INTERNATIONAL NETWORK OF WRESTLING RESEARCHERS (INWR)

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ПРОДВИЖЕНИЕ НАШЕГО СПОРТА ЧЕРЕЗ ЗНАНИЕ

PROGRESO PARA NUESTRO DEPORTE MEDIANTE CONOCIMIENTO

2025

Annual Compilation of Wrestling Research

UWW Wrestlers of the Year:
Sakura Motoki, Japan(FW)
Saeid ESMAEILI, Iran (GR)
Rahman AMOUZAD, Iran (FS)

David Curby, EdD
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International Network of Wrestling Researchers (INWR)

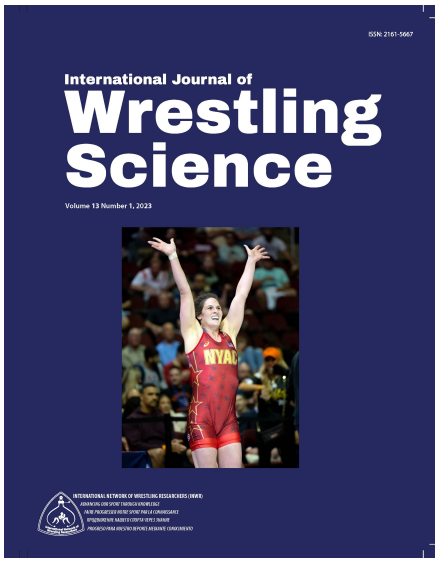
The Annual Compilation of Wrestling Research 2025 is a compilation of published wrestling-related research published during 2023 and is provided by the International Network of Wrestling Researchers (INWR). The INWR is the largest scientific support group for a sport in the world! Our group has grown to over 500 academics, scientists, doctors and wrestling professionals, from 89 countries who are involved with the sport of wrestling. (www.inwr-wrestling.com) Our Mission Statement is:

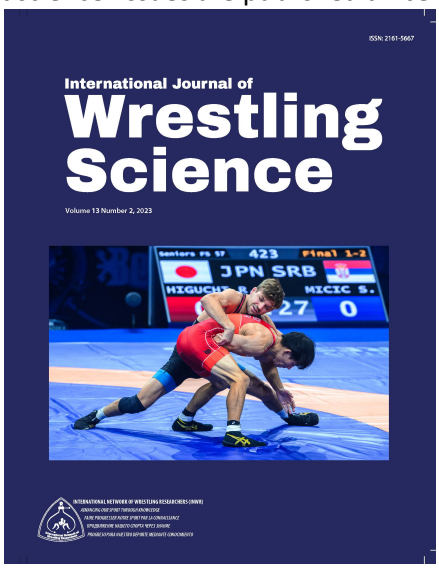
> *The International Network of Wrestling Researchers (INWR) seeks to facilitate the development of wrestling around the world by drawing all wrestling sport science professionals together, in a manner that through our international and intercultural cooperation we are empowered to support the development of wrestling with our research and educational programs.*

We have organized scientific meetings at the senior world wrestling championships and we were instrumental in working with United World Wrestling (UWW) in establishing the Scientific Commission. The INWR sponsors the **Rayko Petrov Award** memorializing the great Bulgarian wrestler, coach and prolific scholar. Each year the INWR names the person to be honored and that person delivers the memorial lecture at the INWR Annual Meeting. The winner for 2025 was Dr. Milorad Dokmanac of Serbia.

The **Young Researcher Award** is also presented to a researcher less than thirty years of age.

We publish the ***International Journal of Wrestling Science*** which is the only journal dedicated to the study of the world's oldest sport. The International Journal of Wrestling Science is a peer reviewed journal for professionals working in wrestling and wrestling sport science. Issues are published twice a year.





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ANNUAL COMPILATION OF WRESTLING-RELATED RESEARCH FOR 2025

Absalyamov, T. and M. Schubert (2025). "Relocate to compete: a critical view on the diaspora of Russian athletes." Front Sports Act Living **7**: 1603414.

> Among the many areas experiencing the growing interplay between geopolitical dynamics and sport is athlete migration and sporting nationality change. These often occur as a reaction to factors such as economic incentives, career prospects, political stability, or personal safety. The current scholarship on this topic is, however, largely underdeveloped. This brief research report critically assesses data on the migration of Russian athletes following the 2022 conflict in Ukraine and related sanctions on Russia. The report reveals that the number of Russian athletes who changed their sporting nationality in order to compete continues to rise, with key sports affected at the moment being chess, figure skating, wrestling, equestrian, auto racing, and soccer. This wave of migration includes both top-level and mid-level athletes, notably featuring six medalists from the 2024 Olympics. The destinations chosen by Russian athletes post-2022 largely align with broader Russian migration patterns, while some also relocated to sporting powerhouses in the Global North. Perspectives on this migration vary depending on stakeholders: state officials stress the investments made in athlete development and call for compensation or loyalty, whereas fellow athletes frame migration as an individual necessity dictated by career prospects and longevity. Athlete migration highlights unique challenges in governance, ethics, and policy-making within sports. Based on our case study, future research directions are outlined to empirically examine the situation through the lens of sports ethics and integrity.

Alpay, M. R., et al. (2025). "Eating disorders and disordered eating on wrestling sport: a systematic review." BMC Nutr **11**(1): 198.

> Although there are studies on the effects of eating disorders (EDs) among athletes, a limited number of studies have been conducted in wrestling. This systematic review aims to identify the prevalence of eating disorders (ED) and disordered eating (DE) in wrestling, which is important for developing healthier weight control behaviours within the sport. A systematic review was conducted following the PRISMA protocol, focusing on publications from the last 10 years. PubMed, Scopus, PsycINFO, SPORTDiscus and Web of Science were used to identify eligible studies with the searching terms "Eating disorders" AND "wrestlers" OR "Eating disorders" AND "wrestling" OR "Disordered eating" AND "wrestlers" OR "Disordered eating" AND "wrestling" OR "Anorexia Nervosa" AND "wrestlers" OR "Anorexia Nervosa" AND "wrestling" OR "Bulimia Nervosa" AND "wrestlers" OR "Bulimia Nervosa" AND "wrestling" within the timeframe from 2014 to 2024. Eight articles met the inclusion criteria. When all studies were considered as a homogeneous group, the analysis revealed: (a) wrestlers are significantly more susceptible to EDs than other branches, (b) wrestlers have unhealthy weight control behaviors to control weight for optimum performance and to enhance their muscular appearance due to body image issues. It is recommended that future research address eating disorders, which have predominantly been studied in male wrestlers, within female wrestlers as well. Additionally, it is advised to identify potential causes contributing to the elevated risk of eating disorders among wrestlers and to develop targeted prevention strategies.

Altulea, A., et al. (2025). "Sport and longevity: an observational study of international athletes." Geroscience **47**(2): 1397-1409.

> The human lifespan is influenced by various factors, with physical activity being a significant contributor. Despite the clear benefit of exercise on health and longevity, the association between different types of sports and lifespan is yet to be considered. Accordingly, we aimed to study this association in a large international cohort of former athletes using a robust linear regression model. We collected data on athletes from public sources, accumulating a total of 95,210 observations, 95.5% of which were accounted for by males. The dataset represented athletes born between 1862 and 2002 from 183 countries across 44 sports disciplines. We calculated the change in lifespan by measuring the difference in age between athletes and the corresponding reference populations, while accounting for variations caused by sex, year of death, and country. The results revealed that various sports impacted lifespan differently, with male athletes being more likely to experience benefits from sports than female athletes. Among male athletes, pole vaulting and gymnastics were linked to the highest extension in lifespan (8.4 years, 95% CI [6.8, 9.9] and 8.2 years, 95% CI [7.4, 9], respectively), while volleyball and sumo

wrestling were the most negatively associated with lifespan (- 5.4 years, 95% CI [- 7, - 3.8]; - 9.8 years, 95% CI [- 11, - 8.6], respectively). The association between lifespan and popular team sports in males was positive for cricket, rowing, baseball, water polo, Australian rules, hurling, lacrosse, field hockey, minimal for rugby, canoeing and kayaking, basketball, gridiron football, and football (soccer), and negative for handball and volleyball. Racquet sports (i.e., tennis and badminton) exhibited a consistent and positive association in both male and female athletes, as shown by an extended lifespan of up to 5.7 years in males (95% CI [5, 6.5]) and 2.8 years in females (95% CI [1.8, 3.9]). Although lacking conclusive evidence, we theorize that the observed results may be attributed to the aerobic and anaerobic characteristics of each sport, with mixed sports yielding the maximum benefits for the lifespan. While results from female athletes should be cautiously interpreted, our study highlights the complex interplay between sports and lifespan and contributes to the growing body of knowledge on the multifaceted relationship between physical activity and human longevity.

Editor's Note: No strong associations with lifespan were observed for table tennis, curling, football, **wrestling**, bobsledding

Ashtary-Larky, D., et al. (2025). "Creatine Supplementation in Combat Sport Athletes: A Narrative Systematic Review." J Diet Suppl **22**(6): 844-869.

Creatine is a widely studied ergogenic aid known for its effects on muscle performance and body composition. However, its impact or utility for athletes involved in combat sports, who often aim to reduce body mass to meet a specific weight class, remains unclear. To conduct a narrative systematic review of peer-reviewed published studies that examined the effects of creatine supplementation on body mass, body composition, muscular strength, power, endurance, fatigue, recovery, and cognitive performance in combat sport athletes. A comprehensive search was conducted in multiple public databases up to March 2025. Databases searched included PubMed, Scopus, Web of Science, and Google Scholar. Studies evaluating creatine supplementation in combat sports (eg wrestling, judo, taekwondo, boxing) were included. Outcomes assessed included changes in body mass and body composition, performance metrics, and markers of fatigue and recovery. Nineteen studies met the inclusion criteria. Creatine supplementation increased body mass, especially during longer-term interventions (≥6 wk) or when combined with structured resistance training. Creatine supplementation also increased measures of body mass and fat-free mass (FFM). Muscular power and maximal strength outcomes improved significantly after creatine supplementation, particularly in studies utilizing short-duration, high-intensity exercise protocols. Creatine supplementation did not influence measures of sport-specific endurance, recovery or fatigue. No serious adverse effects were reported across studies for creatine supplementation. Creatine supplementation enhances body mass, FFM, muscle strength and power in combat sport athletes. Given its safety and efficacy profile, creatine supplementation remains a promising supplement for supporting some aspects of athletic performance in combat sports.

Bagot, S., et al. (2025). "Appetite-Control and Eating-Behavior Traits Might Not Be Impacted by a Single Weight-Cycling Episode in Weight-Cycling Athletes: Results of the Wave Study." Int J Sports Physiol Perform **20**(3): 372-384.

PURPOSE: The impact of weight cycling (WC)-successive weight loss (WL) and weight regain (WG)-on athlete performance is well documented, but effects on appetite are not. This study assessed the impact of a WC episode on dietary and appetitive profiles in athletes, considering sex and sport type. METHODS: Athletes (28 male, 20 female) from combat (n = 23), strength (n = 12), and endurance (n = 13) sports participated in 3 conditions during a WC episode (baseline, WL, WG). Measurements included body composition (dual-energy X-ray absorptiometry), energy intake (48-h food record), appetite (visual analog scale), dietary profile (questionnaires), and food reward (computer task). RESULTS: Overall, athletes lost 4.4% (2.3%) of their body weight and regained 4.5% (2.9%) ($P < .001$). Energy intake decreased during WL ($P < .001$) with a higher protein intake (% of energy intake) before returning to baseline in WG ($P > .05$). WL increased hunger, prospective food consumption, and desire to eat compared with the baseline condition, but these changes were not seen in WG. Liking and wanting for fat and sweet foods were higher during WL and remained elevated in WG ($P < .05$). No eating disorders were found during the WC episode, but combat-sport athletes and females had a higher binge-eating risk than others, independent of the condition. CONCLUSIONS: Moderate WC episodes do not seem to impair appetite responses in athletes experienced with WC, likely due to their maintaining high physical activity levels. However, their long-term eating-behavior traits, especially in combat and female athletes,

seem negatively affected. Practitioners should consider the long-term impacts of these WC practices on nutritional health.

Bagot, S., et al. (2025). "THE TYPE OF SPORT, BUT NOT SEX, IMPACTS BODY COMPOSITION AND METABOLIC RESPONSE TO A COMPLETE WEIGHT LOSS - WEIGHT REGAIN EPISODE IN WEIGHT CYCLING ATHLETES. RESULTS FROM THE WAVE STUDY." Appl Physiol Nutr Metab.

Athletes may engage in weight cycling -successive episodes of weight loss and weight (re)gain-for performance reasons, but risk metabolic adaptations and regaining more fat that was lost (fat overshoot). This study aimed to assess the influence of a complete weight cycling episode on body composition, thermoregulation, and metabolism in athletes, considering sex and the type of sport practiced. 48 athletes (28 males, 20 females) engaged in combat (n=23), strength (n=12), or endurance (n=13) sports were examined under 3 experimental conditions (weight maintenance, weight loss, weight (re)gain) during a weight cycling episode using their habitual strategies. Body composition (dual-energy X-ray absorptiometry), core body temperature (telemetric temperature sensor), energy expenditure and substrate oxidation at rest and during moderate exercise (indirect calorimetry), and energy intake (48h-food record) were assessed. Overall, athletes lost 4.4±2.3% body weight, 12.2±10.6% fat mass, and 2.6±2.3% fat-free mass ($p<0.001$). All variables returned to baseline values during the regain period, and a higher fat mass regain was observed in endurance than combat athletes ($p<0.01$). During weight loss, a transient increase in lipid and decrease in carbohydrate oxidation occurred at rest and during exercise ($p<0.001$). Energy expenditure and core body temperature remained unchanged across the 3 experimental conditions, and no specific sex effect was observed. Overall, no apparent body weight nor fat overshoot was observed in athletes after a complete weight cycling episode. Nonetheless, the greater fat mass gain in endurance, compared with combat athletes, highlights a need for further specific long-term studies in this population.

Barley, O. R. and C. A. Harms (2025). "Rapid Weight Loss Across Combat Sports and the Relationships Between Methods and Magnitude." Transl Sports Med **2025**: 2946317.

This study examined rapid weight loss (RWL) habits across combat sports (CS) and how common usage of different methods was related to the magnitude of RWL. Competitors (N = 256) from CS including boxing, Brazilian jiu-jitsu, muay thai/kickboxing (MT/KB), wrestling, mixed martial arts (MMA), judo, taekwondo, and karate participated in the study. Athletes completed an online survey which included questions on their regular weight loss habits, including magnitudes of weight loss over different time periods and types of methods utilised. Athletes typically started losing weight in their early 20s and engaged in RWL on average three times a year. Magnitudes of weight loss were greater in MT/KB and MMA than other CS examined (d between 0.63 and 1.54). Wrestlers demonstrated higher prevalence of skipping meals or fasting than other CS (d between 0.7 and 1.29). Athletes at higher competitive levels engaged in larger magnitudes of RWL (d between 0.49 and 0.57). The usage of methods of body fluid manipulation such as fluid restriction, water loading, and sauna were associated with greater amounts of weight loss within 2 weeks and 24 h of weighing in (d between 0.36 and 0.45). Findings indicate that larger weight cuts are linked to strategies involving higher risk, such as sauna, and may be more common among athletes who begin RWL practices at a younger age. Use of certain high-risk methods were associated with increased likelihood of disordered eating behaviours. To reduce reliance on these practices, practitioners and regulators should emphasise the use of smaller weight cuts and to begin losing weight further out from competition.

Bayati, R., et al. (2025). "Effects of the wrestling + injury prevention program in freestyle wrestlers: a two-arm randomized controlled trial." J Orthop Surg Res **20**(1): 486.

BACKGROUND: To assess the effectiveness of the Wrestling + injury prevention program on incidence of injuries, neuromuscular mechanisms and dynamic balance of freestyle (FS) wrestler. METHODS: The participants of this study consisted of FS wrestling players in Qom province (Iran). A total of 80 participants were assigned to this study and using simple and random method with computer divided into experimental (EXP, n = 40) and control (CON, n = 40) groups. The groups were blinded against each other. The follow-up period was one season (6 months). EXP replaced their warm-up by Wrestling + program. CON performed a standard warm-up program. The primary outcome was the injury incidence density (injuries per 1000 h of wrestling exposure), compared between groups by incidence rate ratios (RR). Also, the secondary outcome was neuromuscular mechanisms and dynamic balance.

