

# 2015

## Annual Compilation of Wrestling Research



**INTERNATIONAL NETWORK OF WRESTLING RESEARCHERS (INWR)**

*ADVANCING OUR SPORT THROUGH KNOWLEDGE*

*FAIRE PROGRESSER NOTRE SPORT PAR LA CONNAISSANCE*

*ПРОДВИЖЕНИЕ НАШЕГО СПОРТА ЧЕРЕЗ ЗНАНИЕ*

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## 2015 Wrestling Research Bibliography

This compilation of published wrestling-related research during 2015 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 400 academics, scientists, doctors and wrestling professionals, from 79 countries who are involved with the sport of wrestling. ([www.inwr-wrestling.com](http://www.inwr-wrestling.com))

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*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 last 5 senior world wrestling championships and we were instrumental in working with United World Wrestling (UWW) in establishing the Scientific Commission.



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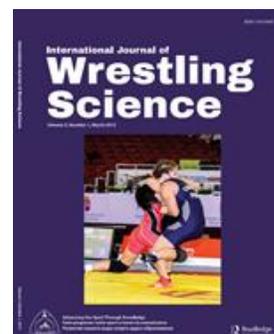
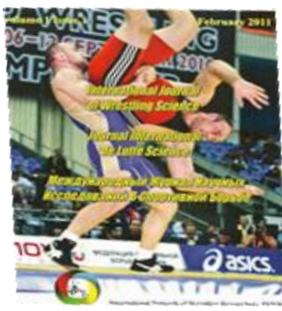
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# International Journal of Wrestling Science

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The International Journal of Wrestling Science 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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## 2015 Wrestling Research Bibliography

Açak M. (2015). The Importance of Motor Tests in Reducing the Injury of Children Who Are New to Wrestling. *International Journal of Wrestling Science*, 5: 47–51.

**ABSTRACT.** The effectiveness of motor tests to reduce the injuries of athletes who are new to wrestling was analyzed. Wrestling is very popular in Turkey. It has been found out that in the initial learning stages of wrestling, injuries are quite common. In the current study, the use of an initial fitness test protocol screening can reduce the injury rate in beginning wrestlers. Specifically, candidate athletes who could score 40 points or higher on the test battery are less likely to be injured. The implementation of this initial fitness screening can be an important injury prevention practice in youth wrestling.

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Acuña-Espinoza A, Aragón-Vargas LF, (2015) Rapid Changes of Body Weight after a Headstand: A Metrological Analysis. *PLoS ONE* 10(5):doi:10.1371/journal.pone.0124764

**Abstract:** Despite recent rules from amateur wrestling sport-governing bodies intended to discourage extreme weight loss measures, wrestling culture still includes varied methods to make weight, including holding a headstand position immediately before stepping on the scale. The procedure, according to the notion, will reduce reported mass anywhere between 250 and 500 g (weight between 2.45 and 4.89 N). The aim of this study was to compare any possible differences between the headstand procedure (HS) and a normal (CON) weight measure, using a metrological approach defined by the European Association of National Metrology Institutes. Seventeen adult men were weighed on a force plate before and after doing a headstand or standing normally for 30s. The order of treatment application was assigned randomly. Post-test weight was significantly larger than pre-test (mean +/- s.d.) (640.7 +/- 62.8) N and 640.3 +/- 62.7 N, respectively,  $p < 0.0001$ ) under both treatments. No treatment vs. time of test interaction was found. No significant difference was found between CON and HS weight (640.6 +/- 62.8 N and 640.9 +/- 62.9 N, respectively,  $p=0.3815$ ). The metrological tests suggest that the statistical differences found are related to the force plate measuring errors in every pre-established time interval. The 45 g (0.44 N) difference found between pretest and post-test lies within the uncertainty range identified for the equipment (+/- 110 g or 1.08 N). In conclusion, a 30-second headstand has no significant effect on registered body weight. The small variations obtained were due to equipment-associated measuring errors. This experiment offers systematic empirical evidence to aid in the elimination of this unjustified practice among the wrestling community.

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Aedma M, Timpman, S, Oopik V. (2015) Dietary sodium citrate supplementation does not improve upper-body anaerobic performance in trained wrestlers in simulated competition-day conditions. *Eur. J Appl. Physiol* 115, 387-396.

