

Rvački Savez Srbije  
Wrestling Federation of Serbia



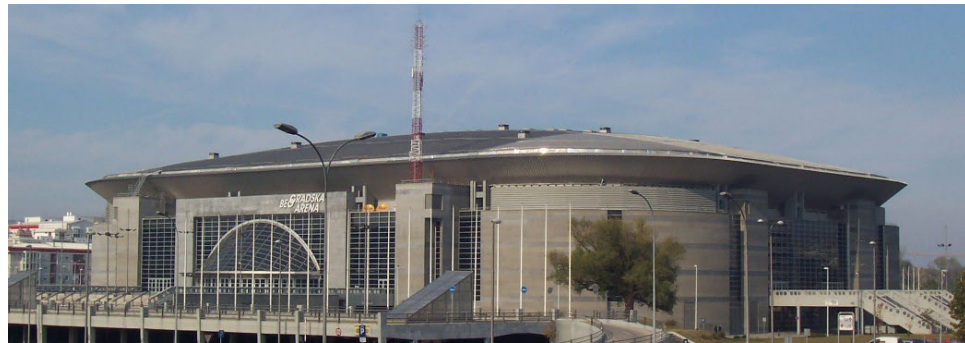
## PROGRAM FOR THE SCIENTIFIC SYMPOSIUM AT THE 2023 SENIOR WORLD CHAMPIONSHIPS IN BELGRADE

*"Using Sport Science to Help Wrestlers and Coaches."*

Wednesday, 20.09.2023. – 9:00 AM to 3:00 PM  
Hyatt Hotel Conference Room



UNITED WORLD  
WRESTLING



Welcome and Introduction of Distinguished Guests  
Daulet Turlykhanov – President of Scientific Commission  
Nenad Lalovic – President of United World Wrestling  
Carlos Roy – Secretary General of United World Wrestling  
Prof. Dr. Milorad Dokmanac – Serbian Wrestling Federation



INTERNATIONAL NETWORK OF WRESTLING RESEARCHERS (INWR)

ADVANCING OUR SPORT THROUGH KNOWLEDGE

FAIRE PROGRESSER NOTRE SPORT PAR LA CONNAISSANCE

ПРОДВИЖЕНИЕ НАШЕГО СПОРТА ЧЕРЕЗ ЗНАНИЕ

PROGRESO PARA NUESTRO DEPORTE MEDIANTE CONOCIMIENTO



### **Rayko Petrov Honorary Lecture**

#### **Georgiy Korobeynikov, PhD**

Professor and Head of Combat Sports and Strength Sports Department at National University of Ukraine on Physical Education and Sport, Kyiv, Ukraine;  
Visiting Professor at German Sport University Cologne, Institute of Psychology, Cologne, Germany  
Member of UWW Scientific Commission

**USE OF HEART RATE VARIABILITY IN THE TRAINING OF ELITE WRESTLERS**

## INVITED KEYNOTE LECTURES (35 minutes)

**BABAK SHADGAN, MD, MSC SPORTS MED, PHD**  
University of British Columbia, Vancouver, Canada  
President – UWW Medical, Prevention & Anti-Doping Commission

***DEVELOPING THE NEW GENERATION OF EXERCISE MONITORS TO IMPROVE ATHLETIC PERFORMANCE***



**BAHMAN MIRZAEI, PHD**  
Director of Physical Education and Sport Sciences Department at  
University of Guilan, Rasht, Iran  
Member of UWW Scientific Commission

***DEVELOPMENT OF WRESTLING SPECIFIC ENDURANCE***

**NIKOS C. APOSTOLOPOULOS, PhD**  
Founder and Developer of microStretching® and Stretch Therapy®

***TO FIGHT ANOTHER DAY - microStretching, THE IMPORTANCE OF PROPER RECOVERY AND REGENERATION***



## MINI-LECTURES (20 MINUTES)



**MARIO BAIĆ, PHD**  
Dean's councilor for quality assurance at the University of Zagreb, Faculty of Kinesiology  
Member of UWW Scientific Commission

***PHYSICAL FITNESS PREPARATION OF TOP-LEVEL WRESTLERS***

**PROFESSOR DR. FIKRAT KERIMOV**

Head coach of freestyle wrestling of the national team of Uzbekistan, doctor of Pedagogical Sciences and professor at Uzbek State University of Physical Education and Sports, Tashkent, Uzbekistan