RESULTS: The per-protocol analysis showed a reduction of the overall injury incidence density in the EXP group by 58% compared to the CON group. Additionally, within-group analyses revealed significant improvements in neuromuscular mechanisms and dynamic balance for both the EXP and CON groups following 24 weeks of warm-up programs ($p < 0.05$). Furthermore, between-group comparisons indicated significant differences favoring the EXP group relative to the CON group ($p < 0.05$). CONCLUSION: The Wrestling + program is effective in reducing injuries among FS wrestlers with overall injuries reduced by 58%. Moreover, the results indicate that the Wrestling + program is more effective than traditional warm-up routines in improving neuromuscular mechanisms and dynamic balance among FS wrestlers. Therefore, it is recommended that coaches use a Wrestling + program to reduce the incidence of injury in FS wrestlers.

Beinabaji, H., et al. (2025). "Double-leg attack vs. arm-drag: Examining muscle synergy consistency between elite and sub-elite freestyle wrestlers." Journal of Biomechanics **183**: 112637.

The ability to execute coordinated muscle contractions has significant implications for wrestlers` performance. The skill level of the individual and the type of technique chosen may influence their success in wrestling. The purpose of this study was to investigate the effect of wrestler skill level (elite vs. sub-elite) on the consistency of muscle synergies during the execution of the Double-Leg Attack and Arm-Drag techniques in freestyle wrestling. Thirty-four male junior wrestlers, classified as either elite (n = 17) or sub-elite (n = 17), participated in the study. Surface electromyography (EMG) recordings from five upper limb muscles were used to extract muscle synergies via Non-negative Matrix Factorization (NMF). Synergy consistency was assessed using Cosine Similarity (CS) analysis. A significant interaction effect was found between skill level and technique type on the consistency of the first muscle synergy ($p = 0.05$), with the Elite group demonstrating greater spatio-temporal synergy consistency compared to the Sub-elite group during the execution of the Double-Leg Attack technique. Elite wrestlers also demonstrated higher temporal consistency in the middle and explosive phases of both techniques. The Double-Leg Attack technique showed more consistent muscle activation patterns than the Arm-Drag, regardless of skill level. These findings suggest that a wrestler`s training experience and skill level significantly influence their ability to effectively execute wrestling techniques by optimizing neuromuscular control strategies. Sport medicine practitioners and athletic trainers may consider monitoring alterations in the muscle synergy components throughout training and rehabilitation programs. This approach could provide a means to objectively assess and benchmark changes in neuromuscular coordination.

Bossung, H., et al. (2025). "Change in mitochondrial capacity in elite triathletes, cyclists, and wrestlers over a training period of 28 days." Eur J Appl Physiol.

PURPOSE: This study investigated the change in mitochondrial capacity and VO(2)max in elite triathlon, cycling, and Greco-Roman wrestling athletes over a 28-day training period. METHODS: Sixteen elite athletes (23 ± 2.5 years; 176 ± 6 cm; 76 ± 8 kg; 65 ± 6.9 ml/min/kg) participated. Mitochondrial capacity was assessed before (pre) and after (post) a 28-day training period by measuring the increase in deoxygenated hemoglobin (HHb) in the m. vastus lateralis during three consecutive one-minute rapid cuff occlusion periods using near-infrared spectroscopy. VO(2)max was measured via a treadmill ramp test at the same time points. RESULTS: The analyses revealed significant differences between pre- and post-measurements, with significant improvements in the second ($\Delta\tau 2 = -3.4 \pm 2.7$ s, $p = 0.001$) and third ($\Delta\tau 3 = -5.0 \pm 5.1$ s, $p = 0.006$) occlusion period. Correlation analyses demonstrated a moderate negative relationship between the first occlusion tau (τ) rate and VO(2)max at pre-test ($r = -0.58$, $p = 0.02$) and an even stronger negative correlation at post-test ($r = -0.62$, $p = 0.01$). Within-subject analysis identified 14 athletes as responders. CONCLUSION: The changes in τ rates indicate significant improvements in mitochondrial capacity over a period of 28 days in elite athletes, underscoring the utility of NIRS-derived τ rates for monitoring changes in elite athletes.

Bulgay, C., et al. (2025). "Genome-Wide Association Study of Exercise Addiction Among Elite Wrestlers." Brain Sci **15**(2).

BACKGROUND: Exercise addiction, marked by an inability to control exercise and associated with distress that clinically impairs daily activities, is a significant but underrecognized issue in physical activity and health. While its physiological, psychological, and behavioral aspects have been studied, the genetic basis of exercise addiction remains poorly understood, requiring further investigation. The present study conducted a genome-wide association study of exercise addiction among elite Turkish wrestlers.

METHODS: The sample comprised 67 male wrestlers (34 freestyle wrestlers and 33 Greco-Roman wrestlers). Exercise addiction was assessed using the Exercise Addiction Scale. Whole-genome genotyping was performed using DNA microarray. RESULTS: Using a genome-wide approach ($p < 1.0 \times 10(-)^{5}$), we identified six suggestively significant single-nucleotide polymorphisms (SNPs) associated with exercise addiction status. Of these, the high-addiction alleles of five SNPs (PRDM10 rs74345126, near PTPRU rs72652685, HADHB rs6745226, XIRP2 rs17614860, and near GAREM2 rs1025542) have previously been associated with an increased risk of mental health disorders such as anxiety and depression or higher levels of physical activity. We also examined potential associations between the genetic markers previously linked to addiction-related traits such as obsessive-compulsive disorder and cigarette smoking, and personality traits linked to negative emotions including neuroticism. Using this candidate gene approach ($p < 0.05$), we identified three additional SNPs associated with exercise addiction in the same direction of association (DEFB135 rs4841662, BCL11A rs7599488, and CSRNP3 rs1551336). CONCLUSIONS: The present study provides preliminary evidence for the genetic basis of exercise addiction, highlighting specific SNPs that may play a role in the development of this condition among elite wrestlers.

Carvajal-Veitía, W., et al. (2025). "Anthropometric characteristics and body composition changes in a five-time Olympic champion in Greco-Roman wrestling: A longitudinal case study towards the Paris 2024 Olympic Games." Journal of Functional Morphology and Kinesiology **10**(2): 176.

Purpose: This case study examines the anthropometric characteristics and body composition changes of a 41-year-old Cuban Greco-Roman 130 kg wrestler, a five-time Olympic gold medalist (2008-2024). To optimize his preparation for the Paris 2024 Olympic Games, another athlete participated in the qualifying process, allowing him to train without competition gear. Methods: The study monitored changes in body composition using anthropometry and bioelectrical impedance analysis (BIA) at three key time points in 2024: January, June, and July. The final assessment occurred 25 days before the Olympic event, coinciding with the final phase of his preparation. Results: The analysis revealed a significant reduction in total body mass, from 150 kg in January to 138.5 kg in July, with fat mass decreasing from 37.06 kg (24.11%) to 29.7 kg (21.5%). Muscle mass decreased slightly (77.41 kg to 72.3 kg), while bone mass remained stable. The somatotype classification was endomorphic-mesomorphic at all assessments, with slight shifts in its components (4.6-10.4-0.1 in January to 4.4-10.3-0.1 in July), reflecting an improved muscle-fat ratio. Notably, hydration levels and cellular integrity remained stable, as indicated by BIVA analysis. Conclusions: This study provides insight into the anthropometric characteristics and body composition of an elite Greco-Roman wrestler, as well as the changes observed during his preparation for his final Olympic participation. These data serve as a valuable reference for wrestlers and sports professionals, highlighting the physical profile of one of the most emblematic figures in Olympic history.

Coutiño Díaz, M., et al. (2025). "Evidence-based supplementation strategies for wrestlers: a systematic review." Current Nutrition Reports **14**: 86.

Background: Wrestling is a popular combat sport that requires muscular strength, power, agility, and endurance. Weight classes have motivated wrestlers to compete at a lower weight to optimise power-to-weight ratio and performance. To achieve these characteristics, athletes may use dietary supplements, however, their efficacy in wrestlers has not been systematically evaluated. Objective The purpose was to systematically review the literature to determine the efficacy of dietary supplements to improve body composition, physiological status, and performance in wrestlers. Methods A systematic search was conducted in PubMed, ProQuest Medline, Web of Science, Cochrane Library, and Scopus on the 21st of January 2024 and updated on the 6th of January 2025. Studies were included if the participants were healthy wrestlers ingesting any type of dietary supplement in comparison to a control. Data associated with intervention type and characteristics, target populations, outcomes, and analysis methods were extracted. Results A total of 24 eligible original articles were included that assessed various supplementation strategies on body composition, exercise performance, and metabolic markers in wrestlers. Individual studies revealed significant effects of sodium citrate, creatine monohydrate, spirulina, green tea and oolong tea extracts, and branched-chain amino acids on body mass or composition. ß-Hydroxy-ß-methylbutyrate (HMB-FA), creatine monohydrate, and iron supplementation improved recovery and may improve exercise performance. Beet-root juice supplementation enhanced muscular strength and balance. BCAA supplementation produced mixed results on muscle damage biomarkers and performance, while sodium citrate, creatine, and spirulina can act as buffering agents. Thyme tea appears to improve antioxidant capacity. Conclusions Overall, individual studies show some promise for several

dietary supplements to alter body mass and body composition, improve exercise recovery and performance, delay fatigue, and modify serum biomarkers; nevertheless, effect sizes were often small, and results were often mixed.

Curby, D. G., Dokmanac, M. (2025). "AN OBJECTIVE METHOD TO IDENTIFY THE MOST OUTSTANDING WRESTLER IN A COMPETITION." Int J Wrestling Sci **15**(2): 40-43.

Demirkan, E., et al. (2025). "Does the inspiratory muscle warm-up have an acute effect on wrestling recovery performance?" PLOS ONE **20**(2): 0316821.

This study aims to investigate the acute effects of inspiratory muscle warm-up (IMW) in young wrestlers. Wrestling is a high-intensity sport that demands anaerobic metabolism, with rapid recovery and endurance playing crucial roles in subsequent performance. Inspiratory muscle warm-up specifically targets the inspiratory muscles, reducing fatigue during exercise and helping to sustain performance. Our study compares three different warm-up protocols (traditional wrestling warm-up, wrestling warm-up (WWIW) + IMW, and wrestling warm-up + placebo (WWPL)) to analyse changes in inspiratory muscle strength and select respiratory function parameters. The study was conducted with 14 male wrestlers aged 15-16. Participants were subjected to the three different warm-up protocols, followed by simulated wrestling bouts. Results showed that the WWIW protocol increased maximal inspiratory pressure by 17.3% compared to the traditional and placebo warm-ups. Additionally, the WWIW protocol delayed fatigue and improved recovery rates among the wrestlers. Specifically, WWIW enabled a faster return to normal heart rate post-competition, accelerating the recovery process. These findings suggest that WWIW can be effectively used in high-intensity sports like wrestling to enhance recovery between matches and improve overall performance. Further studies with larger sample sizes and in different sports are recommended to validate these results.

Demirkiran, B., Işın, A., Sungur, Y., Melekoğlu, T. (2025). "The impact of 8-week re-training following a 14-week period of training cessation on Greco-Roman wrestlers." PLOS ONE **20**(6): e0326731.

Background This study aimed to examine the changes in physical and physiological conditions in elite wrestlers from the Turkish National Wrestling Team, who experienced 14 weeks of restricted physical activity during the COVID-19 lockdown, followed by an 8-week period of retraining and competition. Methods Twenty male elite wrestlers from the National Greco-Roman Wrestling Team participated in the research. Heart Rate Variability values were measured during the training cessation period and for 8 weeks of subsequent training and then interpreted for training periods with different workloads. Body fat percentage values, initially measured during training cessation, were recorded at 2-week intervals during the training period. To determine the fitness status of wrestlers, the Specific Wrestling Fitness Test was used before and following the 8 weeks of training period. Results A gradual decrease in both body fat percentage and weight was observed throughout the course of the training period. The SWFT scores showed significant improvements (31.40 ± 2.91 vs. 37.40 ± 3.22) following the training period. Heart rate variability decreased during the detraining period, progressively improved throughout the 8-week retraining, and subsequently declined during the competition phase, reaching levels similar to those observed during training cessation. Conclusions Our results suggest that athletes undergo identical reactions in their autonomous nervous system during both competition and training cessation period. Obtaining a comprehensive understanding of these changes can enable coaches and athletes to make accurate decisions in order to optimize training adaptations and attain overall athletic success. Furthermore, over a period of eight weeks following a long non-training period, significant improvements in athletes` body fat, muscle mass and wrestling performance can be achieved along with training. Moreover, HRV monitoring revealed that autonomic nervous system balance was compromised during both the 14-week detraining and the subsequent competition phases, underlining the need for careful training load management to optimize recovery and performance readiness.

Dokmanac, M. (2025). "Analysis of the Polyák Imre & Varga János memorial Ranking Series Tournament Budapest 2025 - implications for rules." INTERNATIONAL JOURNAL OF WRESTLING SCIENCE **15**(1): 17-27.

This analysis compares the application of new rules at the European Senior Championship (Bratislava, April 2025) and the IV Ranking Series Tournament (Budapest, July 2025). In both events, under GR style, if a match ended 1-1, the wrestler who scored first was declared the winner. The International Rules of Wrestling for these two events remain unchanged. Judges awarded 1 point for the first and second

passivity; after the third, only the active wrestler could choose to continue in parterre or standing position, with no additional points given. For this analysis, three European Championships from 2022 to 2024 were reviewed, all using the rule that in a 1-1 tie, the wrestler who scored last wins: 2022 European Senior Championship - Budapest (HUN) 2023 European Senior Championship - Zagreb (HR) 2024 European Senior Championship - Bucharest (ROU) Two additional competitions used a modified rule where, in a 1-1 tie, the wrestler who scored first prevails.

Donmez, E., et al. (2025). "Fluctuation in body composition and urine specific gravity of Turkish wrestlers in a top-level official wrestling competition." Frontiers in Physiology **15**: 1516149.

Purpose: This research aimed to examine the fluctuations in body composition and Urine-Specific Gravity (USG) of elite wrestlers in a high-level official wrestling competition. Method: Thirty-one wrestlers in the Türkiye Senior Greco-Romen Wrestling national team participated in this research. Wrestlers were divided into weight loss and non-weight loss groups, and changes in their body composition and USG were measured at three different times (beginning of the camp, weigh-in, and before the competition). The duration between the beginning of the camp and the competition weigh-in time was considered as a dehydration process and the duration between the competition weigh-in time and before the competition was regarded as a rehydration process. In the data analysis, 3 × 2 repeated measures ANOVA was used. Results: It was determined that during the dehydration process of wrestlers who lost weight, there was a decrease of 4.02%, 2.50%, 14.62%, and 2.66% in body weight, FFM, FM, and TBW, whereas, during the rehydration process, there was a gain of 1.85%, 1.77%, 2.63%, and 1.87%, respectively. In addition, it was determined that wrestlers who lost weight had a 0.87% increase in USG during the dehydration process and a 0.41% decrease in the rehydration process. The results show that wrestlers cannot regain body weight and FM lost in the hydration fluctuation during a competition, but they can regain FFM, TBW, and USG. However, although it was determined that the wrestlers were statistically able to regain FFM, TBW, and USG, they could not return to the levels at the beginning of the camp. Conclusion: It was determined that before a high-level official wrestling competition, wrestlers still preferred weight loss practices and it was determined that they were exposed to fluctuations in their body composition and USG. It is thought that this result may negatively affect the wrestlers` health and competition performance during a high-level competition.

Durukan, E., et al. (2025). "Comparison of the acute effects of static and dynamic stretching exercises on the balance performance of Turkish wrestlers." BMC Sports Sci Med Rehabil **17**(1): 242.

BACKGROUND: The importance of dynamic and static stretching exercises on motoric abilities before an athletic performance is well known. However, there is limited information about their effects on balance performance. For this reason, this study aimed to investigate the acute effects of static and dynamic stretching exercises on wrestlers' balance performance and compare wrestlers' balance levels according to their wrestling styles. METHOD: A total of 28 wrestlers who performed dynamic stretching (n = 14) and static stretching (n = 14) protocols voluntarily participated in the study. Data were collected using Togu Challenge Disc 2.0. An independent samples t-test was applied to compare the data that were determined to show normal distribution. RESULTS: When comparing dynamic balance according to warm-up protocols, it was found that there was a significant difference in favor of wrestlers who performed dynamic stretching ($p = 0.023$). However, no statistically significant difference was found between static and dynamic stretching groups in terms of static balance ($p = 0.238$). Additionally, while a significant difference was observed in the wrestlers' dynamic balance scores in both dynamic and static stretching exercises in favor of freestyle wrestlers ($p = 0.008$; $p = 0.022$), a significant difference was found in static balance scores in favor of Greco-Roman wrestlers ($p = 0.014$; $p = 0.018$). CONCLUSION: Dynamic stretching exercises were found to support wrestlers' balance performance more than static stretching. The results showed that the different warm-up protocols applied before training and competition can have different effects on the wrestlers' performance. Therefore, it is suggested that wrestlers should prefer warm-up protocols including dynamic stretching exercises to optimize pre-performance balance outcomes.