**Abstract:** PURPOSE: Similarly to a wrestling match, upper-body intermittent sprint performance (UBISP) test elicits severe acidosis. This study aimed to determine whether sodium citrate (CIT) ingestion would help to better maintain peak power (PP) and mean power (MP) output across four consecutive UBISP tests simulating wrestling matches of a competition-day. METHODS: In a double-blind, counterbalanced, crossover manner, 11 trained wrestlers ingested either placebo (PLC) or CIT (900 mg·kg<sup>-1</sup>) within a 17-h supplementation period. Thereafter they completed four (T1-T4) 6-min UBISP tests interspersed with 30-min recovery periods. RESULTS: Compared with PLC, CIT supplementation resulted in a persistent increase ( $P < 0.05$ ) in blood HCO<sub>3</sub><sup>-</sup> concentration and pH: pre-T1 25.6 % and 0.08 units, post-T4 39.1 % and 0.14 units, respectively. Post-T1 blood lactate concentration in CIT (16.1 +/- 3.8 mmol·L<sup>-1</sup>) was higher ( $P = 0.037$ ) than that in PLC (13.7 +/- 2.3 mmol·L<sup>-1</sup>). Decrease in plasma volume across the supplementation period and UBISP tests was greater ( $P = 0.03$ ) in PLC (-6.91 +/- 4.37 %) than in CIT (-1.51 +/- 4.34 %). There was an overall decrease ( $P = 0.028$ ) in ratings of perceived exertion in CIT compared with PLC, but no between-trial difference ( $P > 0.05$ ) in PP or MP in any UBISP test occurred. CONCLUSION: In trained wrestlers, CIT ingestion induces alkalosis, counteracts reduction in plasma volume, increases post-test blood lactate concentration and reduces perceived exertion, but does not improve PP or MP attained in consecutive UBISP tests simulating four wrestling matches of a competition-day.

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Aedma M, Timpmann S, Lätt E, and Ööpik V. (2015). Short-term creatine supplementation has no impact on upper-body anaerobic power in trained wrestlers. *Journal of the International Society of Sports Nutrition* December, 12:45, Published online 2015 Dec 9. Accessed at: [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4673838/pdf/12970\\_2015\\_Article\\_107.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4673838/pdf/12970_2015_Article_107.pdf)

**Abstract:** Background: Creatine (CR) is considered an effective nutritional supplement having ergogenic effects, which appears more pronounced in upper-body compared to lower-body exercise. Nevertheless, results regarding the impact of CR loading on repeated high-intensity arm-cranking exercise are scarce and in some cases conflicting. Interestingly, few of the conducted studies have structured their research designs to mimic real world sporting events. Therefore, our purpose was to address the hypothesis that CR ingestion would increase anaerobic power output in consecutive upper-body intermittent sprint performance (UBISP) tests designed to simulate wrestling matches on a competition-day. Methods: In a double-blind, placebo-controlled, parallel-group study, 20 trained wrestlers were assigned to either placebo or CR supplemented group (0.3 g · kg<sup>-1</sup> of body mass per day). Four 6-min UBISP tests interspersed with 30-min recovery periods were performed before (trial 1) and after 5 days (trial 2) of supplementation. Each test consisted of six 15-s periods of arm-cranking at maximal executable cadence against resistance of 0.04 kg · kg<sup>-1</sup> body mass interspersed with 40-s unloaded easy cranking periods and 5-s acceleration intervals (T1–T4). Mean power (MP), peak power (PP), fatigue index and heart rate parameters were measured during UBISP tests. Also, body weight and hydration status were assessed. Principle measures were statistical analysed with mixed-model ANOVAs. Results: Mean individual CR consumption in the CR group was 24.8 ± 2.5 g · d<sup>-1</sup>. No significant (P > 0.05) differences occurred in body mass or hydration status indices between the groups or across trials. MP, PP and fatigue index responses were unaffected by supplementation; although, a significant reduction in MP and PP did occur from T1 to T4 in both trial 1 and 2 (P < 0.001). Overall heart rate responses in the tests tended to be higher in the CR than PLC group (P < 0.05); but, trends in responses in trials and tests were comparable (P > 0.05). Conclusion: These results suggest that 5-day CR supplementation has no impact on upper-body muscle anaerobic power output in consecutive UBISP anaerobic tests mimicking wrestling matches on a competition day.  
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Anderson, B. J., D. P. McGuire, M. Reed, M. Foster, and D. Ortiz. (2015). Prophylactic Valacyclovir to Prevent Outbreaks of Primary Herpes Gladiatorum at a 28-Day Wrestling Camp: A 10-Year Review. *Clin. J Sport Med*, Nov 4. [Epub ahead of print].

**Abstract:** OBJECTIVE: To determine efficacy of using oral antiviral medication to reduce herpes gladiatorum (HG) at summer high-school wrestling camps. DESIGN: Usage of antiviral medication hypothetically reduces the likelihood of HG outbreaks. This is an observational study examining the effectiveness of oral antiviral medications in reducing outbreaks of HG because of Herpes Simplex type-1 virus (HSV). SETTING: A 28-day high-school summer wrestling camp at the University of Minnesota from 2003 to 2012. PARTICIPANTS: Each summer approximately 300 high-school wrestlers, age 13 to 18 years of age, participated in this camp. INTERVENTIONS: All athletes were recommended to take valacyclovir 1 g once a day for the duration of the camp. Athletes who did not use any antiviral medication comprised the comparison group for this study. Individuals were screened daily and those with outbreaks of HG were withheld from practice for 120 hours in accordance with National Collegiate Athletic Association/National Federation of State High School Associations guidelines. MAIN OUTCOME MEASURES: To measure viral outbreaks of HG due to HSV-1, determine level of compliance, and determine efficacy of antiviral medication in reducing the occurrence of HG at this 28-day wrestling camp. RESULTS: Of the 2793 athletes who completed camp, 1995 (71%) used antiviral medication, and 36 outbreaks occurred. Eighty-four athletes had a known history of HG/recurrent herpes labialis. Overall, prophylactic antiviral medication resulted in an 84.7% decrease in the probability of an outbreak. Prophylactic valacyclovir (1 g daily) lowered the incidence of individual outbreaks by 89.5%. CONCLUSIONS: Prophylactic use of valacyclovir 1 g once a day is efficacious in lowering the incidence of HSV outbreaks among adolescents at a 28-day wrestling camp.  
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Arakawa H, Yamashita D, Arimitsu T, Sakae K, Shimizu S. (2015). Anthropometric Characteristics of Elite Japanese Female Wrestlers. *International Journal of Wrestling Science*, 5: 13–21.