**MODERN METHODS OF ASSESSING AND PREDICTING WEIGHT INDICATORS IN QUALIFYING AND ORIENTATION FOR WRESTLING**



**SPECIAL PRESENTATIONS (15 MINUTES)**



**ABAZAR HABIBINIA, MD, DFN, CSDTT**

Executive Director Canadian Academy of Sports Nutrition

**CANNABIS IN SPORTS & HOW ATHLETES TRY TO CHEAT DRUG TESTS FOR IT**

**SAEID ESMAELI**

Wrestling for Humanity

**BODY-MIND-COMMUNITY: USING WRESTLING TO BUILD SAFER AND STRONGER COMMUNITIES AND MEMBERS**



**ABSTRACTS (10 MINUTES) Red Denotes Author Present**

**TECHNICAL – TACTICAL ANALYSIS OF XXXII SUMMER OLYMPIC GAMES AND 2022 WORLD CHAMPIONSHIP FREESTYLE WRESTLING COMPETITIONS**

<sup>1,4</sup>Ramiz Arabaci, <sup>2,4</sup>Ali Kamil Gungor, <sup>3,4</sup>Emre Acikgoz

Bursa Uludag University, Faculty of Sport Sciences, Department of Physical Education and Sport Teaching, Nilufer, Bursa / Turkey, 16059, ramizar@uludag.edu.tr, <sup>2</sup> Bursa Uludag University, Faculty of Sport Sciences, Department of Coaching Education <sup>3</sup>Bursa Uludag University, Institute of Education Sciences, Physical Education and Sport Graduate Student <sup>4</sup>Elite Performance in Sport Research Group

**ABSTRACT**

PURPOSE: The aim of present study was to compare notational technical – tactical analysis of XXXII Summer Olympic Games (OG) and 2022 World Championship (WC) freestyle wrestling competitions. METHODS: A total of 293 (103 OG and 190 WC) videos of bouts were watched and analyzed by Dartfish Connect Plus 8.0 match analysis program. Bouts analyzes were performed according to 1) bout analysis preparation, 2) searching and tagging, 3) creating a database, 4) data usage procedures. Wrestling techniques were grouped into take downs and throws (wrestling in standing position), flips and throws (wrestling in parterre position). Diversity, effect and efficiency of techniques are determined in matches. Points according to time and periods, standing and parterre position, winning types, passivity and cautions were determined. There is significant difference between attack and counter-attacks in WC and OG ( $p < 0.05$ ;  $\chi^2 = 31.689$ ). Type of victories in WC and OG are %63.7 and %73.8 by point, respectively. In first and second period are determined Mean Technical points according wrestling actions ( $WA_{mean}$ ) 1.74 and



1.76 ( $t=0.488$ , Cohen's  $d = .031$ ), 1.66 and 1.69 ( $t=0.567$ , Cohen's  $d = .048$ ) in WC and OG, respectively. The most wrestling techniques are performed in standing position (WC 58.8% and OG 68.2%). Leg Attack is the most commonly used technique in standing position (WC 17.9% and OG 21.8%). CONCLUSIONS: In conclusion, techniques which earning two points, attack movements, performed at standing position such as leg attack, take down and push to out are important in elite wrestling matches.

**Key words:** wrestling, performance, match analyses, elite athlete

## TECHNICAL – TACTICAL MOVEMENTS USED IN 2021 AND 2022 WORLD SENIOR FREESTYLE WRESTLING CHAMPIONSHIPS

<sup>1,3</sup>Ramiz Arabaci, <sup>2,3</sup>Ali Kamil Gungor

<sup>1</sup>Bursa Uludag University, Faculty of Sport Sciences, Nilufer, Bursa / Turkey, [ramizar@uludag.edu.tr](mailto:ramizar@uludag.edu.tr) <sup>2</sup> Bursa Uludag University, Faculty of Sport Sciences, Department of Coaching Education <sup>3</sup>Elite Performance in Sport Research Group

### Abstract

**PURPOSE:** The present study aimed to conduct notational analysis on technical and tactical aspects of super elite men's wrestling, comparing the winning and losing markers of the 2021 and 2022 Senior World Wrestling Championships. **METHODS:** A total of 598 bout videos were observed and analysed by Dartfish Connect Plus 8.0 match analysis program. Analyses were performed according to bout analysis preparation, searching and tagging, creating a database, data usage procedures. Wrestling techniques were grouped into take downs and throws (standing position), flips and throws (parterre position). There is significant difference between attack and counter-attacks in 2021WC and 2022WC ( $p < 0.05$ ;  $\chi^2=8.318$ ). The mean technical points ( $TP_{mean}$ ) are determined in first and second period 5.2 and 4.4 ( $p>0.05$ ,  $d=.071$ ) and according wrestling actions ( $WA_{mean}$ ) 1.78 and 1.73 ( $p>0.05$ ,  $d=.068$ ) in 2021WC, and  $TP_{mean}$  5.1 and 4.4 ( $p>0.05$ ,  $d=.061$ ) and  $WA_{mean}$  1.77 and 1.76 ( $p>0.05$   $d=.001$ ) in 2022WC, respectively. The most wrestling techniques are performed in standing position (WC2021 61.4% and WC2022 58.6%). **CONCLUSIONS:** The findings of present study demonstrated attractive and active combat of wrestle in 2021 and 2022 WC. Leg attack, take down, push to out and gut wrench are most valuable techniques in elite freestyle wrestling.