Esfandiarian-Nasab, K., et al. (2025). "Skill Differentiation in Wrestling: Relationship Between Muscle Complexity and Local Dynamic Stability in Neuromuscular Control." Journal of Motor Behavior: 1-16.

Complexity and local dynamic stability (LDS) of electromyographic (EMG) signals are valuable indicators for understanding motor control mechanisms and distinguishing skill levels in dynamic sports such as

wrestling. This study investigates the relationship between complexity and LDS of EMG signals to understand the neuromuscular mechanisms underlying skill differentiation in wrestling. The complexity [using the Higuchi fractal dimension (FD)] and LDS [using the largest Lyapunov exponent (LLE)] activity of the upper limb muscles were calculated in elite and sub-elite wrestlers (N=72) during the arm-drag and double-leg attack techniques. The correlation between complexity and LDS was evaluated using Pearson's correlation coefficient, and random forest analysis was used to determine their importance in differentiating skill levels. Elite wrestlers showed higher complexity, LDS, and correlation between complexity and LDS in EMG signals than sub-elite wrestlers. Random forest analysis showed that complexity is more important than LDS in differentiating skill levels. The findings show that training programs should be designed according to athletes? skill levels. Training programs should adopt a phased approach, initially targeting LDS and motor control and integrating complex exercises to promote adaptability and variability in motor responses. This approach can help athletes improve their motor control and achieve higher skill levels.

Esfandiarian-Nasab, K., et al. (2025). "Unraveling chaotic motor patterns of elite and sub-elite wrestlers in snap-down technique using multidimensional recurrence quantification analysis of muscle activity." Comput Biol Med **196**(Pt A): 110673.

Success in competitive sports depends on athletes' ability to consistently perform complex motor patterns, requiring both stability and adaptability. Rapid adjustments are crucial in freestyle wrestling because of unpredictable opponent actions. Previous research has noted elite wrestlers' adaptability, but traditional linear analyses miss the chaotic, nonlinear dynamics of these movements. This study used multidimensional recurrence ruantification analysis (MDRQA) to explore repeatability, stability, and adaptability in recurrent patterns of neuromuscular coordination among elite and sub-elite wrestlers. Electromyography (EMG) signals from the triceps, biceps, anterior deltoid, and latissimus dorsi in the dominant upper limb were recorded during seven successful snap-down techniques. Determinism (%DET) and laminarity (%LAM) assessed repeatability and stability, whereas the entropy of diagonal (EntL) and vertical (EntV) recurrence patterns measured the complexity and adaptability. Elite wrestlers showed significantly higher %DET and %LAM values, indicating greater motor pattern consistency. Higher EntL and EntV values demonstrate increased complexity and adaptability in neuromuscular control, suggesting the use of chaotic dynamics for optimal performance. This study highlights the importance of nonlinear approaches, such as MDRQA, in understanding athletes' motor control. These insights can inform training programs to enhance athletes' consistency, adaptability, and complexity, ultimately improving their performance in unpredictable environments.

Franchini, E. and M. Takito (2025). "Post-activation Performance in Combat Sports." Exercise Science **34**: 376-387.

Post-activation performance enhancement (PAPE) strategies have been investigated to acutely improve muscle power in combat sports. These strategies involve a conditioning activity followed by a power-related or sport-specific task. This narrative review synthesized studies on PAPE in unarmed combat sports, emphasizing performance outcomes relevant to striking and grappling disciplines, considering sport-specific tasks. In striking sports, effectiveness depends on the conditioning activity, recovery interval, and task specificity. In boxing, velocity-loss resistance protocols may enhance punching force and speed. For kicking actions, squats, plyometrics, and resisted kicking have produced acute benefits, especially with recovery intervals of 3–10 minutes. Research in taekwondo is extensive, indicating that both plyometric drills and repeated sport-specific techniques can acutely enhance repeated-effort and agility performance, with shorter intervals favoring plyometrics and longer intervals supporting high-intensity techniques. In grappling sports, research has primarily examined judo. Conditioning activities such as broad jumps, resistance band pulls, and contrast exercises consistently improved performance in the Special Judo Fitness Test, particularly in the first set, even with minimal recovery intervals. Overall, evidence suggests that coaches should prioritize conditioning activities that replicate the biomechanical and metabolic demands of the target task and carefully manipulate recovery intervals to optimize potentiation while minimizing fatigue.

Friesen, K. B., et al. (2025). "A Look "Inside" the Sport of Wrestling: Examination of Head Acceleration Events and Mechanisms in Female High-School Wrestlers Using Instrumented Mouthguards." Ann Biomed Eng **53**(5): 1247-1256.

PURPOSE: To characterize true-positive head accelerations events (HAEs) captured with instrumented mouthguards (iMGs) in high-school female wrestlers using video-verification during matches and to measure players' perceptions of iMG use. METHODS: Thirty female high-school wrestlers (ages 16.4 ± 0.8 years) from 6 Canadian high schools wore Prevent boil-and-bite iMGs® during a total of 248 video-recorded player-matches. HAEs were identified during matches using Dartfish video analysis and match characteristics (periods of play, offensiveness, move type) were coded per HAE. The rate of HAEs was estimated and a multilevel multivariable analysis fitting all factors was employed to characterize the magnitude of velocities and accelerations. RESULTS: 1313/1414 acceleration events accumulated during match events and above an 8 g threshold were labeled as true-positive (TP) HAEs (93%). Most HAEs occurred in matches with two periods and when the iMG player was engaged in neutral play (neither offensive or defensive). Most HAEs occurred during hand fighting (57.3% of all TP HAEs), followed by ground moves (13.8% of all TP HAEs), and takedowns (10.1% of all TP HAEs). Multivariable models showed offensive moves report higher magnitude peak velocities than during neutral moves. Ground moves, takedowns, and other moves showed higher peak velocities than during hand fighting. Headbutting and takedowns displayed higher peak accelerations than during hand fighting. Players' overall perception of iMG use was positive (comfort rating 0-10 scale: median 7.5; IQR 1.0). CONCLUSION: HAEs occur most during the first period of matches, tournaments, and hand fighting followed by high-intensity moves, such as ground moves and takedowns.

Friesen, K. B., et al. (2025). "Head Acceleration Events Sustained During High School Wrestling Matches: Grappling With Differences Between Male and Female Adolescents." J Appl Biomech **41**(6): 477-484.

Wrestling is a popular high school sport despite high injury and concussion rates. Instrumented mouthguards can reliably measure head acceleration events (HAEs) accrued by wrestlers and may highlight potential sex differences; important considering the higher concussion rates among female athletes. The purpose of this study was to measure HAEs accrued in high school wrestling matches and compare frequency, magnitude, and head impact location between female and male wrestlers. Forty-five (16.5 [0.8] y) wrestlers (20 females; 25 males) wore instrumented mouthguards during high school matches. A total of 2843 (857 females; 1986 males) HAEs above an 8g trigger threshold from 452 player-matches were video verified. Results indicate that males accrue 30% higher HAE count per match (mean frequency = 6.9 HAEs/match) compared to females (mean frequency = 5.3 HAEs/match) (IRR = 1.297; 95% confidence interval, 1.051-1.594). Results also show females and males have similar HAE biomechanics including peak linear acceleration, angular velocity and acceleration, change in angular velocity in all planes, and impulse duration. Finally, females accrue 50% more head impacts high and to the right side of the head than males (IRR = 1.499; 95% confidence interval, 1.053-2.137). Higher HAE match counts for male wrestlers and varied impact locations highlight varied wrestling HAE mechanisms for female and male adolescent wrestlers and potential sex-specific HAE and concussion prevention strategies.

Fujiyama, K., et al. (2025). "Bridging the gap: Awareness, needs, and impact of technical reports in Japanese Women`s Wrestling - Insights from Olympic Gold Medalists and National Coaches." Ido Movement for Culture. Journal of Martial Arts Anthropology **25**(1): 47-58.

Background. This study focuses on the use of Technical Reports (TRs) in wrestling - documents that synthesize research insights relevant to enhancing athletic performance. Despite their potential value, the utilization and awareness of TRs among athletes and coaches remain unclear. Problem and aim. The researchers aimed to evaluate the awareness, usage, and effectiveness of TRs among elite Japanese women wrestlers and their coaches. They also sought to explore how athletes and coaches perceive their own wrestling styles. Material and methods. Semi-structured interviews were conducted with six participants - three Olympic Gold Medalist wrestlers and three national coaches - to gather insights about their awareness and use of TRs and their perceptions of effective wrestling styles. Results. Results revealed that none of the participants were aware of TRs, but expressed interest in using them for various purposes such as generating practice schedules and in-game tactics, after being introduced to the concept. Wrestlers showed a greater focus on technique in wrestling styles, while coaches stressed the mental aspects. Conclusions. This study uncovers that Technical Reports (TRs) are underutilized in

Japanese women`s wrestling due to unrecognized potential and lack of awareness. It shows contrasting emphasis on wrestling styles, with the athletes prioritizing technique and the coaches prioritizing mental aspects. The findings call for the creation of TRs that align with user needs and incorporate diverse perspectives to prevent discrepancy between their intended and actual impacts.

Gawrys, S. P., et al. (2025). "Youth Ages 4 to 13 Trends of Sports Concussions With Loss of Consciousness From 2014-2023 National Electronic Injury Surveillance System." Orthop J Sports Med **13**(8)

BACKGROUND: Sports-related concussions are a public health crisis of serious concern among youth athletes. Loss of consciousness (LOC) is a particularly concerning sequela of concussions, causing detrimental long-term effects. PURPOSE: To utilize National Electronic Injury Surveillance System (NEISS) data from 2014 to 2023 to track the incidence of LOC and concussions in youth athletes ages 4 to 13 years in the United States. STUDY DESIGN: Descriptive epidemiology study. METHODS: NEISS search criteria were entered filtering all concussions and LOC in children ages 4 to 13 years from the years 2014 to 2023 who were filed under the sport tags of football, basketball, baseball, softball, soccer, gymnastics, hockey, wrestling, and lacrosse. Linear regression, analysis of variance (ANOVA), and proportion tests were utilized. RESULTS: In total, 554 (6.30% of 8828) concussions resulted in LOC in the entire 2014-2023 cohort (excluding 2020-2021). The frequency of players experiencing LOC from 2014 to 2023 showed an overall downward trend, with a trendline R value of 0.9114. Football, basketball, soccer, and baseball were the top 4 LOC-producing sports (n = 9) from 2014 to 2023. ANOVA single-factor analysis produced a P value of .0069 between the sports. Wrestling reported the highest overall rate of LOC per concussion from 2014 to 2023, with 24 reported incidences of LOC compared with 216 reported concussions (11.11%). Proportion test analysis of wrestling indicated a statistically significant difference from the mean of the other sports (6.0%) through the years 2014-2023 with a P value of .0059. CONCLUSION: The results of this study show a decrease in the overall level of LOC incidence in US youth athletes ages 4 to 13 years from 2014 to 2023 across 8 sports. The data delineate from previous studies that show an exponential increase in LOC incidence; however, the underlying reasons are still unclear and warrant further investigation. Further investigation into the reasoning behind these epidemiological trends could help build an understanding of these findings and reduce the injury burden on youth athletes.

Geghamyan, V., et al. (2025). "The Impact of Competitive Regulatory Changes on Psychological Indicators Ensuring the Efficiency of a Wrestler’s Performance." Physical Education Theory and Methodology **25**(3): 668-674.

The study attempts to reveal those psychological leading indicators that have emerged as a consequence of the recent regulatory changes in wrestling, which can ensure stable and high competitive results. Objectives This study aimed to identify the primary psychological factors that ensure the stability of a wrestler’s high competitive results and to characterize the specifics of their manifestations, as influenced by the regulatory requirements. Materials and methods. To organize the research process more effectively, modern advanced sensory technologies, tests, questionnaires, observations, and mathematical statistical methods were used. All of these techniques have proven to be of practical significance in sports psychology. The study was conducted among 33 highly qualified wrestlers from the national team of the Republic of Armenia (winners and medalists of World, European, and International Competitions). Results. The comparative analysis of the research results revealed the leading psychological indicators that ensure the effectiveness of wrestlers’ competitive performance under previous and current regulatory requirements. The study also interpreted the reliable interrelationships of these indicators with mental states, various stress factors, individual personality traits, and psychomotor abilities. Conclusions. In modern wrestling, the effectiveness of technical and tactical preparation is realized through the patterns of interconnected manifestations of psychomotor indicators, whereas in the past, manifestations of the emotional sphere prevailed, which have undergone significant transformations over the years due to regulatory changes.

Giannakopoulos, A., Barbas, I. (2025). "POWER, IDENTITY AND EQUALITY: THE NEW ERA OF WOMEN’S WRESTLING." Int J Wrestling Sci **15**(2): 14-21.

The relationship between women and sport is historically charged, as for centuries social perceptions, cultural stereotypes and institutional exclusions limited their participation. From antiquity to the 19th century, sport was viewed as a male activity, while women were confined to marginal or “appropriate” forms of physical exercise. Gradual emancipation and the feminist struggles of the 20th century led to the

pursuit of equality, with pivotal developments such as the work of the FSFI and the increasing inclusion of women in the Olympic Games. However, despite institutional progress and European equality strategies, women continue to face inequalities in leadership, funding, media representation and access to professional opportunities. Wrestling is a characteristic example of a sport where gendered perceptions delayed women's acceptance. The first major women's competition was held only in 1987, and Olympic inclusion came in 2004. Today, women's wrestling is expanding rapidly worldwide, with leading nations such as the USA, Japan and Russia, yet progress remains uneven. Factors such as social resistance, lack of infrastructure, financial barriers and limited media exposure continue to hinder many female athletes. Despite these challenges, women's wrestling is becoming a vehicle for empowerment, the dismantling of stereotypes and social change. The strengthening of institutions, the education of coaches, the establishment of safe environments and the promotion of role models are essential prerequisites for sustainable development. The evolution of women's wrestling reflects broader gender equality dynamics in sport, highlighting that women's participation is not merely a matter of athletic opportunity, but also of social justice, recognition and power,

Gierczuk, D., et al. (2025). "Effects of Ashwagandha (Withania somnifera) Supplementation on Special Endurance and Response Time of Elite Wrestlers." J Strength Cond Res.

Gierczuk, D, Jówko, E, Zawadzki, W, Cieśliński, I, and Sadowski, J. Effects of ashwagandha (Withania somnifera) supplementation on special endurance and response time of elite wrestlers. J Strength Cond Res XX(X): 000-000, 2025-The aim of this study was to determine the effect of ashwagandha supplementation on special endurance and response time of highly qualified wrestlers participating in a structured sports training process (preparatory period). In the randomized, double-blind manner, national team wrestlers received either placebo or ashwagandha extract (600 mg·d-1) for 8 weeks. Twice during the 8-week study period: Pre-intervention (term I) and post-intervention (term II), special endurance (using the dummy suplex throw test), and response time to a stimulus (decision test using the Vienna Test System) were assessed. In term II, as compared with term I, an increase in special endurance (total number of throws) occurred in both groups (main effect of time: $p = 0.000001$, post hoc $p < 0.001$). In addition, both groups experienced favorable changes in the number of correct reactions (main time effect: $p = 0.002$; post hoc $p < 0.05$) and the time of choice reaction (main time effect: $p = 0.0001$, post hoc $p < 0.01$). By contrast, no main effect of group or time × group interaction was found in the parameters studied ($p > 0.05$). In conclusion, in highly qualified wrestlers performing a training program during the preparatory period, 8-week supplementation with ashwagandha at a dose of 600 mg per day does not appear to offer additional benefits in terms of an increase in special endurance and an improvement in response time to stimuli beyond those observed as a result of training. Further research is needed using either longer periods of ashwagandha supplementation or in the search for other dietary supplements to support the training process of wrestlers.