**ABSTRACT.** The purposes of this study were to disclose the anthropometrical characteristics of elite Japanese female wrestlers and to compare them with those of other athletes reported in the literature. To this end, we tested 17 elite Japanese female wrestlers (nine and eight wrestlers, in light and heavyweight categories, respectively), most of who had won gold medals at the internationally recognized tournaments. Body composition, circumferences, and limb lengths were tested based on multi-frequency

bioimpedance analysis (InBody 730, Biospace, Inc.) and whole-body scanning system (Body Line Scanner, Hamamatsu Photonics KK). The main results indicate that the participants are characterized as having great FFM (fat-free mass divided by height squared,  $18.8 \pm 0.8$  in light and  $20.5 \pm 0.8$  in heavyweight groups) with intensely enlarged circumference especially within the arms ( $30.0 \pm 2.7$  cm for upper arms and  $24.2 \pm 1.5$  cm for forearms). These findings suggest that elite female wrestlers have site-specific hypertrophied musculature only in the upper body, despite a general awareness of difficulty in developing upper limb muscles in women. We concluded that extreme development of fat-free tissue, specifically around the upper body, is an important requirement for female wrestlers to win the worldwide prestigious tournaments.

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Ball, J.W. & Bice, M. W. (2015). Adult BMI and Physical Activity: Retrospective Evaluation of High School Sport and Recreation Participation. *Recreational Sports Journal*, 3(9), 144-156.

Research reports children and adolescents who are physically active (PA) are more likely to be active as adults. Physical Activity (PA) levels and BMI status were examined among adults who participated in sport and recreational activities while in high school. The current study consists of 1363 adults who completed the questionnaire. Correlations were used to assess associations among variables and a regression analysis was used to describe the combined effect of BMI status on the outcome of interest (PA). The current study revealed participants who participated in sports or recreational activities while in high school reported to have more individuals in the normal (healthy) BMI category and met the American PA recommendations for the number of day and minutes engaged in moderate and vigorous physical activity. Data suggests participation in sport and recreational activities while in high school positively influences levels of adult PA and healthier BMIs.

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Baria, M. R., Terry MJ, Driscoll SW, Andrews KL, Soma DB, and Prideaux CC. (2015) Wrestlers with Limb Deficiencies: A Descriptive Study. *Am. J Phys. Med. Rehabil.* 94:1052-1057.

**Abstract:** OBJECTIVE: The objective of this study was to determine if wrestling is a safe, positive athletic option for limb-deficient individuals. DESIGN: This descriptive study consisted of an opportunity sample of limb-deficient wrestlers, aged 5 yrs and older with at least 1 yr of experience. Participants completed a questionnaire regarding health, satisfaction, and achievements. Descriptive statistics were used for analysis. RESULTS: Sixteen male wrestlers reported nine below-the-knee, five above-the-knee, and three below-the-elbow limb deficiencies. There were nine congenital deficiencies and seven amputations acquired during childhood. Two individuals won National Collegiate Athletic Association championships, and seven competed collegiately. All reported a positive impact on quality-of-life, 87% reported no difficulty finding acceptance with the team, and 50% experienced wrestling-related residual limb complications. Associations between (1) residual limb complications before and during wrestling and (2) skin breakdown before and during wrestling did not demonstrate statistical significance ( $P = 0.30$  and  $0.1189$ , respectively). CONCLUSIONS: This study suggests that wrestling is a safe, positive sport for limb-deficient individuals, that it fosters competitive equality between impaired and nonimpaired participants, and that it has a positive impact on health and quality-of-life. The incidence of residual limb complications warrants monitoring.