**Key words:** wrestling, notational analyses, technic-tactic, elite athlete

## THE INFLUENCE OF CLUB COACHES AND PEERS ON THE MOTIVATION OF 11-TO-13-YEAR-OLD BOY WRESTLERS

Ivica Biletić<sup>1</sup>, Mario Baić<sup>2</sup>, Damir Pekas<sup>2</sup>

<sup>1</sup> Police Academy - The First Croatian Police Officer Zagreb, University of Applied Sciences in Criminal Investigation and Public Security <sup>2</sup> University of Zagreb, Faculty of Kinesiology

### ABSTRACT

**INTRODUCTION:** Although wrestling training is done in a group (club) and there are team competitions, wrestling in its essence belongs to individual sports. Since the drop in the number of children in the clubs was observed, the aim of this research was to determine the involvement of coaches and peers from the club in motivating and supporting children to practice wrestling. **METHODS:** The sample consisted of 79 young wrestlers between the ages of 11 and 13 from most Croatian wrestling clubs, who, according to the Regulations of the Croatian Wrestling Federation, belong to the age group "younger boy wrestlers" (U13). A questionnaire was used that measures the social orientation of athletes towards coaches and peers. **RESULTS:** The results show that the most important thing for younger boy wrestlers is the coach's praise, followed by the friendship of their peers with whom they train in the wrestling club, and in third place is the sense of belonging and acceptance of the peer group. In the obtained results, the particles of the questionnaire related to common experiences outside of training such as birthdays and going to the cinema, as well as particles of trust in peers and particles related to the importance of the coach's praise, were separated. **CONCLUSION:** From the results of this research, we can conclude that the social environment significantly affects the motivation to engage in wrestling. Although wrestling in its essence is an individual sport, friendship and acceptance of peers, socializing outside the club as well as the positive attitude of the coach and his praise of the individual athlete form a very important link in the motivation of young athletes for wrestling training. Under the positive influence of the social environment (coaches and friends from the club), young wrestlers will perceive wrestling as a sporting activity that gives them pleasure and will be happy to continue wrestling. This paper is part of the doctoral thesis "Social environment and youth participation in wrestling" by Ivica Biletić (2022). **Keywords:** greco-roman style, social environment, social orientation, wrestling training, individual sport.

## DIFFERENCES IN SELECTED VARIABLES FOR ASSESSMENT OF SITUATIONAL EFFICIENCY IN BEGINNER WRESTLERS DEPENDING ON THE METHOD OF LEARNING AND IMPROVING TECHNIQUES

Vračan Dalibor<sup>1</sup>, Mario Baić<sup>2</sup>, Kristijan Slačanać<sup>3</sup>, Damir Pekas<sup>2</sup>

<sup>1</sup>Faculty of Architecture, University of Zagreb

<sup>2</sup>Faculty of Kinesiology, University of Zagreb

<sup>3</sup>Ministry of Tourism and Sports of the Republic of Croatia

[damir.pekas@kif.hr](mailto:damir.pekas@kif.hr)

**INTRODUCTION:** Wrestling is a very complex and energy-demanding kinesiology activity and quite often the improvement of techniques takes place only in the dominant side, which is criticized by wrestling experts and scientists. The goal of this manuscript is to compare the situational efficiency of beginner wrestlers who trained symmetrically to the left and right side with the situational efficiency variables of beginner wrestlers who trained asymmetrically only to the dominant side. **METHODS:** The sample consisted of 115 beginner wrestlers who were divided into two groups. The experimental group performed training symmetrically in both sides ( $n=61$ ), while the control group performed training asymmetrically only in the dominant side ( $n=54$ ). During the training process included in this research, 48 hours of training were conducted. The competition was held according to the Scandinavian competition system with 5 wrestlers in each group. Six variables were observed to assess the situational efficiency of wrestlers (General efficiency, Point efficiency, Pure efficiency, Activity, Success, Superiority). Differences between the control and experimental groups were determined using univariate analysis of variance. **RESULTS:** Univariate analysis of variance

for each variable separately determined a statistically significant difference between the arithmetic means in four of the six variables for assessing situational efficiency in wrestling - General efficiency, Point efficiency, Activity, Superiority. CONCLUSION: It is evident from the results that beginner wrestlers who practiced symmetrical learning and improving techniques in training are better in all variables for assessing situational efficiency. Because of this, we can conclude that in order to improve competitive efficiency in a wrestling match, wrestling elements must be learned and improved in both sides symmetrically.