GRIGORE, E. A., TALAGHIR, L.G., MOISESCU, P. and GRIGORE, A. (2025). "WOMEN WRESTLING AT THE PARIS 2024 OLYMPIC GAMES." Annals of "Dunarea de Jos" University of Galati. Fascicle XV, Physical Education and Sport Management **1**: 86-97.

The paper addresses the women's wrestling competition at the Olympic Games, Paris 2024, trying to establish the trends of participation in the most recent Olympic competition. The research establishes, based on statistical analysis, the origin of the athletes who qualified for the Olympic competition, both from the perspective of continents, but also of the countries of origin. At the same time, by counting the performances obtained, we were able to establish the dominant nations in women's wrestling, in general, as well as in each Olympic weight category, in particular ... The paper also establishes whether the number of qualified athletes is decisive for achieving dominance in terms of top performances (rankings by nations and continents). Based on the correlation of the 3 Olympic qualifying competitions, the Continental Qualification Tournament, the World Qualification Tournament and the World Championship, with the results obtained at the Olympic competition, the paper identifies whether the timing of qualification influences the Olympic course and implicitly the pre-competitive planning of the activity of top female wrestlers. The present paper represents a starting point for future research in order to establish a pattern of technical-tactical manifestation of the Olympic champion, the period necessary to reach maximum potential and implicitly the optimal moment of selection as a consequence of the period of practice necessary to reach this potential.

Grigore, E. A., et al. (2025). "HIGH-LEVEL COMPETITION, AN ESSENTIAL BENCHMARK FOR ESTABLISHING THE MEANS OF TRAINING OLYMPIC-LEVEL FEMALE WRESTLERS." The Annals of Dunarea de Jos University of Galati Fascicle XV Physical Education and Sport Management **1**: 98-106.

High-level competition, an essential benchmark for establishing the means of training Olympic-level female wrestlers. This paper presents a research study focused on the in-depth analysis of high-level competition in women's wrestling, aiming to identify and systematize the latest trends observed during contests and direct combat situations. Understanding these competitive dynamics is essential for designing optimized training programs for Olympic-level performance.The study investigates the key technical-tactical, physical, and physiological characteristics that define elite-level competition. By analyzing official match recordings and performance data from international tournaments, including the Olympic Games and World Championships, we identified a range of indicators that offer valuable insights into the demands placed on athletes at the highest level. Among the variables taken into consideration were the total duration of the contest, the effective active time during direct confrontation, the average number of matches required to win medals, as well as a series of specific technical-tactical elements. These include the frequency and type of scoring actions, transition moments, defensive and offensive strategies, and recovery intervals within a match. The technical-tactical analysis was conducted both at a general level and individually, by weight category. Particular attention was paid to the diversity of techniques used, the tempo of the fight, and the strategic differences between lightweight, middleweight, and heavyweight athletes. The individual characteristics of each athlete, especially those determined by the specific requirements of each weight class, reveal significant differences in the way technical-tactical expression manifests both quantitatively and qualitatively during matches. The findings provide a comprehensive and structured reference framework that can be used to guide the development of evidence-based training methods tailored to the realities of modern female wrestling at the Olympic level.

Güngör, A. K. and R. Arabacı (2025). "Analysis of Technical and Tactical Movements Performed in the 2021 and 2022 Senior Freestyle World Championships." The Online Journal of Recreation and Sports **14**(3): 323-329.

This study aimed to perform a notational analysis to examine the technical and tactical aspects of elite male wrestlers participating in the 2021 and 2022 Senior World Wrestling Championships. A total of 598 bout videos were observed and analyzed using the Dartfish Connect Plus 8.0 match analysis program. The analysis process involved four stages: bout analysis preparation, searching and tagging, database creation, and data utilization procedures. Wrestling techniques were categorized into takedowns and throws (standing position) and flips and throws (parterre position). A significant difference was found between attack and counterattack techniques between the 2021 and 2022 World Championships (p < 0.05; $\chi 2 = 8.318$). The mean technical points (TPmean) recorded during the first and second periods were 5.2 and 4.4, respectively, in the 2021 World Championship (p > 0.05, d = 0.071), while the mean number of wrestling actions (WAmean) was 1.78 and 1.73 (p > 0.05, d = 0.068) for the same periods. In the 2022 World Championship, TPmean was recorded as 5.1 and 4.4 (p > 0.05, d = 0.061), and WAmean as 1.77 and 1.76 (p > 0.05, d = 0.001) for the first and second periods, respectively. The majority of wrestling techniques were performed in the standing position (61.4% in 2021 and 58.6% in 2022). The findings of the present study demonstrated the dynamic and active nature of wrestling in the 2021 and 2022 World Championships. Furthermore, leg attacks, takedowns, push-outs, and gut wrenches were identified as the most valuable techniques in elite freestyle wrestling.

Hafezikhah, A. (2025). "The special expanded wrestling competition format: a conceptual proposal for wrestling competitions." INTERNATIONAL JOURNAL OF WRESTLING SCIENCE **15**(1): 2-7.

Traditional wrestling competitions are structured around individual matchups, limiting talent exposure, strategic depth, and team engagement. This paper introduces the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT—a conceptual model in which each country fields a three-wrestler team per weight class. Matches are held as best-of-three series, with tactical elements such as lineup declarations, strategic substitutions, and the Golden Fall mechanism that can trigger a fourth deciding match under specific conditions. The SPECIAL EXPANDED WRESTLING COMPETITION FORMAT addresses key limitations of the current system by enabling broader athlete participation, enhancing the coach`s strategic role, and increasing psychological fairness through distributed responsibility. It also promotes media engagement and audience retention through multi-layered match narratives. The model is

applicable to various competition levels, from national leagues to potential implementation in global formats such as a Wrestling Nations Cup. This article outlines the structure, logic, advantages, and possible criticisms of the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT, offering a roadmap for pilot implementation and broader adoption. The paper concludes by positioning the SPECIAL EXPANDED WRESTLING COMPETITION FORMAT as a modernization strategy for wrestling—an evolution aligned with global trends in sports governance and audience engagement.

Iliev, I., Metodiev, V. (2025). "COMPARATIVE ANTHROPOMETRIC ASSESSMENT OF HEIGHT AND WEIGHT IN WRESTLERS FROM SPECIALIZED SPORTS SCHOOLS AND NON-ATHLETE HIGH SCHOOL STUDENTS IN BULGARIA." Int J Wrestling Sci **15**(2): 27-33.

The present study aims to analyze and compare the anthropometric indicators of height, weight, and Body Mass Index (BMI) among students from sports schools practicing freestyle wrestling and their peers from general education high schools. The research sample included 60 students (33 boys and 27 girls). The main anthropometric measurements—body weight and height—were used to calculate BMI according to the Quetelet formula (1835). The results indicate that the average BMI values of wrestling students (22.7) were lower than those of high school students (25.2). It was found that 15% of the wrestling students were overweight, compared to 39.2% among the general high school group. The findings confirm the positive impact of systematic wrestling training on body composition, proportions, and physical development. The study highlights the essential role of sports as an effective means for preventing overweight and promoting healthy physical activity habits among adolescents.

Jagim, A. R., et al. (2025). "Prevalence and Magnitude Weight Loss Among Collegiate Wrestlers." J Strength Cond Res. doi: 10.1519/JSC.0000000000005250. Epub.

Jagim, AR, Dobbs, WC, Horswill, CA, Twohey, E, Fields, JB, and Jones, MT. Prevalence and magnitude weight loss among collegiate wrestlers. J Strength Cond Res XX(X): 000-000, 2025-The purpose of this study was to examine the percentage of wrestlers who compete in their minimal weight class (MWC), and the magnitude of weight loss. Data from the 2023-2024 collegiate season were retrospectively analyzed resulting in a sample of 9,638 collegiate male wrestlers from the National Association of Intercollegiate Athletics (n = 1,904) and all 3 divisions of the National Collegiate Athletics Association (n = 7,734). All wrestlers completed skinfold assessments for weight certification at the start of the competition season. The lowest recorded weight class (LRW) achieved by each wrestler during the season was also recorded and used to determine magnitude of weight loss. Out of the 4,605 (53.2%) of wrestlers who competed in their MWC, their average amount of weight loss was significantly higher than those who did not compete in their MWC (3.9 ± 2.5 vs. 3.2 ± 2.9 kg.; $p < 0.001$), yet they had an initial lower body fat percentage (12.7 ± 2.9 vs. 17.5 ± 4.8%; $p < 0.001$). At the time of weight certification, wrestlers weighed 8.1 ± 4.5 (95% confidence interval (CI): 8.0-8.2; effect size (ES) = 1.8) kg more than their minimal wrestling weight. The LRW was 3.6 ± 2.9 (95% CI: 3.6-3.7; ES = 1.2) kg lower than their weight at the time of weight certification. Given that slightly more than half of the male wrestlers competed in their MWC, coaches and sports practitioners should recognize that not all athletes follow the traditional assumption of cutting to the lowest possible weight class. Importantly, those who did achieve their MWC had lower initial body fat percentages, limiting the amount of weight they could safely lose. This underscores the need for individualized weight management strategies that consider body composition and health implications.

Jagim, A. R., et al. (2025). "Minimum Wrestling Weight for High School Girls Wrestling: Time to Revisit Minimal Body Fat Percent." J Strength Cond Res **39**(3): 332-339.

Jagim, AR, Horswill, CA, Dobbs, WC, Twohey, EE, Tinsley, GM, Fields, JB, and Jones, MT. Minimum wrestling weight for high school girls wrestling: Time to revisit minimal body fat percent. J Strength Cond Res 39(3): 332-339, 2025-The purpose of this study was to determine whether an alternative body fat percentage (BF%) could be established as a safer margin for minimal wrestling weight (MWW) determination by evaluating the distribution of BF% and MWW values naturally occurring for high school girls wrestling. Data from the 2022-2023 high school season were retrospectively analyzed. In total, 33,321 female wrestlers completed skinfold (SKF) assessments or bioelectrical impedance analysis (BIA) in accordance with sport governing body mandates for weight certification. Frequency statistics and descriptive analysis were performed to compute normative MWW and BF% profiles. Body fat percentage thresholds of 12% (12MWW) and the BF% value defining the lowest fifth percentile were used to determine the resulting MWW and minimum weight class for each method. The median ± interquartile

range for BF% was 28.3 ± 9.2%. There was a difference (p < 0.001) in BF% values between BIA (28.4 ± 6.8%) and SKF (29.4 ± 7.6%), but a trivial effect size (ES = 0.14). The fifth percentile for BF% was 19%, which was used for alternative MWW determination (19MWW). 12MWW and 19MWW were 11.2 ± 6.4 kg (p < 0.001; ES = 1.8) and 8.6 ± 7.7 kg (p < 0.001; ES = 1.1) lower than the body mass of the wrestlers at the time of weight certification. Nearly all BF% values were above the 12% threshold currently used to determine MWW. Current body weights were more than 9.1 kg above MWW values for both 12MWW and 19MWW. Increasing the minimum BF% threshold from 12 to 19% would affect a small percentage of wrestlers and improve the margin of safety for those intent on achieving a lower weight class.

Jagim, A. R., et al. (2025). "Differences in body fat percentage and minimum wrestling weight values between NCAA and NAIA women`s wrestlers." Medicine & Science in Sports & Exercise **57**(4): 727-737.

The estimation of body fat percentage (BF%) in wrestling is used to determine the minimum wrestling weight (MWW) and lowest allowable weight class for wrestlers to compete in. The current minimum threshold for BF% used to calculate MWW is 12% for women wrestlers, yet a potential increase has been discussed. Because of the novelty of collegiate women`s wrestling, there is a paucity of literature available on the body composition norms of this population. PURPOSE: The purpose of the present study was to characterize the BF% and MWW values of collegiate women wrestlers. METHODS: Data from the 2022-2023 collegiate season was retrospectively analyzed using a sample of 1,648 collegiate women wrestlers from the National Association of Intercollegiate Athletics (NAIA, n = 866) and the National Collegiate Athletics Association (NCAA, n = 782). Data were extracted from the weight certification submission system provided by the National Wrestling Coaches Association. All wrestlers completed skinfold assessments for weight certification at the start of the competition season, with values entered into the system to compute BF% using the Slaughter skinfold equation. RESULTS: There was a positively skewed (0.94) and platykurtic (1.86) distribution of MWW values. Table 1 provides a summary of MWW and BF% values. When pre-season weight was compared to the MWW, wrestlers competing in the NCAA were farther from MWW than those in the NAIA (NCAA: 13.4 ± 7.9 vs. NAIA: 12.1 ± 7.8 kg, p < 0.001). CONCLUSION: Wrestlers competing in the NCAA had a slightly higher BF% and lower MWW compared to those competing in the NAIA. Increasing the minimum BF% threshold from 12% to 17% (5th percentile) would affect a small percentage of wrestlers. On average, wrestlers were 13 kg away from their MWW at the start of the season.

Jesus, F., et al. (2025). "Isotope Dilution for Measuring Total Energy Expenditure, Water Turnover, and Total Body Water in Athletes: A Systematic Review." International Journal of Sport Nutrition and Exercise Metabolism **35**.

Isotope-based tracer methods allow the determination of total energy expenditure (TEE), water turnover (rH 2 O), and total body water (TBW) in free-living conditions. These methods have exciting applications in athletes. However, the limited number of available measurements constrains their applicability. The aim was to describe the application of isotope dilution techniques for measuring TEE, rH 2 O, and TBW in athletic populations. A comprehensive search (https://doi.org/10.17605/OSF.IO/7932T) was performed in three databases: PubMed, EBSCO (CINAHL, MEDLINE, and SPORTDiscus), and Cochrane Library. A total of 1,540 records were identified (564 excluded) and 174 through other sources. After excluding 53 duplicates, 1,097 articles were screened. A total of 121 studies were included, totaling 3,244 measurements from different types of sports, age range, and tier level, with 1,020 from female athletes and 139 measurements where sex was not reported. For TEE, 75 studies were included with values ranging from 1,939 to 10,070 kcal/day. For rH 2 O, 15 studies were included with values ranging from 2.7 to 13.4 L/day. For TBW, 77 studies were included with values ranging from 29.8 to 76.8 kg. Variability was observed across the studies among the variables of interest. Overall, males showed higher TEE, rH 2 O, and TBW values than females, with endurance sports showing the greatest variability in energy and water flux, and TBW values varying most in team and mixed sports. Future research should increase representation of females, athletes with disabilities, and Tier 5 "world-class" athletes to establish normative values across sports, age groups, and sex while applying standardized isotope dilution methodologies.

Juhanis, J., et al. (2025). "Establishing the Interaction between Training Methods and Power Levels in Wrestling: A 2x3 Factorial Design of Hip Toss Skills." Physical Education Theory and Methodology **25**(2): 234-244.

Objectives. This study aimed to evaluate the effects of resistance band exercises, good morning drills, and bicep curls on improving the hip throw technique among wrestling athletes, considering their initial power levels. Materials and methods. This study employed a 2x3 factorial design involving 66 male

students, grouped based on power levels (high and low) and training methods. The training was conducted over six weeks with a frequency of three weekly sessions. The measured parameters included improvements in hip throw technique skills, encompassing strength, stability, and execution speed. Data analysis was performed using ANOVA and Tukey's test to evaluate significant differences between groups. Results. The results indicated a significant main effect of the training method factor (A) on hip toss skills ($F = 5.413$, $p = 0.007$), demonstrating that variations in training methods led to marked differences in skill outcomes. The second main effect, power level (B), showed an even more substantial influence ($F = 99.426$, $p = 0.000$), indicating that athletes' baseline power plays a crucial role in determining hip toss performance. Regarding the interaction effect, there was a considerable interaction between training methods and power levels ($F = 7.914$, $p = 0.001$). Conclusions. This study concludes that resistance band exercises are the most effective method for athletes with high power in enhancing dynamic strength and flexibility relevant to hip toss techniques. The exercise effectively supports postural stability, while bicep curls contribute to grip strength. A multidimensional approach integrating resistance band exercises, good morning drills, and bicep curls provide complementary benefits for improving hip toss technique skills in wrestling. These findings can serve as a foundation for coaches to design evidence-based training programs tailored to the specific needs of athletes.

Kara, E., et al. (2025). "Examination of oxygen saturation and heart rate levels of female freestyle wrestlers according to the physiological load created by the competition." BMC Sports Sci Med Rehabil **17**(1): 299.