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Berengui R, Ortin FJ, Garcés de los Fayos EJ, Gullon JM, Pinto. (2015) Optimism, burnout and mood states in competitive sports [article in Portuguese]. *Análise Psicológica*, 33(2), 221-233

**Abstract:** The aim of the present study is to analyse the relation between dispositional optimism, burnout syndrome and mood of athletes in a pre-competitive state. The sample was composed by 227 wrestling athletes who were competing in the National Wrestling Championship in Spain. The instruments used for this study were LOT-R a Spanish adaptation of Otero et al. (1998) of the Scheier and Carver (1985) test in the review of Scheier, Carver and Bridges (1994), and the Inventory of Burnout for Athletes (IBD). The IBD is an adaptation designed for populations involved in sports made by Garcés de Los Fayos (1999) of the Maslach Burnout Inventory (Maslach & Jackson, 1981) and the Profile of Mood States (POMS). To evaluate the profile of mood state a reduced and adapted version by Fuentes, Balaguer, Meliá and García-Merita (1995) of the original instrument of McNair, Lorr and Dropplemam (1971) was used. The questionnaires were applied during the Wrestling National Championship in Spain, in the cadet and senior categories. The results indicate a relation between optimism and some dimensions of burnout, for example emotional exhaustion and depersonalization. Furthermore optimism was related with mood states like depression, exhaustion and anger.

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- Cengiz, A. (2015) Effects of self-selected dehydration and meaningful rehydration on anaerobic power and heart rate recovery of elite wrestlers. *J Phys. Ther. Sci* 27:1441-1444.  
**Abstract:** [Purpose] This study aimed to verify the effects of self-directed weight loss on lower- and upper-body power, fatigue index, and heart rate recovery immediately before a meaningful competition (12 hours of recovery). In addition, this study tested the hypothesis that weight loss provides advantages in strength and power, as the relative power of the wrestlers is higher than that of opponents in the same weight class who do not reduce weight. [Subjects and Methods] Eleven well-trained wrestlers volunteered for the study. At baseline, their mean  $\pm$  SD age, body mass, and height were 20.45  $\pm$  2.69 years, 74.36  $\pm$  9.22 kg, and 177  $\pm$  5.71 cm, respectively. Repeated-measures one-way analysis of variance was performed to analyze differences. [Results] Rapid weight loss achieved by restriction of energy and fluid intake resulted in exercise-impaired decreases in peak power and increased fatigue index. Moreover, weight loss by dehydration negatively affected cardiovascular stability. [Conclusion] Most of the negative effects of rapid weight loss disappear after a 12-hour recovery period, and relative peak power increases after weight loss.  
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- Chapman, J. and Woodman T. (2016) Disordered eating in male athletes: a meta-analysis. *J Sports Sci*: 34(2):101-9. (published on-line April 28, 2015)  
**Abstract:** We examined the propensity for male athletes to exhibit symptoms of disordered eating. Using meta-analytic techniques, we examined overall effect size, individual effect sizes for specific sport types, standard of athletic competition and diagnostic tools from 31 studies. When all studies were considered as a homogeneous group, male athletes did not have symptoms of disordered eating that were significantly different from non-athletic controls. However, significant moderator effects emerged for sport type and measurement: (a) wrestling reported a greater incidence of disordered eating; and (b) studies that reported data from the Eating Attitudes Test yielded a significantly greater incidence of disordered eating in male athletes compared to non-athletes. Although some sports seem to present a higher risk of disordered eating compared to others, the effects are weak and heterogeneous. We make suggestions for the development of the research area, which has been severely hampered by the diagnostic tools that have been available for the study of men.  
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- Chino, K., Y. Saito, S. Matsumoto, T. Ikeda, and Y. Yanagawa. (2015) Investigation of exercise intensity during a freestyle wrestling match. *J Sports Med. Phys. Fitness* 55 4, 290-296.  
**Abstract:** AIM: This study investigated changes in exercise intensity during a freestyle wrestling match. METHODS: Wrestling matches that consisted of three periods of 2 min were performed by nine elite collegiate male wrestlers. Exercise intensity was measured using heart rate (HR), blood lactate concentration ([BLa-]), and rating of perceived exertion (RPE). HR was continuously recorded during the match, and mean HR during each period was obtained. [BLa-] and RPE according to the 6-20-point Borg Perceived Exertion Scale were measured immediately after each period. RESULTS: HR during the wrestling match increased as a whole, but a continuous decrease in HR was observed during the first half of the second and third periods. This was likely caused by a cautious strategy involving reduced aggressive actions. HR significantly increased ( $P < 0.05$ ) from the first period (81  $\pm$  6% of maximal HR [HRmax]) to the second period (88  $\pm$  5% of HR(max)), and from the second to the third periods (92  $\pm$  5% of HR(max)). [BLa-] significantly increased ( $P < 0.05$ ) from the first period (7.6  $\pm$  2.0 mmol.L<sup>-1</sup>) to the second period (10.4  $\pm$  4.2 mmol.L<sup>-1</sup>), but not from the second to the third periods (11.5  $\pm$  3.1 mmol.L<sup>-1</sup>). RPE significantly increased across the three periods (first, 13  $\pm$  1; second, 15  $\pm$  2; and third periods, 17  $\pm$  2,  $P < 0.05$ ). CONCLUSION: Our results on changes in exercise intensity during each period and between periods would be helpful for making strategic decisions during wrestling matches and for planning daily training.  
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- Cochrane, KC, Housh, TJ, Bergstrom, HC, Jenkins, NDM, Johnson, GO, Housh, DJ, Traylor, DA, Lewis, RW Jr, Schmidt, RJ, and Cramer, JT. (2015) Dissociations among direct and indirect indicators of adiposity in young wrestlers. *J Strength Cond Res* 29(2): 408–415.  
 The purposes of this study were to: (a) examine the age-related patterns of differences in height (HT), body mass (BM), percent body fat (% fat), body mass index (BMI), and skinfolds (SF) in 11- to 18-year-old wrestlers; (b) determine the coherence of direct (% fat) and indirect (BMI and SFs) indicators of adiposity in the wrestlers; and (c) compare the age-related patterns and mean values for HT, BM, BMI, subscapular, and triceps SF for the wrestlers to those of national samples of boys from the National