Key words: symmetric learning and improvement, asymmetric learning and improvement, dominant side

### **Body-Mind-Community: Using Wrestling to Build Safer and Stronger Communities and Members**

Saeid Esmaeli (Open University), Dr Carl Berry (University of England), Mark Berry (University of Bournemouth).

This programme description will present a proposed interdisciplinary research project conducted by Coach Saeid Esmaeli and colleagues at Bournemouth University and the University of the West of England, which aims to investigate the positive and transformative impact of wrestling participation on the lives of marginalised young people living in Bristol, U.K. This programme description proposes an ethnographic methodology of interviews and observations and aims to build upon the British Home Office project: RAYS (Berry, 2023), which used music and art to divert at-risk Albanian youth towards pro-social life trajectories. Research indicates the tremendous value of wrestling in building participants' physical health, psychological resilience and career success (Gould, et al 2017). By applying the concept of body-mind-community, this project aims to investigate how wrestling can also assist in promoting community safety concerning young people at risk of gang membership and criminal offending, besides promoting community engagement for refugees, participants with visible/non-visible disabilities, mental health and substance misuse issues. Esmaeli's non-profit organisation: Wrestling for Humanity, recently received a Points of Light award from the British Prime Minister, Rishi Sunak for his outstanding community work, which this proposed research seeks to systematically evaluate.

### **Freestyle Wrestlers Reaction Time Differences Between Different Wrestling Specific Visual Stimuli and Kinetic Responses**

Gkrekidis<sup>1</sup> A., Nikolopoulos<sup>1</sup> G., Gkagka<sup>2</sup> P., Barbas<sup>1</sup> I., Menychtas<sup>1</sup> D., Giannakou<sup>1</sup>, E., Aggeloussis<sup>1</sup>, N.

1 Democritus University of Thrace School of Physical Education and Sport Sciences 2 Democritus University of Thrace Department of Social Work

#### **Abstract**

PURPOSE of the current study was to examine the differences between the reaction time of wrestlers attacking the left leg, the right leg or both legs given a different kinetic visual stimulus. METHODS: The sample consisted of 19 wrestling athletes, male and female, who voluntarily participated in the research, seven were adolescent girls with an average age of  $16 \pm 1.95$  years while 12 were young men with an average age of  $20.27 \pm 2.27$  years. "Barbas 3D Wrestling Dummy" was used to produce stimuli and to apply the responses to these stimuli on it. Two in-floor force plates were used, the athletes stood on them so that the first occurrence of force at the onset of the motor response after the stimulus was recorded. An extensometer attached to the dummy's ankles and an accelerometer placed on the dummy's back were used to observe the timing of the onset of the stimuli during the measurements procedure. RESULTS: In all comparisons the "type of stimulus" factor showed statistically significant main effect with the mean reaction times of attacking the left leg being lower than the ones of attacking the right leg or both legs, also the mean reaction times when the attack occurred on the right leg were shorter than the ones of the attack on both legs. CONCLUSIONS: The different kinetic responses as well as the differences concerning the source of stimuli and the target of the response could be the major causes for the current results. More research is needed before we can safely assume that our results are valid for other wrestling athletes too as gender, age, physique, type and intensity of stimulus as well as the kinetic response critically influence reaction time.

**Keywords: Wrestling, Reaction time, Visual stimulus**

### **TRAINING SYSTEM OF HIGHLY QUALIFIED WRESTLERS**

Fikrat Kerimov, Olga Goncharova, Rashid Burnashev, **Khamidjanov Abdulaziz Usubjon**

Uzbek State University of Physical Education and Sports, Uzbekistan

#### **ABSTRACT**

**PURPOSE:** This study is an example of a significant contribution to the system of modern sports training of highly qualified wrestlers through the transformation of digital technologies in the training process.

**METHODS:** wrestlers (n=28) of high qualification participated as subjects. The qualitative kinematic characteristics of the speed-strength indicators (SSI) of individual muscle groups of various body segments were recorded using a universal dynamographic stand. Recording of speed-strength indicators was carried out with the help of a specially developed and patented program for the analysis of special strength indicators of athletes "Sila - 1"(strength). The coefficients of multiple correlations were also calculated as a measure of contingency between the physical, technical and functional training of wrestlers.

**RESULTS:** showed that in the course of the experiment, using quantitative instrumental methods by objective recording of the qualitative kinematic characteristics of the speed-strength indicators of individual muscle groups of various body segments in the experimental groups at the end of the experiment, despite the identity of the rates of development of the studied initial indicators of the SSI of highly qualified wrestlers, we observe all normative indicators of the experimental group have higher results, as evidenced by the arithmetic mean of these values, as well as the significance of the difference (<0.01).