BACKGROUND: The aim of this study was to investigate the peripheral oxygen saturation (SpO_2) and heart rate (HR) levels of female freestyle wrestlers according to the physiological load created by the competition. METHODS: A total of 26 volunteer participants (mean age 11.54 ± 0.50 years, mean height 157.23 ± 8.91 cm, mean body weight 49.99 ± 12.51 kg, mean BMI 19.96 ± 3.22 kg/m(2)) were included. SpO_2 and HR were measured by digital pulse oximetry before and after the wrestling competition. The data were analysed via the IBM SPSS 21 package program. The normality of distributions and homogeneity of variances were determined via the Shapiro–Wilks test. Descriptive statistics and dependent sample t tests were performed to compare the data of the participants. The significance level was determined as $p < 0.05$. RESULTS: According to the statistical analyses, no significant difference was found between the pretest and posttest SpO_2 values ($p > 0.05$). However, a highly significant difference was observed between the pretest and posttest HR values ($p < 0.01$). The mean SpO_2 was 96.96 ± 3.60%, the mean HR was 120.58 ± 16.06 bpm, the mean SpO_2 was 99.50% ± 3.20%, and the mean HR was 150.46 ± 24.89 bpm. There was a significant increase in HR after the wrestling competition, but SpO_2 levels did not significantly change. CONCLUSION: This study revealed that wrestling competition significantly increased the HR but did not significantly affect the SpO_2 levels. The results emphasize the effects of intense sporting activities, such as wrestling, on HR, whereas no significant change in the SpO_2 level was detected.

Khatun, S., et al. (2025). "Characterizing link among phase angle, muscle strength, body composition variables, and urine metabolites in Japanese females with or without dysmenorrhea: A pilot study." Physiol Behav **300**: 115039.

BACKGROUND: Dysmenorrhea, characterized by painful menstruation, can influence body composition, muscle strength, and metabolic function. This study aimed to investigate differences and relationships between body composition variables, phase angle (PhA), muscle strength, and urine metabolites among Japanese female individuals with and without dysmenorrhea. METHODS: Thirty-four participants, divided into healthy menstruating control (n = 15) and dysmenorrhea (n = 19) groups, were included. PhA, whole body lean soft tissue (WB LST), visceral fat (VF) and subcutaneous fat (SF), hand grip strength (HGS), leg strength, and urine metabolites were measured using multifrequency bioelectrical impedance analysis, dual-energy X-ray absorptiometry, computed tomography, dynamometry, and liquid chromatography, respectively. RESULTS: No significant differences were found in the characteristic variables. BMI, PhA, and muscle strength showed a positive association only in the control group. However, menstrual status (control/dysmenorrhea, 0/1) did not affect muscle strength. Conversely, a negative coefficient (LASSO: -0.098; Elastic net: -0.109) demonstrated that the dysmenorrhea group had lower predictive PhA values than did the control group. PhA and WB LST were identified as meaningful predictors of HGS ($R(2) = 0.433$) and leg strength ($R(2) = 0.251$). Acylcarnitine metabolites were positively associated with VF and PhA in the dysmenorrhea and control groups, respectively. CONCLUSION: The study findings highlight distinct associations among body composition, PhA, muscle strength, and urinary metabolites in these female groups. However, the study is limited by the absence of

severity of dysmenorrhea symptoms, phases of menstruation, and no adjustment for lifestyle factors. A future longitudinal study is warranted to understand these physiological association between the control and dysmenorrhea groups.

Khuyagbaatar, B., et al. (2025). "Assessment of functional movement screen and performance parameters of wrestlers using inertial sensors." Frontiers in Sports and Active Living **7**: 1560924.

A functional movement screen (FMS) is an assessment system that identifies athletes' movement profiles and injury risks. This is also used to determine sport-specific performance and training effectiveness. However, none of the studies have employed the IMU measurement system to assess FMS and performance parameters in wrestling. In this study, we aimed to assess FMS and kinematic parameters in wrestlers using IMU sensors to explore the relationship between FMS scores, range of motion (ROM), and performance parameters. Ten healthy controls and ten wrestlers completed the seven tasks of the FMS and performed wrestling techniques. The screening results were assessed, revealing significant differences in shoulder mobility (Control: 2.7 ± 0.6, Wrestlers: 1.9 ± 0.8) ($p = 0.034$, Cohen's $d = 1.02$) and active leg raise tests (Control: 2.3 ± 0.4, Wrestlers: 2.9 ± 0.3) ($p = 0.004$, Cohen's $d = 1.47$) between the two groups. Additionally, center of mass (CoM) velocity increased by 18%, while CoM position lowered by approximately 5%-8% during wrestling techniques in the higher FMS group. This study demonstrated the convergent validity of FMS scores with joint mobility and performance parameters in wrestling techniques. We assessed athletes` ability to correctly perform movements using the FMS scoring system and analyzed kinematic parameters, including the displacement and velocity of the CoM, through wearable inertial sensors. Our findings indicate that higher FMS scores are associated with greater CoM velocity and the ability to maintain a low CoM position during wrestling.

Kim, B. H. and H. S. Rhyu (2025). "The effects of different exercise types on insulin resistance and inflammatory markers in overweight female wrestlers." J Exerc Rehabil **21**(3): 159-166.

This study aimed to propose the most effective exercise program for overweight female wrestlers by comparing aerobic exercise, resistance exercise, and a combination exercise program. Thirty overweight female wrestlers were randomly assigned to the aerobic exercise group (AEG, n=10), resistance exercise group (n=10), and combined exercise group (CEG, n=10). Exercise intensity was set at 70% of maximal oxygen uptake and one-repetition maximum. Each group exercised for 50 min per session, 7 times per week, for 12 weeks. The study analyzed body composition, insulin resistance (IR), tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and C-reactive protein (CRP). After 12 weeks, body weight and body fat significantly decreased in all groups, with the most pronounced reduction observed in the AEG. IR also significantly improved in all groups, with the greatest reduction in the AEG. Finally, TNF-α, IL-6, and CRP levels decreased in all groups, with the most notable reduction observed in the CEG. The 12-week exercise program implemented in this study had positive effects on weight and body fat reduction, IR improvement, and decreases in TNF-α, IL-6, and CRP levels among overweight female wrestlers. These findings suggest that the program can contribute to enhancing athletic performance and daily activities through weight management, metabolic health, and inflammation control.

Konakbayev, B., et al. (2025). "Characteristics of the level of athletes' sports preparedness in freestyle wrestling." Retos **64**: 576-588.

Introduction: This article deals with the issue of a comprehensive approach to researching the level of athletic fitness of freestyle wrestlers based on the results of competitive activity, in the laboratory and training process. Objective: Using a comprehensive research approach to assess the technical and tactical skills, as well as the level of functional capabilities of athletes in freestyle wrestling. Methodology: Competitive activity was analyzed to evaluate technical and tactical skill. The heart rate and lactate concentration level were recorded during the preparation for competitive wrestling and the recovery period. An in-depth complex examination was performed, which included assessment of anthropometric indices, registration of the main parameters of external respiration and gas exchange, cardiovascular system. Results: The indicators of recovery processes during the training process and competitive activity were obtained to assess the level of preparation of freestyle wrestlers, where a number of shortcomings of their training were revealed. Discussion: Criteria for evaluating competitive loads on the basis of determining the concentration of lactate in the blood were developed. The obtained information allowed to determine the level of preparedness of athletes in freestyle wrestling, as well as the readiness to conduct the next competitive bout Conclusions: Comparative analysis of competitive activity has shown that it is

necessary to correct the algorithm of modes of training processes. When conducting training of low aerobic power to perform the necessary volume while observing the individual mode as for the level of lactate and heart rate.

Korobeynikov, G., et al. (2025). "Comparative performance analysis between winners and losers in freestyle wrestling at the 2023 World Championship: 2025, V.11, No. 4." Health, sport, rehabilitation.

Background and purpose In the modern sports world, the study of factors determining success in competitions remains a topic of constant interest for researchers. Purpose: study is to identify differences in performance indicators between winners and losers among freestyle wrestlers at the 2023 World Championship. Data from 703 matches at the 2023 World Championship in Belgrade, Serbia were analyzed. The aim of this study is to identify differences in performance indicators between winners and losers among freestyle wrestlers at the 2023 World Championship. Data from 703 matches at the 2023 World Championship in Belgrade, Serbia were analyzed. Results Analysis was conducted using the Internet platform Performance Data Analysis. Statistically significant differences were found between the average number of actions performed by the winners and the losers (p<0.05) for both male and female athletes. The analysis revealed a similar trend among both winners and losers in the per-centage distribution of actions evaluated with a specific number of points: two-point actions were performed the most frequently. The effectiveness was significantly higher (0.05) among the winning wrestlers compared to the losing ones in both styles. The average scores per match were 7.7 points for men and 7.1 points for women among the winners, and 1.8 points for men and 1.6 points for women among the losers. The ratio of actions performed by winners to those performed by losers was 3.8 for men and 3.7 for women. Both winning and losing athletes, regardless of gender, performed more actions in the standing position than in the parterre. For all wrestlers, leg attacks were the most common action, with a frequency ranging from 22.8% to 27.5% of all actions. Conclusions The study indicates notable differences in performance indicators between winners and losers. Winners generally demonstrate a higher level of technical and tactical preparedness. They adapt more swiftly to their opponent's actions and are capable of effectively responding to changing circumstances during the match.

Korobeynikov, G., et al. (2025). "FEATURES OF THE MANIFESTATION OF COGNITIVE FUNCTIONS IN SKILLED WRESTLERS." Sport Science Spectrum(3): 39-44.

The analysis of previous studies which concerning to sport wrestling showed that cognitive functions supported of wrestler’s ability to adequate response on the active from enemy in competition fight. Therefore there is a need to study the cognitive functions of wrestlers that contribute to a decision-making during competition activity. Purpose: to study the characteristics to the manifestation of cognitive functions in skilled wrestlers. The 31 skilled wrestlers, age 14–16 were examined. All of the athletes have training in sport club Kremenchyk city. For asses of cognitive functions were used the two tests: on estimate of decision-making time and assessing of non-verbal intelligence by Raven’s Progressive Matrices. In addition, the perception stress scale (PSS) was used. The athletes were divided into two groups according to the level of subjective perception of stress. The results of the study revealed a significant difference between athlete’s groups by meanings of productively and efficacy in procession non-verbal information. In wrestlers with moderate perception of stress the productively of procession non-verbal information are significant higher than in group of wrestlers with low stress perception. The conducted correlation analysis establishes the presence of compensatory mechanism on prevention of level of non- verbal intelligence in wrestlers. The presents of moderate stress perception in skilled wrestlers is a sign of adequate sense of the external of the environment. This activates the athletes’ ability to make optimal decisions by engaging mechanisms for fast and high-quality perception and processing of non-verbal information.

Kovbasiuk, A., et al. (2025). "A taste of ambrosia: Do Olympic medalists live longer than Olympic losers?" Scand J Public Health **53**(1): 8-14.

OBJECTIVE: To investigate the longevity of a large sample of Olympic Games participants, considering the interaction between different types of sports and medal awards. METHODOLGY: Data scraping from Wikipedia and Wikidata allowed us to collect a sample of 102,993 famous athletes. We selected 20 of the most populated disciplines to make the groups comparable. We conducted a comparison of life duration on a subset of 17,194 elite athletes, predominantly male, dead at the time of analysis. RESULTS: Olympic medalists' lifespan was shorter than non-medalists. Athletes in such disciplines as boxing,

weightlifting, ice hockey, cycling, football, swimming, and wrestling lived significantly shorter lives than the mean of the group of athletes. In contrast, the duration of life in athletes involved in athletics, rowing, fencing, artistic gymnastics, shooting, cross-country skiing, sailing, and equestrian sports was highest compared with the mean of the group. CONCLUSIONS: Disciplines classified as engaging mostly power were linked to shorter lifespans, whereas those involving predominantly skill were associated with longer life durations. The interaction of being a medalist and sport was found to be significant. Medalists in the disciplines of athletics, basketball, boxing, equestrian sports, wrestling, and water polo had significantly shorter lives (the final item was insignificant after correction for multiple comparisons). Olympic achievement was linked to length of life in mainly individual, not team, sports.

Kozuma, A., et al. (2025). "Genetic Factors of Elite Wrestling Status: A Multi-Ethnic Comparative Study." Genes (Basel) **16**(8).

BACKGROUND: In recent years, comprehensive analyses using a genome-wide association study (GWAS) have been conducted to identify genetic factors related to athletic performance. In this study, we investigated the association between genetic variants and elite wrestling status across multiple ethnic groups using a genome-wide genotyping approach. METHODS: This study included 168 elite wrestlers (64 Japanese, 67 Turkish, and 36 Russian), all of whom had competed in international tournaments, including the Olympic Games. Control groups consisted of 306 Japanese, 137 Turkish, and 173 Russian individuals without elite athletic backgrounds. We performed a GWAS comparing allele frequencies of single-nucleotide polymorphisms (SNPs) between elite wrestlers and controls in each ethnic cohort. Cross-population analysis comprised (1) identifying SNPs with nominal significance ($p < 0.05$) in all three groups, then (2) meta-analyzing overlapped SNPs to assess effect consistency and combined significance. Finally, we investigated whether the most significant SNPs were associated with gene expression in skeletal muscle in 23 physically active men. RESULTS: The GWAS identified 328,388 (Japanese), 23,932 (Turkish), and 30,385 (Russian) SNPs reaching nominal significance. Meta-analysis revealed that the ATP2A3 rs6502758 and UNC5C rs265061 polymorphisms were associated ($p < 0.0001$) with elite wrestling status across all three populations. Both variants are located in intronic regions and influence the expression of their respective genes in skeletal muscle. CONCLUSIONS: This is the first study to investigate gene polymorphisms associated with elite wrestling status in a multi-ethnic cohort. ATP2A3 rs6502758 and UNC5C rs265061 polymorphisms may represent important genetic factors associated with achieving an elite status in wrestling, irrespective of ethnicity.

Kruszewski, A., et al. (2025). "Assessment of balance asymmetry in elite polish greco-roman style wrestlers using the Y-balance test." Ido Movement for Culture. Journal of Martial Arts Anthropology **25**(2): 40-49.

Introduction. A wrestling bout is characterised by a short, intense, intermittent effort lasting 6 minutes in total for the senior group, making the need to play 4-5 matches in 1 day, during a wrestling tournament, an additional element of this effort. The ability to maintain balance is manifested through dynamic stability, plays a key role in the sport of wrestling, where precise motor control is essential for the effective execution of techniques and the avoidance of injury. Asymmetries resulting from imbalances can affect players` performance and their susceptibility to injury. The aim of the study was to evaluate asymmetry in the dynamic stability of Polish national team wrestlers in three directions of movement (forward, posteromedial, posterolateral) using the Y-Balance test. Research material and methods. Eighteen national team wrestlers in Greco-Roman style wrestling, took part in the study. A threeway Y-Balance test was used for both lower limbs. The results were statistically analysed, assessing the mean, standard deviation and significance of differences between limbs. Study results. There was significant asymmetry in forward movement ($p=0.05$), with the left lower limb showing better stability. In the other directions, asymmetries were present, but the differences were not statistically significant ($p>0.05$). However, 4 players were found to have an asymmetry of more than 4 cm, indicating a risk of injury. Conclusions. Although the dynamic asymmetries indicated in the study occur frequently among wrestling athletes, they are not always statistically significant. The results suggest that the Polish national team wrestlers have well-developed dynamic stability, but the asymmetries revealed in individual cases need to be monitored in order to prevent injuries and optimise training.

Krymov, A. I. (2025). "Model of long-term improvement for the efficiency of the training process in Greco-Roman wrestling: physiological, psychological, and technical aspects, individualization of training." Theory and Practice of Physical Culture(2): 16-19.

This article is dedicated to the study of long-term training methods for Greco-Roman wrestlers, focusing on the individualization of training and consideration of physiological, psychological, and technical-tactical parameters. The article presents a model of long-term improvement in the training process, taking into account the individual characteristics of athletes at different stages of their development. The stages of wrestlers' development from adolescence are examined, and methodologies adapted to anthropometric and psychophysiological characteristics are proposed. Particular attention is paid to a comprehensive approach that includes strength, endurance, and coordination development, injury prevention, and optimization of training loads considering the specifics of Greco-Roman wrestling. Coaches must consider each athlete's individual characteristics, such as their physical and psychological readiness level, to prevent injuries and burnout. Individualized training programs help improve preparation efficiency and develop technical-tactical skills crucial for successful competition performances. The proposed model of long-term improvement contributes to maintaining stable results at high-level competitions and ensuring the harmonious development of athletes in the long term.

Kużdżał, A., et al. (2025). "Effects of Weight-Cutting Practices on Sleep, Recovery, and Injury in Combat Sports: A Scoping Review." J Funct Morphol Kinesiol **10**(3).