Health and Nutrition Examination Survey (NHANES) database. One hundred thirty wrestlers were divided into 8 independent yearly age groups (AG): AG11–AG18 years. Height, BM, BMI, subscapular SF, triceps SF, medial calf SF, thigh SF, sum of SFs, and % fat were assessed. There were no differences between the wrestlers and NHANES samples for age-related patterns of BMI ( $0.61$  and  $0.63 \text{ kg}\cdot\text{m}^{-2}\cdot\text{y}^{-1}$ ) subscapular SF ( $0.47$  and  $0.37 \text{ mm}\cdot\text{y}^{-1}$ ), or triceps SF ( $20.31$  and  $20.39 \text{ mm}\cdot\text{y}^{-1}$ ). Furthermore, the wrestlers displayed no differences in % fat between age groups. The results indicated that: (a) dissociations existed between the direct and indirect indicators of adiposity; (b) the wrestlers were similar in height but had smaller upper-body SFs when compared with NHANES samples; and (c) participation in wrestling (1–8 years) had no adverse effects on the normal age related growth patterns for HT, but favorable effects on measures of adiposity.

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Coswig VS, Fukuda DH, Del Vecchio FB. (2015). Rapid Weight Loss Elicits Harmful Biochemical and Hormonal Responses in Mixed Martial Arts Athletes. *Int J Sport Nutr Exerc Metab*, 25(5):480-6.

**Abstract:** The purpose of this study was to compare biochemical and hormonal responses between mixed martial arts (MMA) competitors with minimal prefight weight loss and those undergoing rapid weight loss (RWL). Blood samples were taken from 17 MMA athletes (Mean $\pm$  SD; age:  $27.4 \pm 5.3$ yr; body mass:  $76.2 \pm 12.4$ kg; height:  $1.71 \pm 0.05$ m and training experience:  $39.4 \pm 25$  months) before and after each match, according to the official events rules. The no rapid weight loss (NWL,  $n = 12$ ) group weighed in on the day of the event (~30 min prior fight) and athletes declared not having used RWL strategies, while the RWL group ( $n = 5$ ) weighed in 24 hr before the event and the athletes claimed to have lost  $7.4 \pm 1.1$ kg, approximately 10% of their body mass in the week preceding the event. Results showed significant ( $p < .05$ ) increases following fights, regardless of group, in lactate, glucose, lactate dehydrogenase (LDH), creatinine, and cortisol for all athletes. With regard to group differences, NWL had significantly ( $p < .05$ ) greater creatinine levels (Mean $\pm$  SD; pre to post) (NWL=  $101.6 \pm 15$ - $142.3 \pm 22.9$  $\mu\text{mol/L}$  and RWL=  $68.9 \pm 10.6$ - $79.5 \pm 15.9$  $\mu\text{mol/L}$ ), while RWL had higher LDH (median [interquartile range]; pre to post) (NWL=  $211.5$ [ $183$ - $236$ ] to  $231$ [ $203$ - $258$ ]U/L and RWL=  $390$ [ $370.5$ - $443.5$ ] to  $488$ [ $463.5$ - $540.5$ ]U/L) and AST (NWL=  $30$ [ $22$ - $37$ ] to  $32$ [ $22$ - $41$ ]U/L and  $39$ [ $32.5$ - $76.5$ ] to  $72$ [ $38.5$ - $112.5$ ] U/L) values (NWL versus RWL,  $p < .05$ ). Post hoc analysis showed that AST significantly increased in only the RWL group, while creatinine increased in only the NWL group. The practice of rapid weight loss showed a negative impact on energy availability and increased both muscle damage markers and catabolic expression in MMA fighters.

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Curby DG, Jomand G. (2015). The Evolution of Women's Wrestling: .History, Issues and Future. *International Journal of Wrestling Science*, 5, 2–12.

**ABSTRACT.** The growth of modern women's wrestling around the world has been rapid. From the first world championships held in 1987, with eight countries participating, it has grown to be recognized as an Olympic sport with over 100 countries having registered competitors. This has been accompanied with new social definitions of perceived gender roles. The participation of women in sport has followed a path of inclusion in those activities that have been culturally deemed as "appropriate for women," to participation in all of the combative Olympic sports. This has radically changed the perceptions of what are held as universally inherent gender differences, as well as labeling of certain sports themselves as masculine or feminine. Women played a large role in the struggle to keep wrestling in the Olympic program. Issues that are still present include the identification of promotion strategies to reach more women, as well as enlisting advocates to deal with cultural and religious barriers to women's participation in wrestling.