**CONCLUSION:** it was revealed that the transformation of digital technologies in the training process of highly qualified wrestlers is a new promising methodological approach of the modern system of sports training. The use of quantitative instrumental methods of objective registration of individual muscle groups of various body segments in sports training determines the dynamics of the athlete's condition. This information can help the coach make timely adjustments to the athlete's individual card, necessary to improve the motor potential of wrestlers

and their performance, which in turn will have a positive effect on the ability of athletes to effectively demonstrate special strength qualities in specific technical and tactical actions, both in the training process and in the competitive period.

## STRESS RESPONSE MECHANISMS IN WRESTLING COMPETITIONS

*Georgiy Korobeynikov<sup>1,2</sup>, Lesia Korobeinikova<sup>1,2</sup>, Markus Raab<sup>2</sup>, Anatoliy Kokhanovich<sup>1</sup>, Ivanna Korobeinikova<sup>2</sup>*

<sup>1</sup> National University of Ukraine on Physical Education and Sport, Kyiv, Ukraine

<sup>2</sup> German Sport University Cologne, Institute of Psychology, Cologne, Germany

[k.george.65.w@gmail.com](mailto:k.george.65.w@gmail.com)

### ABSTRACT

**PURPOSE:** To study the peculiarities of stress response to competition in elite wrestlers.

**METHODS:** The 24 elite Greco-Roman wrestlers (age 22-26) were examined. Heart rate variability (HRV) was used as an indicator of stress response. We used the approach to analyze HRV according to the European Association of Cardiology by a computer electrocardiograph "Fazagraf" (Ukraine). All of these persons agree to the use of research results for scientific work, according recommendation of Ethics Committees for Biomedical Research.

**RESULTS:** The obtained result indicates an increase in the level of tension of HRV regulation in wrestlers in the process of competitive activity. Competitive activity provokes inhibition of activity of sympathetic and parasympathetic links. However, the balance between LF and HF does not change during competition.

Scatterplot analysis of NN intervals shows a decrease in SD1 and SD2 in athletes during competition. The obtained fact indicates an increase in the tension of regulation due to periodic and aperiodic fluctuations of cardiointervals. In addition, the decrease in SD2 is associated with the activation of sympathetic tone of the autonomic nervous system. Thus, the stress reaction to competitions in elite wrestlers is characterized by an increase in the level of HRV regulation stress with deterioration of sympathetic and parasympathetic tone activity.

**CONCLUSION:** Competitions lead to an increase in the stress response due to the tension of the autonomic regulation of the heart rate in elite wrestlers. The adaptive mechanism for the prevention of stress response during competitive activity in elite wrestlers is associated with changes in the organization of the autonomic regulation of the heart rhythm.

## INDIVIDUAL WINNING CONSISTENCY METRICS PREDICT MATCH OUTCOME AND PODIUM PERFORMANCE IN FREESTYLE SENIOR WORLD WRESTLING

David Eduardo López-González

Wrestling Canada Lutte

**Purpose.** This study introduces the concept of Individual Winning Consistency (IWC) as an Opponent Quality metric in Freestyle Wrestling. The research aims to address two primary questions: a) Can a higher IWC for a contender, calculated prior to a match-up, reliably predict the match result? b) Can the IWC effectively predict Medal Performance? **Methods.** Athlete Place and Match results of the Wrestling Senior World Championships 2022 were collected, with 176 Women's (WW) and 258 Men's Freestyle (FS) participants. Final athlete rankings were compiled for those participating in at least one international tournament between September 10th, 2020, and September 9th, 2022. The quantification of IWC involved recording victories for each individual and subsequently calculating the median victories per tournament. For instance, an undefeated wrestler winning 10 tournaments, each with 4 victories, would hold an IWC of 4.0. Match pairings were meticulously chosen based on varying IWC values, enabling computation of the associated metric "Winning Consistency Advantage" (WCA) by subtracting the lower IWC from the higher. For instance, in a match-up between athletes with IWC values of 3.5 and 1.0, the athlete with higher IWC would have a WCA of 2.5. A total of 151 WW and 236 FS matches formed corresponding datasets, each split into training (70% of the data) and testing (30%) subsets, for CHAID classification tree analysis to evaluate outcome prediction. The wrestler's outcome ("won" or "lost") when in advantage was the target, with three WCA value ranges categorized as "Big" (WCA  $\geq 2.5$ ), "Moderate" (WCA of 1.5 to 2.0), and "Small" (WCA of 0.5 to 1.0) as predicting variables. Medal Performance prediction utilized IWC of all the participants with international participation in the 2 years prior time span as predicting variable and final place as target variable, ranging from 1 (1st place) to 24 and 34 (24th place in WW and 34th place in FS respectively), treated by regression CHAID. Accuracy %, p-value, and Root Mean Square Error (RMSE) were calculated for model evaluation. **Results.** The accuracy of Match Outcome prediction achieved by WCA was 82% for the WW testing dataset and 72% for the FS testing dataset ( $p < 0.05$ ). The calculated probability of winning a match was greater than 75% with a "Moderate" advantage, and greater than 85% with a "Big" advantage. Medal performance prediction reached RMSE lower than 0.4, indicating IWC  $\geq 3.5$  as predictor of 1st to 3rd place in WW ( $p < 0.05$ ) and 1st to 8th place in FS ( $p = 0.00$ ). **Conclusion.** Evaluation of classification and regression models demonstrates that IWC and WCA, computed from international performance data spanning two years prior, predict podium performance and match outcomes within the context of Senior World results. These indicators hold promise for high-performance Olympic Wrestling programs, contributing to performance prediction, athlete selection, resource allocation, and opponent scouting.