Objectives: This scoping review aims to synthesize the methodological characteristics of weight-cutting strategies, summarize their effects on sleep, recovery, and injury outcomes, and identify research gaps. Methods: Following the PRISMA guidelines, searches were conducted on 20 May 2025, across PubMed, Scopus, and Web of Science, with snowball citation tracking and expert consultation to enhance retrieval. Inclusion criteria targeted peer-reviewed studies involving competitive or recreational combat sport athletes (all ages and sexes) undergoing weight-cutting practices, reporting outcomes on sleep (e.g., quality and duration), recovery (e.g., perceived fatigue and biomarkers), or injury incidence (e.g., reported injuries and odds ratios). Studies included randomized controlled trials, non-randomized trials, or cohort studies with or without comparator groups. The risk of bias was assessed using the RoB 2 tool for randomized trials and the ROBINS-I tool for non-randomized studies. Results: From 2784 records, 17 studies met the inclusion criteria. Participant ages ranged from 17.79 ± 0.75 to 30.1 ± 7.5 years, predominantly national-level combat sport athletes (wrestling, judo, taekwondo, and MMA). Rapid weight loss (RWL, 2-10% body mass loss over 1-7 days) via food/fluid restriction, sauna use, and caloric deficits consistently increased creatine kinase (peaking at 713.4 ± 194.6 U/L), perceived fatigue (41.8 ± 0.9 to 51.3 ± 2.0 A.U.), and injury rates (45.62 injuries/1000 athletic exposures in females). Cortisol responses showed increases in some studies (from 499.9 ± 107.8 to 731.6 ± 80.2 nmol/L) and decreases in others (from 603.2 ± 146.8 to 505.8 ± 118.4 nmol/L). Sleep quality showed mild worsening (5.15 ± 1.83 to 5.52 ± 1.71 A.U.), and perceived recovery declined post-RWL (101.40 ± 2.52 to 87.63 ± 2.47 A.U.). Conclusions: RWL in combat sports consistently impairs recovery, increases muscle damage and fatigue, and increases injury risk, though sleep quality effects are less pronounced. Variability in weight-cutting protocols, outcome measures, and study designs shows the need for standardized methodologies, broader inclusion of female athletes, and longitudinal studies to assess long-term impacts.

Lakicevic, N. and E. Panfilova (2025). "The Role of Mental Toughness in Combat Sports: A Critical Examination of Psychological Resilience and Performance Outcomes." Psychology. Journal of the Higher School of Economics [Психология. Журнал Высшей школы экономики] **22**: 408-414.

Combat sports athletes (CSAs) operate in high-stress environments where exceptional physical conditioning must be complemented by strong psychological resilience. This mini-review examines the critical role of mental toughness (MT) in combat sports, highlighting its key components and influence on athletic performance. Despite the universally high training loads reported by CSAs, the distinguishing factor between regular and exceptional athletes often lies in their mental toughness. The demanding training and nutrition regimens required for weight class compliance frequently compel CSAs to drastically reduce food and fluid intake, sometimes leading to extreme measures such as gut manipulation techniques or doping. This challenging environment necessitates a mindset capable of withstanding significant pressure, particularly for younger athletes navigating puberty and external expectations from coaches and peers. Developing mental toughness emerges as a vital component for success in combat sports, as it can alleviate performance anxiety and mitigate psychological stressors inherent in

competitive settings. Evidence indicates that psychological skills training can enhance self-reported MT, with sport-specific techniques—such as imagery, relaxation strategies, and cognitive interruption—effectively fostering core attributes like hardiness, self-esteem, self-efficacy, dispositional optimism, and positive affectivity. Furthermore, perceptions of stress among CSAs vary; while some view intense training as a testament to dedication, others may find it overwhelming. This distinction emphasizes the importance of mindset, motivation, and individual resilience in shaping athletic performance outcomes. The findings underscore the necessity of integrating mental toughness training into the preparation of combat sports athletes.

Laptev, A. I., Shevtsov, A.V. (2025). "PLANNING OF TRAINING LOADS TAKING INTO ACCOUNT OPERATIONAL CONTROL OF MEDICAL AND BIOLOGICAL INDICATORS OF QUALIFIED WRESTLERS." Int J Wrestling Sci **15**(2): 10-13.

The article presents experimental material on the study of indicators of medical and biological control as markers in the planning of the training process, taking into account the operational state of martial arts athletes. The dynamics of the rate of recovery processes after maximum glycolytic work with and without moderate and high-power pedagogical means of recovery have been revealed. The work used science-intensive and generally recognized standard certified techniques and methods: ergometry, pulseometry, gasometry, and lactometry. The results of the study show that when assessing the rate of recovery processes after maximum glycolytic work using pedagogical means of recovery, the use of locomotion at the level of the threshold of aerobic metabolism is significantly higher than during rest without locomotion and is equal to 12.3%, but when using high-power pedagogical means, the decrease in lactate concentration at the 3rd minute of recovery is even faster and is equal to 21.4%. Thus, it has been established that the specifics of urgent recovery using aerobic-anaerobic (mixed) effects can have a positive impact on repeated physical exertion, which should be taken into account when planning the training process.

Laptev, A. I., et al. (2025). "The specifics of the components of physical fitness in student wrestlers specializing in freestyle and Greco-Roman styles." Theory and Practice of Physical Culture(6): 7-10.

Objective of the study is a comparative analysis of the physical fitness of student wrestlers engaged in freestyle and Greco-Roman wrestling. Methods and structure of the study The study involved 81 university-trained athletes specializing in wrestling. The group consisted of 47 Greco-Roman wrestlers (average age 17.5±2.4 years) and 34 freestyle wrestlers (average age 17.5±1.6 years). All participants were students studying at physical education and sports colleges and universities. The following methods were used to conduct the study: anthropometric measurements and bioimpedance analysis, as well as ergometric tests. In addition, the strength indicators of the muscles of the upper and lower extremities were assessed. Results and conclusions. The analysis of anthropometric data and body composition revealed no significant differences between wrestlers of different styles. However, when assessing the anaerobic power of the arm muscles, Greco-Roman wrestlers showed significantly better results compared to freestyle wrestlers. This is due to the fact that in Greco-Roman wrestling, hand actions are more important, which affects the characteristics of their physical fitness and tactics. At the same time, despite the concession in the anaerobic power of the arm muscles, freestyle wrestlers demonstrate an advantage in most speed and strength characteristics. This reflects a wider range of techniques and a balanced development of physical qualities in athletes of this style.

Latyshev, S. V. (2025). "Comparative analysis of the performance of Olympic Games-2024 finalists in wrestling." Theory and Practice of Physical Culture(3): 13-15.

Objective of the study was to perform a comparative study of the performance traits of male and female wrestlers in the disciplines of freestyle and Greco-Roman wrestling at the Olympic Games in Paris in 2024. Methods and structure of the study. The following approaches were employed in the research: a review of scholarly and methodological publications, video analysis, and timing of the competitive matches for the first and third places in each weight class at the Paris 2024 Olympic Games in wrestling for both men and women (freestyle and Greco-Roman wrestling), as well as the application of mathematical statistical techniques. Results and conclusions. The following aspects of the competitive performance of wrestlers were calculated: the average duration of a bout, the average time spent wrestling in the standing and clinch positions separately, the intensity and consistency of wrestling in the standing position, the overall effectiveness of the bout, and the effectiveness of wrestling in the standing

and clinch positions separately, as well as the number of high-scoring bouts. Subsequently, a comparative analysis of these aspects was conducted based on gender and wrestling discipline. The analysis revealed that the key indicators of entertainment and success in a wrestling match, such as activity, effectiveness, and high-scoring, were highest for male wrestlers specializing in freestyle and lowest for Greco-Roman wrestlers. The disparities in these indicators were substantial, varying from 1,29 to 2,52 times. The efficacy of grappling on the ground is significantly higher for men in two categories, with a ratio of more than two to one, and for women, it is 1,27 times more effective. This necessitates a substantial overhaul of the training regimen for athletes, with a focus on enhancing their technical and tactical abilities in the clinch, particularly for men.

Latyshev, S. V. (2025). "The specifics of technical and tactical training of elite level wrestlers." Theory and Practice of Physical Culture(4): 10-12.

Objective of the study - is to identify the specific features of the technical and tactical readiness of elite-level wrestlers. For this purpose, an analysis of the universal principles that guide these athletes during competitive fights was carried out. Methods and structure of the study. Within the framework of the research, an integrated approach was applied, including the study of specialized literature, pedagogical observation of the training and competitive process, video analysis of duels and systematization of best practices in the field of sports practice. Results and conclusions. The competitive activity of freestyle wrestlers at the Olympic Games was studied, starting with the 1996 Atlanta Olympics and ending with the 2024 Paris Games. The information from scientific publications, the results of pedagogical observations and the experience of leading experts are summarized. This made it possible to establish general trends in the conduct of a duel and, consequently, to determine the characteristic features of the technical and tactical preparedness of wrestlers of the highest athletic skill.

Lewis, G. et al. (2025) The athlete microbiome project: Integrating deep learning to reveal microbial associations of physical fitness, 03 July 2025, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-6551234/v1]

Regular exercise improves human fitness and health through direct effects on muscle and metabolism and indirect effects involving the gut microbiome. To better understand the relationship between the gut microbiome and physical fitness, we conducted a secondary analysis of amplicon sequencing data and metadata from published human microbiota studies across three continents. Participants were categorized as athletes (n = 655) or non-athletes (n = 199) based on American Heart Association and American College of Cardiology guidelines. Using multivariate statistics, random forest, and a multilayer perceptron neural network, we identified significant differences in microbial community structure, diversity, and composition. Key taxa—including Faecalibacterium , Parabacteroides , and Prevotella —were associated with fat-free mass percentage and VO 2 max, explaining up to 66% and 45% of the variance, respectively. The multilayer perceptron model distinguished athletes from non-athletes with 92.37% accuracy and an AUC of 0.97, highlighting distinct microbiome profiles between groups. These findings suggest microbial associations with athletic status and identify candidate taxa linked to physical fitness. Although causality cannot be inferred from this cross-sectional analysis, the results support further investigation into microbiome-mediated adaptations to exercise.

Li, Y., et al. (2025). "Advancements in virtual reality for performance enhancement in combat sports: a mini-review and perspective." Front Psychol **16**: 1563212.

This mini-review examines the role of Virtual Reality (VR) in enhancing athletes' performance and reaction abilities in combat sports, aiming to highlight the advantages and potential benefits of VR technology for improving outcomes in various combat disciplines. We identified 13 relevant studies from the Web of Science and Scopus databases, encompassing disciplines such as fencing, taekwondo, karate, judo, and wrestling. The findings indicate that VR training can enhance athletes' sports skills and physical fitness, correct improper movements, provide training feedback, and, in some cases, surpass the effectiveness of traditional training methods. It also significantly enhances athletes' reaction capabilities. Even with these benefits, VR usage in combat training is still quite limited. Future research should focus on how to better leverage the advantages of VR technology in practical combat training for athletes, addressing the lack of tactile feedback, aiding athletes adapt to competition pressure caused by spectators, and examining whether there are gender differences in the use of this technology for training.

Liang, Y., et al. (2025). "The impact of low energy availability risk on pre-competition physiological function in Chinese female combat athletes." J Int Soc Sports Nutr **22**(1): 2490170.

BACKGROUND: Low energy availability (LEA) can negatively impact athletes' physiological function and performance. This study aims to examine the prevalence of LEA in Chinese female combat athletes and monitor changes in physiological function and performance during the pre-competition period. METHOD: We assessed the incidence of low energy availability (LEA) and eating disorder (ED) risks in 84 female combat athletes (judo, freestyle wrestling, and sanda) from Beijing using the Low Energy Availability in Females Questionnaire (LEAF-Q) and the Eating Disorder Examination Questionnaire (EDE-Q). From this group, 11 judo athletes who were preparing for competition were selected and divided into a low energy availability (LEA) group and a non-LEA group based on their energy availability levels. Dietary intake, training energy expenditure, body composition, resting metabolic rate, blood markers, and special judo fitness tests were monitored at 4 weeks, 2 weeks, and 0 weeks before the competition. RESULTS: Among the 84 athletes, 45.2% of athletes (n = 38) were at increased risk of LEA, and 21.4% of athletes (n = 18) were classified as high in eating disorder risk. There were no significant differences in LEA and ED risk between elite and recreational athletes. Among the 11 athletes preparing for competition, 6 athletes (45.5%) were in a state of LEA at the initial stage (4 weeks before the competition), and by the competition week, all 11 athletes exhibited LEA. Additionally, athletes in the LEA group experienced significant reductions in VO(2) and resting metabolic rate at 0 week of the competition compared to 4 weeks prior ($p < 0.05$). Thyroid function indicators and IGF-1 levels of LEA group also significantly decreased ($p < 0.05$). After completing the four-week pre-competition weight loss, heart rate recovery during the special judo fitness test improved significantly in both the LEA and non-LEA groups ($p < 0.05$). CONCLUSION: The current study identified a risk of LEA among Chinese female combat sport athletes, with no significant difference in the prevalence of LEA between elite and recreational athletes. It is essential for Chinese coaches and sports medicine staff to implement LEA-related nutritional education across all performance levels. Moreover, preventive measures during training are recommended to mitigate the impact of LEA on physiological function during the pre-competition weight loss phase.

Lüdemann, R., et al. (2025). "Analyse des Olympiazyklus 2021-2024 im Ringen." Schriftenreihe für Angewandte Trainingswissenschaft, 20: 395-414.

Summary: Wrestling has gained significantly in dynamism. For a long time, so many points per minute had not been scored in all three styles as at the 2024 Olympic Games. This is also reflected in the impressions of the coaches. The winners of these Games are the Asians, particularly the Japanese. They no longer dominate only women's wrestling; they are also among the top nations in Greco-Roman and freestyle wrestling. In total, they won 11 out of 18 possible medals. From a German perspective, only one female athlete managed to reach a final. After a very successful Olympic cycle from 2017 to 2021, the retirement of the best athletes has not yet been compensated for, although successes and world-class performances were achieved in individual matches by young male and female athletes. The goal is to continue this development. Through the interplay of subjective assessments and qualitative and quantitative competition analyses, aspects were identified within the framework of the Olympic cycle analysis that characterize the behavior of the world's elite and can be used as a guide for the training process. These include both tactical and conditioning aspects.

Marten, A. D., et al. (2025). "Effects of rapid weight loss in male and female wrestlers." The Journal of Strength and Conditioning Research **39**(5): 721-729.

The long-standing practice of rapid weight loss (RWL) of wrestlers and other combat athletes is known as "cutting weight." This practice often consists of rapid dehydration and malnutrition to "weigh-in" at a lower weight class for competition. There are multiple negative nutritional and psychological implications in wrestlers because of cutting weight including significantly increased risk of athletic injury, decreased serum testosterone and increased serum cortisol, as well as an increased risk of eating disorders and hormone fluctuations in female athletes. In addition, literature suggests a decrease in athletic performance for athletes undergoing >5% RWL. The purpose of this narrative review was to provide an overview of the implications of weight cutting on athletic performance and overall well-being, and to highlight specific medical, physiological, and psychological effects in male and female wrestlers to aid healthcare workers in making recommendations regarding weight cutting practices.

Noorbakhsh, M., et al. (2025). "Exploring the influence of a 10-week specific detraining on injury risk factors among elite young wrestlers: a prospective study." Sci Rep **15**(1): 7348.

Extended periods of inactivity in sports can impact athletes' performance and overall well-being. The current study examined the effects of a 10-week wrestling -specific detraining period on the isokinetic strength of knee and shoulder flexor and extensor muscles, knee proprioception, and dynamic balance among young male elite wrestlers. This prospective study included 63 male wrestlers : age (19.33 ± 3 years), height (174.32 ± 6.8 cm), weight (80.21 ± 22.01 kg), BMI (25.34 ± 5.89), fat percentage (13.25 ± 5.80) in Tehran's premier wrestling league. Baseline measurements, including isokinetic strength of knee and shoulder flexors and extensors, knee proprioception, and dynamic balance, were evaluated using the Biodex 4 dynamometer and Biodex balance meter, respectively, and repeated after a 10-week lockdown during the COVID-19 pandemic at Shahid Beheshti University, Tehran, Iran. Statistical analysis utilized dependent t-tests to compare the results. Significant differences were observed in the isokinetic strength of shoulder and knee flexor and extensor muscles at angular speeds of 60, 180, and 300 degrees per second after 10 weeks of detraining ($p < 0.05$). Additionally, a decrease in the accuracy of knee joint proprioception was found, including active angle restoration at angles of 30°, 60°, and 90° and passive movement detection in flexion and extension at a 90-degree angle ($p < 0.05$). Moreover, dynamic balance significantly reduced in the single-leg form ($p < 0.05$). The findings revealed that wrestling -specific detraining period can significantly affect musculoskeletal and proprioceptive parameters in wrestlers, increasing the risk of injuries and reducing the performance and physical fitness. Consistent engagement in wrestling -specific training is essential to ensure optimal fitness and overall well-being, particularly for elite athletes.