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Demirelli S, Sam CT, Ermis E, Degirmenci H, Sen I, Arisoy A, Arslan K, Duman H, Simsek Z. (2015) Long-Term Cardiac Remodeling in Elite Athletes: Assessment by Tissue Doppler and Speckle Tracking Echocardiography. *Echocardiography*. Sep; 32(9):1367-73.

**Abstract AIMS:** Currently, it remains unclear whether there are differences in the long-term physiologic and adaptive changes in an athlete's heart, varying by the type of exercise undertaken. In this study, we used standard and speckle tracking echocardiography (STE) to evaluate the long-term effects of cardiac remodeling, which persisted many years after retiring from professional sports (marathon running and wrestling). **METHODS AND RESULTS:** Twenty-four marathon runners, 25 wrestlers, and 24 healthy subjects were included in the study. Left ventricular (LV) strain (S) and strain rate (Sr) were evaluated by apical two- (2C), three- (3C), and four-chamber (4C) imaging. Global S and Sr were calculated by averaging the 3 apical views. The participants' mean age was comparable across the 3 groups. Weight, body mass index, LV mass, LV mass index, and relative diastolic wall thickness were higher in wrestlers

than the other groups ( $P < 0.001$ ). Systolic and diastolic functions, evaluated using conventional echocardiography, were comparable among the 3 groups. 2C, 3C, and 4C longitudinal strain (LS), global LS (GLS), and global Sr systolic filling (SrS) values were comparable between the marathon runners and control group; however, GLS, LS-2C, GLSrS, SrS-3C, and SrS-2C values were significantly increased in wrestlers compared with the control group. **CONCLUSIONS:** Myocardial changes in wrestlers and marathon runners who quit sports after an extensive period were evaluated using standard echocardiographic and STE parameters. Although they had stopped playing active sports more than 10 years earlier, both the structural and functional properties of the heart were maintained in wrestlers.  
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Demirkan, E., M. Koz, M. Kutlu, and M. Favre. (2015) Comparison of Physical and Physiological Profiles in Elite and Amateur Young Wrestlers. *J Strength. Cond. Res.*, 29,1876-1883.

**Abstract:** The aim of this study is to examine the physical and physiological determinants of wrestling success between elite and amateur male wrestlers. The wrestlers ( $N = 126$ ) were first assigned to 3 groups based on their competitive level (top elite, elite, and amateur) and then to 6 groups according to their body mass (light, middle, and heavy weight) and their competitive level (elite and amateur). Top elite and elite wrestlers had significantly ( $p \leq 0.05$ ) more training experiences and maximal oxygen uptake compared with the amateur group. In separating weight classes, light- and middle-weight elite (MWE) wrestlers had significantly ( $p \leq 0.05$ ) more training experience (7-20%) compared with the light- and middle-weight amateur (MWA) wrestlers. No significant differences were detected between elite and amateur groups (light-, middle-, and heavy-weight wrestlers) for age, body mass, height, body mass index, and body fat ( $p > 0.05$ ), with the exception of height for heavy wrestlers. Leg average and peak power values (in watts and watts per kilogram) in MWE were higher than MWA (6.5 and 13%,  $p \leq 0.05$ ). Relative leg average power value in heavy-weight elite (HWE) (in watts per kilogram) was higher than heavy-weight amateur (HWA) (9.6%,  $p \leq 0.05$ ). It was seen that elite wrestlers in MWE and HWE statistically possessed a higher  $VO_{2max}$  (12.5 and 11.4%, respectively) than amateur middle- and heavy-weight wrestlers ( $p \leq 0.05$ ). The results of this study suggest that training experience, aerobic endurance, and anaerobic power and capacity will give a clear advantage for the wrestlers to take part in the elite group.

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Divert, V. E., S. G. Krivoshchekov, and S. N. Vodyanitsky. (2015) [Individual-typological evaluation of cardiorespiratory responses to hypoxia and hypercapnia in young healthy men]. *Fiziol. Cheloveka* 41, 64-73.

**Abstract:** The aim of the study was the approaches development to a substantiation of recommendations on the persons selection for different types of physical exercise on the basis of individual chemoreflex reactivity of cardiorespiratory system. That's for the ventilatory and cardiac responses in tests with increasing inhalation hypoxia and hypercapnia on the group of young healthy man was performed. It was shown that hypoxia induce predominantly cardiac response, but hypercapnia--ventilatory response. On that predominantly chemoreflex reactions (respiration system to hypercarbia and cardiac--to hypoxaemia) four types of in parts were defined: small reactions in both parts (type 1), small reaction of cardiac system and strong of respiratory system (type 2), strong for heart response and small for respiration (type 3), and strong for both parts (type 4). Statistical analysis has shown that each type of reactions is specific to certain kind of sports training: 1 type for swimmers, 2 and 3 types for skiers, 4 type for boxers, weight lifters and wrestlers. For skiers group the inverse regression dependence between the growth of heart reactivity to hypoxaemia and depression of the pulmonary ventilation reactivity to hypercarbia is revealed at joint rising of the oxygen consumption per unit body weight. High quality skiers are distinguished by relative balance of chemoreflex responses of respiration and heart. It was found that physically untrained persons have pronounced individual variability of cardiorespiratory system chemoreflex reactions, what can be used for personal recommendations for choosing the kind of sports to employment.