Keywords: wrestling, performance analysis, outcome prediction, opponent quality, machine learning.

## DYNAMICS OF THE NUMBER OF WEIGHT CATEGORIES IN WOMEN'S WRESTLING

Viktor Shandryhos [shandrygos.v@gmail.com](mailto:shandrygos.v@gmail.com)

Ternopil Volodymyr Hnatyuk National Pedagogical University, Ternopil, Ukraine

### ABSTRACT

**PURPOSE:** to analyze the dynamics of the number of weight categories in women's wrestling. **METHODS:** theoretical analysis and generalization of literature data, Internet sources, system-historical analysis, methods of mathematical statistics. **RESULTS:** the article presents the results of empirical studies of the dynamics of the number of weight categories of women wrestling athletes since 1987. It was found that since 1997,

there has been a clear trend of increasing the number of weight categories of women wrestlers. It has been established that since 1997 women have competed in only six categories; since 2002 – at seven; from 2014 – in eight, and from 2018 – in ten weight categories. In 2004, women's wrestling received general recognition with the inclusion in the program of the Olympics in Athens as an independent discipline. Since then, there has been a division of weight categories into "Olympic" and "non-Olympic". In total, women's wrestling was included in the programs of the Olympic Games 4 times and during this period 18 sets of awards were drawn. **CONCLUSIONS:** It is established that to promote, entertain and promote wrestling as a sport in the world, UWW makes changes and additions to the rules of competition, including changes in the number of weight categories. It was found that with the beginning of the popularization of women's wrestling, there is a clear trend of increasing the number of weight categories of wrestling. The number of participating countries and athletes has also increased significantly, which indicates the growing popularity of women's wrestling in the world. All this objectively confirms the leading role of women's wrestling and contributes to the preservation of a worthy status of wrestling in the structure of modern world sports. **Key words:** weight categories, women's wrestling, dynamics, women wrestlers, world championships, Olympic Games, system-historical analysis, regulations.

## **DESIGNING A MODEL FOR MEASURING THE EMPOWERMENT OF WRESTLING COACHES**

Alireza Rahmati Tabrizi<sup>1</sup>, Aliakbar Jirsaraei Bazarkard<sup>2</sup> Abas Khodayari<sup>3</sup>

1Alborz Islamic Azad University, Department of Sports management, Karaj Branch, Iran 2 Amoli, Department of Sports management, Amol, Iran 3 Alborz Islamic Azad University, Department of Sports management, Karaj Branch, Iran

### **ABSTRACT**

**PURPOSE:** This study was to design a model for measuring the empowerment of wrestling coaches. The present study was a mixed method (qualitative-quantitative). The qualitative part included the directors of wrestling (former and current), the president of the federation and the deputies, the secretary of the federation, and the wrestling coaches and veterans, and the quantitative part included the coaches and wrestlers of the 2nd grade and above Iran. The sample of the qualitative section was ten people. The quantitative section consisted of 300 coaches of wrestlers of 2nd grade and above, who were selected by the available sample method. The research tool was a researcher-made questionnaire. Data were analyzed using SPSS and AMOS software.

**CONCLUSIONS:** The results showed that the model of empowering ship coaches consists of 4 main components, including individual, environmental, organizational, and managerial factors, and nine sub-factors of the feeling of efficiency, self-efficacy, economic status, perceived support, organizational structure, organizational perspective, training quality, information growth, and Management style was identified and extracted. The obtained model based on the approved fit indices can be useful to achieve more empowerment of trainers.