Okudan, B., et al. (2025). "Physiological and psychological effects of weight loss-induced stress before a competition in senior wrestlers." Front Psychol **16**: 1568284.

BACKGROUND: It is known that stress occurring through/against a phenomenon will have physiological and psychological effects on the human organism. Therefore, this research aimed to determine the physiological and psychological effects of weight loss-induced stress before a competition in senior wrestlers. METHODS: This cross-sectional study used a purposeful sampling method to select participants. Two hundred and forty-three wrestlers participated in the study voluntarily. The perceived stress scale and athlete weight loss methodology and effects scale were used to determine the physiological and psychological effects of weight loss-induced stress. Independent samples t-test, One-way ANOVA, Pearson correlation analysis, and linear regression analysis were used to analyze normally distributed data. RESULTS: There was no statistical difference in the wrestlers' body weight loss percentages, stress levels, and weight loss methods and effects sub-dimensions according to their gender and wrestling styles ($p > 0.05$). Despite this, there was a statistical difference in wrestlers' stress levels, ergogenic aids sub-dimension from weight loss methods, and psychological effect levels according to body weight loss percentages ($p < 0.05$). Additionally, there was a positive relationship between the body weight loss percentages of wrestlers with their stress levels (r: 0.461) and psychological effects (r: 0.240). Furthermore, there was a positive relationship between the stress levels of wrestlers with the average physiological (r: 0.298) and psychological (r: 0.508) effects. According to these results, it was determined that as the body weight loss percentages of wrestlers increased, their stress levels and the psychological effects they were exposed to would increase. It was also determined that as the stress level of wrestlers increased, the physiological and psychological effects they were exposed to would increase the weight loss-induced stress levels of wrestlers positively predicted their exposure to physiological and psychological effects at 8.5% (Adj. R (2) = 0.085) and 25.8% (Adj. R (2) = 0.258), respectively. CONCLUSION: It was determined that as the percentage of body weight loss increases in wrestlers, the stress level will also increase and the stress level increases, the physiological and psychological effects will also increase. It is thought that weight loss-induced stress has both physiological and psychological effects on wrestlers and may reduce their athletic performance.

Pagliaro, A., et al. (2025). "Genetic Profiling and Performance Optimization in Elite Combat Sport Athletes: A Cross-Sectional Study Based on Total Genetic Score Analysis." Genes **16**(4): 461.

Background/Objectives: The interplay between genetics and athletic performance has garnered significant attention, particularly regarding performance-enhancing polymorphisms (PEPs) and their role in determining key traits that are critical for athletic success. Therefore, this study investigates the genetic predispositions related to peroxisome proliferator activated

receptor alpha (PPARα), angiotensin converting enzyme (ACE), and creatine kinase muscle-type (CKM) gene variants and their potential influence on elite point-fighting (PF) athletes. Methods: A total of 24 elite PF athletes (12 women and 12 men; age = 22.1 ± 5.8 years; body mass = 66.1 ± 15.4 kg; and height = 173.0 ± 9.5 cm, BMI = 21.8 ± 3.2 kg·m−2) participated in the study. Saliva samples were collected for DNA extraction and genotyping, analyzing the prevalence of key genetic markers, including the D allele and ID genotype for the ACE variant, the G allele and GG genotype for PPARα, and the A allele and AA genotype for CKM. Results: Genotyping revealed a high prevalence of key genetic markers among participants, with the D allele (58.33%) and ID genotype (66.67%) for the ACE variant, the G allele (77.08%) and GG genotype (54.17%) for PPARα, and the A allele (77.08%) with an AA genotype (62.50%) for CKM. The Total Genetic Score (TGS) analysis indicated a mixed-oriented genetic predisposition across the sample. Conclusions: Although PF athletes showed mixed aerobic/anaerobic genetic profiles, their training routines were primarily strength-oriented, suggesting a possible misalignment between genetic predispositions and their current training approach. These findings offer preliminary insights into the genetic characteristics of elite PF athletes and may inform future investigations into the potential role of genetic information in guiding training strategies.

PĂTRU, A. C. (2025). "THE PSYCHOLOGICAL IMPACT OF EARLY SELECTION ON CHILDREN IN WRESTLING." The Annals of Dunarea de Jos University of Galati Fascicle XV Physical Education and Sport Management: 3-12.

Early talent selection in wrestling, though often necessary for high-performance development, poses significant psychological risks when not tailored to children's emotional and maturational stages. This study investigates the mental and emotional consequences of early selection practices, especially in athletes aged 6 to 10. Drawing from self-determination theory and the Developmental Model of Sport Participation, the paper highlights how rigid, performance-based selection can lead to stress, anxiety, identity foreclosure, and sport dropout—particularly among early-maturing girls. Case studies from ACS Pătru Academy and CS Petrolul Ploiești illustrate the real-world impact of early puberty, with findings emphasizing the importance of psychological readiness, gender-sensitive coaching, and biological-age informed criteria. The paper proposes a child-centered, ethically grounded approach to selection, integrating physical assessments with emotional monitoring and parental guidance. Recommendations include avoiding labeling, adjusting expectations based on pubertal timing, and promoting long-term engagement over short-term success. Ultimately, early selection should serve not as a filter for exclusion, but as a structured opportunity to support each child's holistic development in sport.

Pavlov Ya, E., et al. (2025). "ANALYSIS OF THE PERFORMANCES OF THE 2024 OLYMPIC CHAMPION IN FREESTYLE WRESTLING IN THE CATEGORY UP TO 57 KG." Theory and Practice of Physical Culture(8): 13-16.

Objective of the study is to analyze the competitive activity of a freestyle wrestler. Methods and structure of the study: Pedagogical studies of competitive activity have been carried out, as well as an analysis of video recordings of freestyle wrestlers based on the results of their participation in the Olympic tournament in Paris. Results and conclusions. A study of wrestler Rei Higuchi's competitive practice revealed that at the 2024 Olympic Games he was active in the stand 63.6% of the time, and on the mat 36.3%. At the same time, his arsenal of technical actions was mainly reduced to 2-3 techniques. Despite the limited set of techniques, Higuchi is highly effective in applying proven combinations, varying them during the match. Key techniques include a side pass with a switch to the other side when an opponent resists, or a transfer to the left hand with a pass to the right side leg, a two-leg pass, as well as deceptive maneuvers preceding a technical action. Characteristic features of the Higuchi style are: disorientation of the opponent due to sudden movements in different directions, a stable stance, active work with the hands to prevent seizures and head control, as well as dominance in determining the pace and nature of the fight. The information about technical actions obtained as a result of the analysis forms a valuable methodological database that can assist coaches and athletes in optimizing the training process.

Peacock, C. A., et al. (2025). "The Impact of Rapid Weight Regain on Fight Outcomes in Bellator Mixed Martial Arts Athletes." Cureus **17**(1): e77785.

OBJECTIVES: This study aimed to evaluate the effect of rapid weight regain on the fight outcomes in professional mixed martial arts (MMA) athletes competing in Bellator. MATERIALS AND METHODS:

Twenty fighters (16 male and four female fighters) were included in the analysis. Official weigh-in and fight-night weights were recorded, and percentage weight regain was calculated. Fighters were divided into groups based on their percentage weight regain (<10% vs. ≥10%). Descriptive statistics were calculated, and independent t-tests and logistic regression were employed. RESULTS: The results indicated that while fighters significantly regained weight between weigh-ins and fight-night, this weight gain did not significantly ($p \geq 0.05$) predict fight outcomes. CONCLUSION: These findings suggest that weight regain may not provide a competitive advantage in Bellator MMA athletes.

Predoiu, R., et al. (2025). "Psychological resilience in Olympic combat sports." Frontiers in Psychology **16**: 1605765.

Introduction: The purpose of the study was to examine psychological resilience in Olympic combat sports, comparing gender, sports performance level and discipline type. Moreover, we verified whether resilience predicts sports performance. Materials and methods: Eighty-four athletes were involved in the study. Psychological resilience was assessed with the Romanian adaptation of the Brief Resilience Scale. Results: Using the Goodman and Kruskal tau association test a significant link was found between athletes` gender and the scoring on psychological resilience. Also, analysis of variance and Tukey post-hoc test highlighted significant differences between athletes` level (i.e., international, national, and regional/local athletes) ($p=0.02$, respectively $p<0.01$). Data analysis showed no significant differences in resilience ($p=0.182$) between the Olympic combat sports (disciplines) investigated (boxing, karate, fencing and taekwondo). In addition, a binomial logistic regression was performed, predicting athletes` likelihood to obtain higher sports performances based on psychological resilience. Conclusion: A slightly above average level of psychological resilience (generally) is linked with an increased likelihood of international and/or national performances in Olympic combat sports. On the other hand, athletes with lower caliber obtained the highest scores for resilience. In addition, male athletes obtained higher scores for resilience than female athletes. The study offers a valuable window into understanding psychological resilience in combat sports.

Razazan, R., et al. (2025). "Performance-enhancing effects of caffeine and L-Theanine among Iranian elite wrestlers: a focus on cognitive and specific physical performance." J Int Soc Sports Nutr **22**(1): 2564238.

BACKGROUND: Caffeine is a well-known ergogenic aid that can enhance physical and cognitive performance. However, it often induces side effects, such as anxiety and overstimulation, which can be problematic in high-pressure sports like wrestling. L-theanine, a non-stimulant amino acid found in tea, may help mitigate these effects by promoting a calm yet focused mental state. This study aimed to investigate the acute effects of caffeine, L-theanine, and their combination on physical performance, cognitive function, and anxiety in elite male wrestlers. METHODS: In a double-blind, placebo-controlled, crossover design, 12 elite male wrestlers (21.8 ± 2.1 years) completed four test sessions under randomized conditions: placebo (PLA), caffeine (CAF; 3 mg/kg), L-theanine (THE; 3 mg/kg), and caffeine + L-theanine (CAF+THE; 3 mg/kg each). After 60 minutes, athletes performed the wall-squat test, vertical jump height (VJH), medicine ball throw (MBT), handgrip strength, and the Specific Wrestling Fitness Test (SWFT). Cognitive function was assessed pre- and post-SWFT using a computerized Stroop test. Anxiety was assessed using the State-Trait Anxiety Inventory (STAI), and side effects were recorded. RESULTS: CAF+THE outperformed PLA in wall-squat time ($p = 0.001$), MBT ($p = 0.005$), VJH ($p = 0.011$), and grip strength ($p = 0.004$). SWFT throw count was highest in CAF+THE versus all other conditions ($p < 0.001$). Post-SWFT Stroop reaction time was faster in CAF+THE than PLA ($p = 0.004$) and THE ($p = 0.036$), and accuracy was also higher ($p = 0.009$ vs PLA). CAF alone increased state anxiety compared to PLA ($p = 0.021$), while CAF+THE reduced anxiety to below placebo levels (8% incidence vs 33%). Trait anxiety was lower in CAF+THE compared to CAF ($p = 0.018$). The prevalence of caffeine-induced tachycardia (92%) was notably reduced under CAF+THE (17%). CONCLUSION: CAF+THE (3 mg/kg each) enhances elite wrestlers' strength, endurance, cognitive speed, and accuracy while reducing anxiety and physiological side effects commonly associated with caffeine alone. This combination represents a safe, practical supplement strategy for combat sports athletes who must maintain explosive performance and mental control under stress. Coaches are encouraged to trial CAF+THE protocols during training to personalize timing and dosage.

Robalino, J., et al. (2025). "Assessing the Reliability of a Combat Sports Kick-Time Device." Sensors (Basel) **25**(5).

> In combat sports, precise technique evaluation is crucial for performance optimization; however, traditional systems for evaluating kick performance are frequently unreasonably complicated and costly. This study offers a useful and accessible substitute by introducing a contact mat-based tool that measures the roundhouse kick's execution time during both the attack and recovery phases and by demonstrating its reliability. The experimental sessions involved 16 male Shotokan karate athletes (age: 25.6 ± 7.1 years; height: 1.74 ± 0.05 m; body mass: 71.5 ± 8.7 kg; body fat percentage: 14.7 ± 6.7%; training experience: 11.0 ± 4.9 years). The protocol included four sessions, starting with a familiarization phase followed by three testing sessions (test, retest, and retest two), during which a standardized warm-up was performed along with the roundhouse kick test. The intraclass coefficient correlation (ICC) used indicated high reliability for the at-tack (ICC = 0.85, 95% CI [0.64, 0.94]), recovery (ICC = 0.89, 95% CI [0.75, 0.96]), and total time (ICC = 0.90, 95% CI [0.76, 0.96]). The Friedman test revealed no significant difference between testing sessions ($p > 0.31$), demonstrating high reliability and no significant differences between sessions. This study confirms the system as a simple and reliability tool for measuring roundhouse-kick timing in combat sports.

Sarıakçalı, B., et al. (2025). "The dual impact: physiological and psychological effects of rapid weight loss in wrestling." Front Psychol **15**: 1513129.

> INTRODUCTION: Athletes competing in weight-class sports often seek to gain an advantage by competing at lower weights. Athletes competing in weight-class sports often seek to gain an advantage by competing at lower weights. To achieve this, they aim to lose weight during the competition period, leading to various physiological and psychological changes. This study aimed to investigate the biochemical, hormonal, and psychological effects of weight reduction in elite wrestlers during the competition phase. METHODS: Thirty-seven elite male free style wrestlers (age: 19.02 ± 1.27) participated in the study. Samples were collected 5 days before and on the day of the match. RESULTS: A significant decrease in body weight was observed ($p < 0.05$). Levels of creatine, BUN, sodium, hematocrit, hemoglobin, LDH, and cortisol increased, while albumin, testosterone, and FSH levels decreased. There were no significant differences in potassium, ALT, AST, TSH levels. State and trait anxiety scores of the wrestlers increased significantly during the RWL period. CONCLUSION: The study concluded that elite wrestlers experienced significant changes in physiological and psychological parameters during the competition periods. These findings underscore the importance of careful monitoring of RWL strategies by coaches and athletes to mitigate the adverse effects on nutritional status, psychological well-being, and physical performance.

Shai, K. (2025). "Weight loss in female wrestlers: observations and recommendations from a competitor and coach." INTERNATIONAL JOURNAL OF WRESTLING SCIENCE **15**(1): 42-46.

> Weight cutting is the perceived equalizer in wrestling. We have used it to build resilient, disciplined athletes and humans. For some, weight cutting becomes a persona, for others, simply a means to a goal. Despite our unavoidable entanglement with managing weight, it is often the most misunderstood and mismanaged part of the wrestling experience. This is becoming especially true for girls and women. My experience as an athlete has given me the opportunity to see weight cutting and weight management from all angles. I was a 7-time U.S. National Team Member (add a covid year and many years on the sidelines due to surgeries), a World University Champion, and a 2-time Olympic Team alternate. I`ve experienced the emotional highs of victory and the physical lows of poor weight management. Now, as a coach and founder of LuchaFit, I work with the next generation of female wrestlers and their support systems to ensure they don`t make the same mistakes I did, or the mistakes of others I witnessed far too often. Throughout my career, I saw athletes with bright futures break down after repeat cuts and never see out their potential. I witnessed hidden disordered eating, and chronic under-fueling. The unfortunate truth I observed was the habits of the women at the top level, trickling down to our development and youth wrestlers. I also discovered how proper nutrition, a grounded mindset, and phase-specific adjustments could transform the weight cut process and enhance performance.. What`s missing in most wrestling rooms isn`t cranking up the heat up, it`s education. This commentary is meant to bridge the gap. Pulling from my personal experience, as well as the science behind female physiology, I created a comprehensive guide to help female wrestlers manage their weight safely and sustainably. I will be

summarizing the core principles from that guide, offering insights and recommendations to support athletes, coaches, parents, and the team behind them.