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Dizdarevic, I., S. Low, D. W. Currie, R. D. Comstock, S. Hammoud, and A. Atanda, Jr. (2015) Epidemiology of Elbow Dislocations in High School Athletes. *Am. J Sports Med.* DOI: 10.1177/0363546515610527  
**Abstract:** BACKGROUND: The elbow is the second most commonly dislocated major joint in the general population. Previous studies that focused on emergency department populations indicate that such injuries occur most frequently among adolescent athletes. PURPOSE: To describe the epidemiological rates and patterns of sports-related elbow dislocations in high school athletes. STUDY DESIGN: Descriptive epidemiology study. METHODS: Sports-related injury data for the 2005-2006 through 2013-2014 academic years from a national convenience sample of high schools participating in the National

High School Sports-Related Injury Surveillance Study (High School Reporting Information Online [RIO]) were analyzed. RESULTS: Certified athletic trainers participating in High School RIO reported 115 of 1246 (9.2%) elbow injuries as elbow dislocations. A total of 30,415,179 athlete exposures (AEs) were reported during the study period, resulting in a dislocation rate of 0.38 per 100,000 AEs. The majority of the dislocations resulted from boys' wrestling (46.1%) and football (37.4%). Elbow dislocation rates were higher in competition than in practice. Also, 91.3% of dislocations occurred in boys' sports. Among both boys (60.4%) and girls (88.9%), the majority of injuries occurred during varsity sports activities. Contact with another person was the most common injury mechanism (46.9%), followed by contact with the playing surface (46.0%). Dislocations more commonly resulted in removal from play for more than 3 weeks (23.4% vs 6.9%, respectively) or medical disqualification (36.9% vs 7.0%, respectively) compared with other elbow injuries. Dislocations were also more likely to result in surgical treatment than other elbow injuries (13.6% vs 4.7%, respectively). CONCLUSION: In high school athletes, elbow dislocations result in longer removal from play and are more likely to require surgical treatment than nondislocation-associated elbow injuries. Rates and patterns of elbow dislocations vary by sport. In high-risk sports, focused sport-specific prevention strategies may help to decrease the rates and severity of elbow dislocation injuries.

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Driban, J. B., J. M. Hootman, M. R. Sittler, K. Harris, and N. M. Cattano. (2015) Is Participation in Certain Sports Associated With Knee Osteoarthritis? A Systematic Review. *J Athl. Train.* 50, 2, Jan 9. [Epub ahead of print] doi: 10.4085/1062-6050-50.2.08.

Abstract: OBJECTIVE: Information regarding the relative risks of developing knee osteoarthritis (OA) as a result of sport participation is critical for shaping public health messages and for informing knee-OA prevention strategies. The purpose of this systematic review was to investigate the association between participation in specific sports and knee OA. DATA SOURCES: We completed a systematic literature search in September 2012 using 6 bibliographic databases (PubMed; Ovid MEDLINE; Your Journals@Ovid; American College of Physicians Journal Club; Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Review, Database of Abstracts of Reviews of Effects; and Ovid HealthStar), manual searches (4 journals), and reference lists (56 articles). STUDY SELECTION: Studies were included if they met the following 4 criteria: (1) an aim was to investigate an association between sport participation and knee osteoarthritis; (2) the outcome measure was radiographic knee osteoarthritis, clinical knee osteoarthritis, total knee replacement, self-reported diagnosis of knee osteoarthritis, or placement on a waiting list for a total knee replacement; (3) the study design was case-control or cohort; and (4) the study was written in English. Articles were excluded if the study population had an underlying condition other than knee osteoarthritis. DATA EXTRACTION: One investigator extracted data (eg, group descriptions, knee osteoarthritis prevalence, source of nonexposed controls). DATA SYNTHESIS: The overall knee-osteoarthritis prevalence in sport participants (n = 3759) was 7.7%, compared with 7.3% among nonexposed controls (referent group n = 4730, odds ratio [OR] = 0.9). Specific sports with a significantly higher prevalence of knee osteoarthritis were soccer (OR = 3.5), elite-level long-distance running (OR = 3.3), competitive weight lifting (OR = 6.9), and wrestling (OR = 3.8). Elite-sport (soccer or orienteering) and nonelite-sport (soccer or American football) participants without a history of knee injury had a greater prevalence of knee osteoarthritis than nonexposed participants. CONCLUSIONS: Participants in soccer (elite and nonelite), elite-level long-distance running, weight lifting, and wrestling had an increased prevalence of knee osteoarthritis and should be targeted for risk-reduction strategies.

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Dubnov-Raz G, Mashlach-Arazi Y, Nouriel A, Raz R, Constantini NW. (2015) Can height categories replace weight categories in striking martial arts competitions? A pilot study. *J Hum Kinet.* Oct 14; 47:91-8. doi: 10.1515/hukin-2015-0065.

