0.78	27.8 ± 0.74	290 ± 1.50	374 ± 1.65
Freestyle wrestling	20	9.64 ± 0.52	9.40 ± 0.56	22.5 ± 0.65	280 ± 1.20	356 ± 1.25
Prizewinners	4	9.82 ± 0.65	8.60 ± 0.56	18.8 ± 0.95	255 ± 1.60	306 ± 1.62
Nonprizewinners	16	8.92 ± 0.54	9.20 ± 0.64	24.2 ± 0.56	280 ± 1.25	340 ± 1.45
Women's wrestling	20	7.84 ± 0.52	9.80 ± 0.72	19.80 ± 0.75	294 ± 2.25	397 ± 2.45
Prizewinners	4	8.00 ± 0.65	10.00 ± 0.75	20.5 ± 0.68	285 ± 1.85	368 ± 2.03
Nonprizewinners	16	7.58 ± 062	9.60 ± 0.68	19.6 ± 0.70	306 ± 2.12	418 ± 2.18

TABLE 3 Indications of Functional and Strength Fitness of Athletes of Varying Age and Qualifications ($N = 20$, $M \pm m$)

	Indications at Rest			
Test Subjects	*PWC_{170} (kgm/kg)*	*Vital Capacity (ml)*	*Gench Test (s.)*	*Right Hand Maximum Strength (kg)*
Adult athletes	25.6 ±2.1	4720 ± 36.8	50.5 ± 2.1	42.5 ± 1.83
Juniors	27.0 ± 1.9	4100 ± 41.0	37.3 ± 1.8	36.1 ± 1.94
Cadets	26.1 ± 2.8	3500 ± 44.5	30.1 ± 2.1	30.1 ± 2.1

Note. PWC = physical work capacity test on cycle ergometer.

TABLE 4 Indications of the Cardiovascular System and Central Nervous System Recovery Immediately After Competition ($N = 20$, $M \pm m$)

	Indications After the Match		
Test Subjects	*Heart Rate (bpm 1-minute recovery)*	*Heart Rate (bpm 2-minute recovery)*	*Spatial Orientation (degree, error)*
Adult athletes	177 ± 1.7	124 ± 1.5	2.3 ± 2.3
Juniors	190 ± 1.1	138 ± 1.4	3.6 ± 2.1
Cadets	196 ± 1.6	162 ± 1.9	11.8 ± 1.8

TABLE 5 Indications of the cardiovascular System During Later Phases of the Recovery Period ($N = 20$, $M \pm m$)

	Adult Athletes		*Juniors*		*Cadets*	
Indications	*Evening, After Dinner*	*Morning, After Sleep*	*Evening, After Dinner*	*Morning, After Sleep*	*Evening, After Dinner*	*Morning, After Sleep*
Heart rate (bpm)	85.6 ± 1.3	68 ± 1.4	88.2 ± 1.3	80.1 ± 1.55	96.2 ± 1.1	88.1 ± 1.55
Ruffier index (points)	10.2 ± 1.5	4.7 ± 1.6	13.4 ± 1.65	9.9 ± 1.4	14.1 ± 1.65	12.7 ± 1.4
Blood pressure (mm Hg)	112/75 ± 1.4		115/78 ± 1.1		116/85 ± 1.24	

In comparison with adult athletes, juniors' condition of the blood circulatory system is more highly stressed (the Ruffier index is accurately higher) and although heart rate levels and the Ruffier index decreased the next day, they were not normalized, which reflects the athletes' underrecovery after intense training.

Cadets exhibit the worst functional recovery after competition stress both in the evening and in the morning. They display the slowest heart rate recovery after matches and the biggest error in tests that determine the body's spatial orientation (above the norm). In the evening, they show the highest heart rate, diastolic blood pressure, and Ruffier index results. In the morning, the state of the blood circulation system is not completely normalized after an intense stress load (although heart rateis significantly lower, the Ruffier index does not differ significantly in the evening and in the morning).

Research results indicate that the degree of realizing the body's potential reserves during competition activity depends on the functional abilities of the cardiorespiratory system (PWC_{170} level, vital capacity, breath-holding period), strength potential and the condition of the central nervous system. A high level of system coordination determines an effective adaptation to competition stress and a fast recovery of adult athletes' cardiorespiratory system after completion. Compared to elite athletes, juniors have lower reserve capabilities of the cardiorespiratory system and strength potential, which is reflected in a decrease in the recovery process speed and indicates lower efficiency of intersystem regulation. Central nervous system fatigue, which reveals itself in poor coordination, cardiorespiratory system tension right after the match, and in the later phases of recovery are related to insufficient functional potential in cadets. Therefore, it is advisable for this category of athletes to use coordination ability development exercises which improve spatial orientation and to implement exercises to increase juniors' strength potential.

Having an active rest between exercises and a series of exercises contributes to the faster recovery of functions, an

increase in analytical and energy system activity efficiency and, in particular, a decrease in blood acidification and an increase in activity volume with prevalent aerobic components of muscle activity energy supply, while preserving high efficiency of technical and tactical actions.

This allows one to increase the load volume and prolong activity in this more intensive regime. Young athletes need a longer rest. Longer rest between loads using aerobic activity of a recreational type and a shorter duration of stress in submaximum intensity areas presupposes a decrease in their volume in young athletes and an increase in aerobic activity compared to adults in training cycles.

SUMMARY

Research results allow us to make the following conclusions:

- The activity capacity level in competition loads of high intensity is determined by the magnitude of reserve capabilities, which provide the stability of the body's function in extreme conditions.
- The efficiency of the intersystem regulation and activity capacity in intensive competition regimes increases with age and the level of qualification.
- When planning young female athletes' training loads, it is necessary to take into account age-specific peculiarities of body development and use training loads adequate to their functional abilities.
- The most important factor in evaluating the efficiency of adapting to competition loads is the recovery speed of the body systems and their normalization in the later phases of the recovery period.

NEW DIRECTIONS

To speed up female athletes' recovery after high training and competition stress loads, experts in cosmoenergetics have recently been involved in working with our Russian sports teams. This is, in essence, a new trend in medicine—energy and information technologies, which enable the cleansing human cells of energy and information smog and include them in the self-regulation process. (Kronn, Jones, & Zaporozhets, 2008; Bagirov, Sharkov, & Lebedeva, 2009). Cosmoenergetic channelsis the conventional name for the cosmic energy which aids in health recovery. Cosmoenergetic channels purportedly possess cleansing, healing, and protective properties, and each of them is capable of healing groups of organs or even whole systems. At the same time, the effect of energy channels on a person removes negative information from the biological field, cleanses and restores all thin bodies, which a human body is made up of, and restores the activity of energy centers responsible for the function of all systems in the human body.

These energy and information technologies are an alternative to various stimulators, and may hold great promise for their effects on the human body, including any pharmacological substances and banned methods aimed at improving athletes' strength and endurance. Our experience in the application of these energy-information technologies in the training of athletes in the past four years, show great promise.

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