SHEVTSOV, A. V. M., A.B.; LAPTEV, A.I. (2025). "COMPARATIVE ANALYSIS OF SPEED CHARACTERISTICS WHEN USING CLUSTER SETS IN BENCH PRESS FOR GRECO-ROMAN WRESTLERS." Int J Wrestling Sci **15**(2): 22-26.

In the course of the pilot study, the effectiveness of traditional strength training and the cluster set method was compared with an equal ratio of load and rest time for Greco-Roman wrestlers in terms of the speed of the bench press. The analysis was carried out on the basis of kinematic characteristics during the exercise. The results showed that the use of cluster approaches contributes to achieving higher acceleration values compared to the traditional training method. However, the revealed differences did not reach statistical significance with a confidence level of $p < 0.05$. The data obtained indicate the prospects of using cluster training as a tool for individualizing and optimizing athletes' strength training.

Sho, I., et al. (2025). "Preliminary investigation into the biomechanics and EMG analysis of a setup in wrestling." INTERNATIONAL JOURNAL OF WRESTLING SCIENCE **15**(1): 28-41.

This preliminary study explored methods for evaluating the setup techniques for wrestling, which are critical for successful leg attacks. Two male collegiate wrestlers, who had placed in the top ranks at national-level student competitions, participated in simulated trials in which setup motions were executed and evaluated using both biomechanical and subjective measures. Three-dimensional motion capture and surface electromyography (EMG) were employed to assess the kinematic and muscular responses, while the visual analog scale (VAS) was used by three assessors—the attacker, defender, and a coach with competitive and coaching experience (the first author of this study)—to rate the quality of each setup. Moderate inter-rater agreement was observed in one the trials of one participant (Kendall`s $W = 0.411$, $p = 0.016$), whereas the other trial showed low agreement. Correlation analysis revealed that the kinematic features most strongly associated with the VAS scores varied among the assessors, suggesting differing evaluation criteria. EMG data showed consistent activation patterns, although quantitative comparisons were limited by the absence of a standardized reference point. These findings highlight the challenges of using subjective assessments alone to evaluate setup quality and suggest the need for objective kinematic indicators, such as vertical head acceleration, to standardize feedback and improve training. This study represents an early step toward developing reliable tools for analyzing and teaching setup movements during wrestling.

Slačanac, K. (2025). "SUMMARY OF COMPETITION PERFORMANCE AT THE SENIOR WORLD WRESTLING CHAMPIONSHIPS (ZAGREB, 2025)." Int J Wrestling Sci **15**(2): 34-36.

Stamenković, S., et al. (2025). "Kicking, Throwing, Grappling: How Combat Sports Shape Muscular Fitness and Motor Competence in Children." J Funct Morphol Kinesiol **10**(1).

Background/Objectives: This study aimed to examine differences in motor competence and muscular fitness between children engaged in combat sports and their peers who do not participate in structured physical activity. Methods: The sample consisted of 120 healthy eight-year-old children, evenly divided into two groups: 60 children practicing combat sports (karate, judo, and wrestling) for at least one year and 60 children without structured sports involvement. Motor competence was assessed using the Test of Gross Motor Development-2 (TGMD-2), while muscular fitness was evaluated through standing broad jump, grip strength, 30 s sit-ups, bent arm hang, medicine ball throw, and push-ups. For differences between groups, the independent samples t-test was performed. Results: Results indicated that children practicing combat sports demonstrated significantly higher locomotor and manipulative skills ($p < 0.01$, ES = 0.76-1.25) and superior muscular fitness across all tests ($p < 0.01$, ES = 0.53-1.09) compared to their peers. Conclusions: These findings highlight the positive impact of combat sports on overall physical development, particularly in enhancing motor competence, muscle strength, and endurance. Given the critical role of motor competence and physical fitness at this age, integrating combat sports into daily routines can support long-term athletic development, encourage physical activity, and enhance overall health. Future research should explore the influence of specific combat sports on distinct physical attributes and consider additional factors such as total physical activity levels.

Thomas, T., et al. (2025). "A silent opponent: Staphylococcus aureus and its impact on wrestlers." Int J Sports Med **46**(6): 383-389.

> Community acquired methicillin resistant Staphylococcus aureus infections have surged dramatically over the past decade. Athletes in contact sports, especially wrestlers, represent a unique subset of young, healthy individuals who are at heightened risk for transmitting methicillin resistant Staphylococcus aureus. The sport of wrestling has seen a significant increase in participation, particularly among adolescents, underscoring its growing popularity and the urgent need to address this issue. Unfortunately, the rates of community acquired methicillin resistant Staphylococcus aureus have followed a similar upward trend. Treatment options for community acquired methicillin resistant Staphylococcus aureus vary, ranging from topical or systemic antibiotics to more invasive interventions like incision, drainage, and intralesional injections. Preventive measures are also essential and include avoiding shared equipment, meticulous mat and gear cleaning, and eliminating bacterial colonization. While existing research supports the effectiveness of decolonization strategies in hospital settings, there is a pressing need to adapt and implement these approaches within the wrestling community. Current prevention methods, such as mat cleaning and skin checks before competitions, are insufficient on their own. By adopting more comprehensive decolonization protocols tailored to the wrestling environment, we can better protect athletes and reduce the incidence of community acquired methicillin resistant Staphylococcus aureus skin infections.

Tosun, M. I., et al. (2025). "Respiratory muscle training improves aerobic capacity and respiratory muscle strength in youth wrestlers." Front Physiol **16**: 1492446.

> BACKGROUND: Respiratory muscle training (RMT) has shown potential for enhancing athletic performance, but its effectiveness, in youth wrestlers, remains unclear. This study aimed to investigate the effects of RMT on respiratory muscle strength and aerobic endurance in youth wrestlers. METHODS: A parallel-grouperal was conducted across 22 male youth wrestlers aged 14.8 ± 0.4 years. Participants were assigned to an experimental(E) group (n = 11), which received RMT in addition to their regular wrestling training, or a control(C) group (n = 11), which continued with standard wrestling training only. The RMT was performed three times a week using the POWERbreathe Classic Blue® device at 50% of maximal inspiratory pressure (MIP). Pre- and post-intervention measurements included MIP, peak inspiratory flow (PIF), inspiratory volume (IV), and aerobic endurance assessed by the Yo-Yo Endurance Level 1 test (YYT). RESULTS: Significant improvements were observed in the E group, with MIP increasing by 9.57%, PIF by 14.77%, and IV by 10.46% ($p < 0.05$ for all). Aerobic endurance, as measured by VO(2)max and total running distance, also significantly improved by 4.93% and 8.22%, respectively ($p < 0.05$). The C group showed smaller yet significant gains in MIP, PIF, and VO(2)max, but no significant change in IV. CONCLUSION: The addition of RMT to traditional wrestling training significantly enhances respiratory muscle strength and aerobic endurance in youth wrestlers. These results suggest that RMT may be an effective complementary training method to improve athletic performance in this population.

Tronstad, M., et al. (2025). "It is like an endless guilt trip" - Greco-Roman wrestlers` willingness to train and compete with pain and/or injuries." International Journal of Sports Science & Coaching. https://doi.org/10.1177/17479541251350

> The aim of this study was to examine factors that impact wrestlers` decision-making related to their willingness to train and compete with pain and/or injuries. Five Greco-Roman male wrestlers from Norway, with a mean age of 27.0 (SD = 2.55), were interviewed about their decision-making process when dealing with pain and/or injury. The foundation for the study was based on a decision-based framework for presenteeism and absenteeism in athletes outlined by Mayer and Thiel.(Mayer J, Giel KE, Malcolm D, et al. Compete or rest? Willingness to compete hurt among adolescent elite athletes. Psychol Sport Exerc 2018; 35: 143-150.) The thematic analysis identified three themes: 1) personal self-expectations, 2) the wrestling culture, and 3) post career health. Overall, all the wrestlers expressed a high degree of willingness to risk their bodies physically to achieve top results in competitions. A strong desire to compete, athletic identity, a normalized pain culture, and fear of long-term consequences are the main factors impacting the wrestler's choice to train or compete with pain and/or injury.

Turgut, M., et al. (2025). "Effects of core stabilization exercises on trunk muscle strength, upper extremity performance, and balance in female wrestlers: A randomized controlled trial." International Journal of Sports Science & Coaching. 20(6), 2596-2602

The aim of this study is to investigate the effects of core stabilization exercises on trunk muscle strength, upper extremity performance, and balance in female wrestlers. This prospective randomized controlled study included 20 female wrestlers (mean age:17.5 ± 2.16 years). The participants were divided into two groups: the Core Stabilization Group (CSG) (n = 10), which performed a progressive core exercise program in addition to regular wrestling training, and the Control Group (CG) (n = 10), which continued with regular wrestling training only. Trunk muscle strength was assessed using an isokinetic dynamometer; upper extremity performance, with medicine ball throw test (MBTT), closed kinetic chain upper extremity test (CKC-UET), upper extremity Y-balance test (UE-YBT); balance with the functional reach test (FRT). Between-group comparisons revealed that the CSG had a greater improvement than the CG in 60° trunk flexion, MBTT, and UEY-BT (n2 = 0.492, p = 0.004; ?2 = 0.831, p = 0.014; n2 = 0.403, p = 0.032; n2 = 0.580, p = 0.038, respectively). The core stabilization exercises can improve trunk muscle strength, upper extremity performance, and balance in female wrestlers.

Tzeng, G. J., et al. (2025). "Caffeinated Chewing Gum Improves Sympathetic Nerve Activity and Wrestling Performance: A Double-Blind Crossover Trial." Int J Sports Physiol Perform: 21(1):41-48.

PURPOSE: This study investigated the effect of caffeinated chewing gum on sympathetic nerve activity and simulated wrestling performance. METHODS: Sixteen professional male wrestlers (age: 21.8 [1.0] y, height: 168.4 [4.5] cm, mass: 68.2 [8.7] kg) were randomly assigned to either a caffeinated-chewing-gum (CAF) trial or a placebo trial (PL) using a double-blind, randomized crossover study design. Participants warmed up for 15 minutes after chewing CAF containing 3 mg/kg body weight or caffeine-free placebo gum (PL) for 10 minutes. Participants were sequentially tested for grip strength and a specific wrestling performance test (SWPT). Saliva samples were collected when participants arrived at the laboratory and at the end of the SWPT to analyze caffeine and α-amylase concentrations. RESULTS: Caffeinated chewing gum significantly increased the number of throws in round 1 (CAF: 26.8 [3.3] times, PL: 24.0 [2.7] times; P = .002, Cohen d = 0.92), round 2 (CAF: 22.8 [3.3] times, PL: 20.4 [3.3] times; P = .047, Cohen d = 0.72), and total number of throws (CAF: 49.6 [5.7] times, PL: 44.5 [4.7] times; P = .001, Cohen d = 0.97), as measured by SWPT, compared with the PL. The saliva α-amylase concentrations were higher in the CAF trial than in the PL trial at the end of the SWPT (P = .040, Cohen d = 0.52). CONCLUSIONS: The results of this study provide support that caffeinated chewing gum is effective in improving the number of throws in an SWPT. Increased sympathetic nerve activity may have improved the number of throws.

V., L. S. (2025). "The evolution of performance metrics in the competitive arena of freestyle wrestling Olympic finalists." Theory and Practice of Physical Culture (2): 36-38.

Objective of the study was to examine the evolution of performance metrics for wrestlers in the discipline of freestyle wrestling at the Olympic Games, both before and after the rule modifications implemented in 2013. Methods and structure of the study. The following methods were used in the work: analysis of scientific and methodological literature, video analysis and timing of competitive duels for first and third places in each weight category at the Olympic Games in Paris (2024) in men's wrestling (discipline - freestyle wrestling), methods of mathematical statistics. Results and conclusions. In the research, we calculated specific metrics for the performance of the finalists in the wrestling competition at the Beijing Olympics (2024). These metrics included the average duration of each bout, the average time spent in the standing and clinching positions, activity, effectiveness, the number of high-scoring moves, and the reliability of the wrestler's offensive and defensive strategies. We then compared these findings with the results of our previous studies, which analyzed the performance of wrestlers at the Olympic Games in Atlanta (1996) and Sydney (2000). A comparative study revealed that the alterations in the rules governing competition in 2013 had a substantial effect on the performance of competitive activities, resulting in a shift towards enhancing the entertainment value of competitive matches. Specifically, the average duration of fights decreased due to an increase in the number of early victories. The intensity and overall effectiveness of the fights increased approximately twofold. The reliability of offensive actions decreased, while defensive actions increased. The proportion of high-scoring TTA remained relatively stable.

Yue, F., et al. (2025). "Effects of high-intensity interval training on aerobic and anaerobic capacity in Olympic combat sports: a systematic review and meta-analysis." Front Physiol **16**: 1576676.

This study aimed to summarize the findings of research comparing the effects of high-intensity interval training (HIIT) with active controls (alternative training methods) and passive controls (no exercise intervention) on aerobic and anaerobic performance in male and female athletes engaged in Olympic combat sports. Using the PICOS framework, the study included original research on healthy, trained male and female athletes in Olympic combat sports. These studies compared HIIT interventions (lasting at least 4 weeks) with control groups, focusing on aerobic and anaerobic performance outcomes. Studies that measured other fitness parameters, had non-randomized designs, or involved mixed interventions were excluded. A database search was conducted on February 1, 2025, through PubMed, Scopus, and Web of Science. Study quality and risk of bias were assessed using the Physiotherapy Evidence Database (PEDro) scale, while the GRADE scale was used to assess the certainty of evidence. After screening, 20 studies were deemed eligible for inclusion in this review. The results showed a significant effect of HIIT over control groups for maximal oxygen uptake, with a moderate effect size (ES = 1.007, 95% CI 0.701 to 1.312, $p < 0.001$). A significant, but small, effect favoring HIIT was also found for peak power output (ES = 0.528, 95% CI 0.102 to 0.954, $p = 0.015$). Furthermore, the analysis of mean power output showed a moderate significant effect of HIIT over controls (ES = 0.871, 95% CI 0.392 to 1.350, $p < 0.001$). In conclusion, HIIT, whether performed through running or sport-specific techniques, appears to effectively enhance both aerobic and anaerobic performance in athletes participating in Olympic combat sports. These improvements could contribute to better overall performance, supporting the physical and physiological demands of these sports.

Zhao, N., et al. (2025). "Epidemiology of causes and management of severe spinal injuries in elite male wrestlers." Int J Sports Med **46**(7): 525-532.

Spinal injuries are common in wrestlers. This study aimed to investigate the characteristics and post-injury management practices of severe spinal injuries among elite male wrestlers, with a comparative analysis between Greco-Roman and freestyle wrestling styles. A total of 110 elite male wrestlers (55 Greco-Roman and 55 freestyle athletes) were participated in the study, interviews were conducted severe spinal injuries and their post-injury management practices. Approximately 30.9% of participants reported experiencing severe spinal injuries, and among them, 58.8% were reinjury. These injuries predominantly occurred during technical training sessions due to overuse mechanisms during offensive maneuvers. Among the injured athletes, only 38.2% received specialized rehabilitation, and 35.3% obtained medical clearance before returning to play. The Greco-Roman style was found to have a significantly higher risk of reinjury than the freestyle (odds ratio=5.24 and 95% confidence interval=1.09-21.25). There were significant differences in the specific situations causing spinal injuries between wrestling styles (p=0.018). In conclusion, this study demonstrates that elite male wrestlers are at high risk of severe spinal injury and reinjury; yet, they often lack adequate post-injury management. Moreover, the differences in reinjury rates and specific situations causing injuries based on wrestling styles emphasize the need for tailored prevention and management strategies for each style.

Zimmerman, C., et al. (2025). "Repetitive head impact exposure in collegiate wrestling practices using instrumented mouthguard technology." Research in Sports Medicine. 33(6):661-668

Collegiate wrestling presents a higher risk of concussion than American football. However, there is limited research on repetitive head impact exposure in wrestling, and how it compares to football is unknown. Therefore, this study explores repetitive head impacts in Division 1 collegiate wrestlers (n = 11, age = 20 ± 2 years, 125-285 lbs) during the 2019-2020 wrestling season. Using an instrumented mouthguard, we examined impact numbers and head kinematics, including linear acceleration, angular velocity, and angular acceleration. Of the 246 true positive impacts identified, 60% were head-to-body, 30.1% head-to-head, and 9.9% head-to-ground. Although head-to-ground impacts demonstrated higher magnitudes, differences were not significant. The median PLA was 39.89 g, which is higher than previous reports of head impacts in football. This study provides insights for future wrestling research and the development of safety interventions, such as protective headgear or specialized training exercises, to reduce risks of brain trauma for wrestlers.