## **COMPARATIVE ANALYSIS OF PHYSICAL PREPAREDNESS INDICATORS AMONG WRESTLERS OF DIFFERENT QUALIFICATIONS**

Yuriy Tropin, Yuliya Kovalenko

Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

e-mail: tropin.yurij@gmail.com

### **ABSTRACT**

**PURPOSE:** This study aims to conduct physical fitness testing among wrestlers of different qualifications to identify differences in physical preparedness indicators. **METHODS:** The study involved 32 Greco-Roman style wrestlers in the middleweight classes (72 kg, 77 kg, 82 kg). The participants were divided into two groups: elite athletes (n=16) with an average weight of 77.07±6.11 kg and sub-elite athletes (n=16) with an average weight of 76.98±5.99 kg. Various physical fitness tests were conducted on the wrestlers, including the 30-meter sprint (s), vertical jump (cm), legless rope climb (s), pull-ups for 10 s (n), push-ups for 10 s (n), maximum number of squats with a partner (n), maximum number of pull-ups (n), maximum number of push-ups (n), and three sets of 15 hip turning throws with a one-minute rest interval (s). The differences between groups were assessed using the Student's T-Test. **RESULTS:** The results of the tests indicated that elite wrestlers significantly outperformed sub-elite wrestlers in almost all assessments: 30-meter sprint (t=5.07; p<0.001), vertical jump (t=3.5; p<0.01), legless rope climb (t=3.5; p<0.01), pull-ups for 10 s (t=5.25; p<0.001), maximum number of squats with a partner (t=4.81; p<0.001), maximum number of pull-ups (t=7.44; p<0.001), and three sets of 15 hip turning throws (t=5.27; p<0.001). Statistically insignificant differences were observed in the tests of push-ups for 10 s (t=1.91; p>0.05) and the maximum number of push-ups (t=0.46; p>0.05). This discrepancy can be attributed to the fact that the strength demands in these exercises are not specific to wrestling, as wrestlers predominantly engage in movements involving pressing their opponents towards themselves rather than pushing them away. **CONCLUSIONS:** The study revealed that elite wrestlers exhibit superior physical preparedness indicators compared to sub-elite wrestlers across all tests. The findings validate this claim, with the most substantial disparities observed in the tests of three sets of 15 hip turning throws (25%), maximum number of pull-ups bar (23%), maximum number of squats with a partner (20%), and legless rope climb (19%). Other exercises also displayed higher performance in elite wrestlers: pull-ups for 10 s (15%), vertical jump (11%), 30-meter sprint (11%), push-ups for 10 s (10%), and the maximum number of push-ups (2%).

**Keywords:** physical preparedness, Greco-Roman wrestling, elite and sub-elite athletes.

## **SYMMETRY OF LEG MUSCLES IN WRESTLERS**

Marković Milan<sup>1</sup>, Toskić Lazar<sup>1,2</sup>,

<sup>1</sup>Faculty of Sport and Physical Education, University of Priština in Kosovska Mitrovica, Leposavić, Serbia

<sup>2</sup>Faculty of Sport, University "Union-Nikola Tesla", Belgrade, Serbia

### **ABSTRACT**

**PURPOSE:** The purpose of this research is to determine the relationship between the contractile characteristics of the right and left leg, as well as the flexors (F) and extensors (E) of the knee joint muscles, during voluntary and involuntary contractions. **METHODS:** Voluntary muscle contractions were measured using the isokinetic dynamometry method (KinCom) in concentric mode of operation at the speeds of 60 and 180 ȳs (peak torque/moment – T<sup>max</sup>). Involuntary muscle contractions were measured by tensiomyography (TMG) on the rectus femoris (RF) and



biceps femoris (BF) muscles (parameters of contraction time - Tc, delay time - Td, relaxation time - Tr, maximal displacement - Dm, sustain time - Ts). The sample consists of 8 wrestlers aged 22.5±3.1 years, body height 176.8±8.7 cm, body mass 79.3±9.4 kg, body mass index 25.4±1.3 kg/m<sup>2</sup>, body fat percentage 10.9±3.3 % and body muscle percentage 51.2±2.1 %. Among the statistical procedures, the method of descriptive statistics and analysis of differences (T test) was applied in the study. RESULTS: Initially, the absence of differences in the lean body mass of the left and right legs was determined, whereas the main results of the research further showed that there was a statistically highly-significant difference (p=0.000) in the isokinetic strength between the muscles of the front and the back of the thigh, regardless of the angular velocity of movement (60/180 °/s) and regardless of the leg (R/L). There was no difference between the right and the left leg, both in terms of the function of flexors and in the function of extensors. From the aspect of mechanical and contractile properties, TMG results also showed the absence of a cut between the right and the left leg, while significant differences were observed between RF and BF in Tr of the right leg (p = 0.034) and in Dm of the left leg (p = 0.040), and Ts at the limit of significance for both legs, while no differences were observed in the other parameters. CONCLUSION: Data on the differences in isokinetic strength and the defined degree of asymmetry – BF is 65.8% of the RF of the left and 63.8% of the right – represents a physiological normal, or perhaps a specific characteristic of the leg muscles in wrestlers, which can be used to design the training load, but also in the process of physical therapy and rehabilitation.

## **PSYCHO-PHYSIOLOGICAL CONTROL FOR OPTIMIZING THE TRAINING AND COMPETITIVE ACTIVITIES OF YOUNG WRESTLERS IN THE CONDITIONS OF MARTIAL LAW**

Liliia Yukhymenko, Volodymyr Lyzogub, Sergii Khomenko

Scientific-research Institute named after Mykhailo Bosyi of Cherkasy National University named after Bohdan Khmelnytyi, Ukraine

**ABSTRACT PURPOSE:** this investigation is dedicated to identifying the role of the athlete's psychophysiological functions in the effectiveness of the competitive activity of young wrestlers, namely the properties of the higher departments of the central nervous system, in the martial law conditions. **METHODS** We examined the psychophysiological functions of 12 wrestlers aged 10-11 years (anxiety level, indicators of simple and complex sensorimotor reaction to positive and negative stimuli, sensorimotor reaction to a moving object), which trained and competed under the conditions of martial law. The obtained results were compared with the similar indicators of wrestlers of the same age recorded in the pre-war period. **RESULTS:** a comparison of indicators of a complex sensorimotor reaction and sensorimotor reactivity to a moving object established a clear tendency to the worsen of psychophysiological functions in wrestlers which trained and competed under the martial law, compared to the data of wrestlers obtained in pre-war times. Indicators of anxiety in wrestlers, who trained in the martial law conditions, were highly variable and indicated a significant risk of the stress. **CONCLUSIONS** It is shown that martial law acts as a catalyst for negative changes of the mental and sensorimotor levels of athletes, and neurodynamic analysis is a sensitive method of assessing the psychophysiological status of young wrestlers. This information can be used by the coach to prevent the occurrence of stress, exhaustion of the nervous system, the development of overtraining, and a decrease of the technical and tactical capabilities of young wrestlers.

## **STUDY OF THE CARDIOVASCULAR SYSTEM'S REACTION TO THE TRAINING LOAD OF HIGHLY QUALIFIED WRESTLERS**

**Burnashev R.A.**

*Head of the Laboratory of Functional and Psychodiagnostics of Athletes*

*Scientific Research Institute of Physical Culture and Sports-Uzbekistan*

### **Abstract**

This study examined the reaction of the cardiovascular system of highly qualified freestyle wrestlers to a competitive load in the pre-competitive period of training, where such internal changes such as the maximum heart rate, heart rate variability before and after the load, the level of stress before and after the load, and the recovery time of athletes after exercise in the submaximal and maximum intensity zones. The heart rate and stress index were measured before the load at rest, during the competitive load and after the completion of the training process, the effect of the physical load on the wrestlers' body was studied. It was found that the stress index was exceeded in most wrestlers before the start of the training process, which subsequently had a negative impact on the entire training process. In this connection, it was decided to identify the causes causing an increase in the stress of athletes. The results of the study discussed in this article may be useful to coaches and specialists in the preparation of athletes in martial arts. **Purpose of the research.** To reveal the maximum heart rate for the competitive load in highly qualified wrestlers in the pre-competitive period of preparation. **Subjects:** 4 highly qualified wrestlers participated in the study (2 wrestlers participated in the Olympic Games in Tokyo, 1 wrestler was a bronze medalist of the Olympic Games in Buenos Aires and 1 wrestler was a bronze medalist of the Olympic Games in Rio de Janeiro). **Methods:** The study of the reaction of the cardiovascular system with an instrumental method, the identification of heart rate variability and stress index before exercise, during exercise and after it, as well as the recovery time with a special measuring device Veda Pulse and Polar h10 with CardrioMood software. The study lasted 4 microcycles, where each microcycle was 7 days. The training process was as follows: the athletes came to the gym, where, before the warm-up, we took measurements and determination of heart rate variability and stress index, then determined the maximum heart rate at submaximal and maximum load, as well as the performance of wrestlers. After the competitive load, the second measurement was carried out, where the heart rate variability and the stress index for the load were determined. **Results of the study:** as a result of the study, the following indicators were obtained. At the beginning of the training process, the average heart rate of highly skilled wrestlers was 74.8±6.7 beats per minute; during the submaximal training load, this indicator increased to 165.3±13.6 beats per minute. The submaximal load lasted 3 minutes. And in the maximum training load, the maximum heart rate reached 187.3±9.4 beats per minute. But to date, heart rate indicators in highly qualified athletes are uninformative, but heart rate variability and body stress index at high or low heart rate are more informative for coaches and specialists. **Conclusions:** In the course of the study of the cardiovascular system of the body of highly qualified freestyle wrestlers, it was revealed that at this stage the level of preparedness is not high enough to compete in the submaximal and maximum intensity zones to show high results in international competitions, and therefore it is necessary to further develop proposals and recommendations for increasing the special working capacity and the level of the functional state of athletes.