**Abstract:** In most combat sports and martial arts, athletes compete within weight categories. Disordered eating behaviors and intentional pre-competition rapid weight loss are commonly seen in this population, attributed to weight categorization. We examined if height categories can be used as an alternative to weight categories for competition, in order to protect the health of athletes. Height and weight of 169 child and adolescent competitive karate athletes were measured. Participants were divided into eleven hypothetical weight categories of 5 kg increments, and eleven hypothetical height categories of 5 cm increments. We calculated the coefficient of variation of height and weight by each division method. We also calculated how many participants fit into corresponding categories of both height and weight, and how many would shift a category if divided by height. There was a high correlation between height and weight ( $r = 0.91$ ,  $p < 0.001$ ). The mean range of heights seen within current weight categories was reduced

by 83% when participants were divided by height. When allocating athletes by height categories, 74% of athletes would shift up or down one weight category at most, compared with the current categorization method. We conclude that dividing young karate athletes by height categories significantly reduced the range of heights of competitors within the category. Such categorization would not cause athletes to compete against much heavier opponents in most cases. Using height categories as a means to reduce eating disorders in combat sports should be further examined.

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Durkalec-Michalski K, Gościńska I, Jeszka J. (2015) Does conventional body weight reduction decreasing anaerobic capacity of boxers in the competition period? ***Archives of Budo | Science of Martial Arts***. Volume 11, 251-258

**Abstract: Background & Study Aim:** Body weight reduction (BWR) is a serious problem in combat sports. Athletes frequently reduce their body weight in an inappropriate manner, which may have a negative effect on their exercise capacity and health. In view of the above and taking into consideration the limited number of studies conducted on trained boxers, the aim of this study was the knowledge about effect of conventional body weight reduction, used in this sports discipline, on body composition and anaerobic adaptation in athletes. **Material & Methods:** The study involved 20 trained male boxers. The energy balance was determined based on the 4 day ongoing recording of food and liquids consumption, as well as 24 h energy expenditure estimated using heart rate monitoring. Body composition was measured using bioelectric impedance. The Wingate test was performed in order to determine the effect of BWR on anaerobic capacity. **Results:** Boxers reduced their body weight on average by 5.4% within  $7.8 \pm 3.2$  days. The energy value of their diet during BWR was by 51.5% lower ( $p < 0.001$ ) comparing to the training (preparation) period. It was observed that conventional BWR results in the reduction ( $p < 0.05$ ) not only of fat mass (BWRPRE:  $11.7 \pm 3.6$  kg vs. BWRPOST:  $10.7 \pm 3.9$  kg), but to a considerable extent ( $p < 0.01$ ) also fat free mass (BWRPRE:  $61.1 \pm 9.5$  kg vs. BWRPOST:  $59.2 \pm 9.3$  kg) and body water (BWRPRE:  $44.8 \pm 6.7$  l vs. BWRPOST:  $43.8 \pm 6.4$  l). A deterioration was also recorded ( $p < 0.001$ ) in peak power ( $-9.3\%$ ), average power ( $-4.7\%$ ) and time at peak power ( $+55\%$ ), as well as ( $p < 0.001$ ) minimum power ( $-3.9\%$ ). **Conclusion:** Conventional BWR adopted by boxers, connected with dietary limitations, is rapid and has an adverse effect on body composition and anaerobic capacity. This is seems necessary to implement an adequate education program in this respect, making it possible for athletes and coaches to plan a rational body weight reduction strategy in the pre-competition period.

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Gann, Joshua J. MS; Tinsley, Grant M. MS; La Bounty, Paul M. (2015). Weight Cycling: Prevalence, Strategies, and Effects on Combat Athletes. ***Strength & Conditioning Journal***, 37-5, 105–111.

**Abstract:** combat sports are categorized by weight classes to establish equity in competition and reduce potential injury risk. To gain a perceived mental and physical advantage over their opponent, combat athletes often engage in weight cycling to compete in the lowest weight class possible. The prevalence of this practice has been well established. Depending on duration of time between weigh-in and competition, weight cycling strategies can differ. Current research suggests that rapid weight loss can have a negative effect on physical and mental performance, although this can be potentially negated when given sufficient time to regain weight.

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Ghorbani S, Mohebbi H, Safarimosavi S, Ghasemikaram M. (2015). The effect of different recovery methods on blood lactate removal in wrestlers. ***Journal of Sports Medicine and Physical Fitness***, April, 55(4), 273-9. **AIM:** The first aim of this study was to compare the  $VO_2$  at lactate threshold (LT) and maximum rate of fat oxidation (Fatmax) intensity in wrestlers. A secondary aim was to compare the different recovery trials in wrestlers for finding effective methods of lactate removal post-match. **METHODS:** Eight wrestlers (mean $\pm$ SD; age,  $23.2 \pm 1$  year;  $VO_2max$ ,  $55.2 \pm 3.4$  mL.min $^{-1}$ .kg $^{-1}$ ) completed four recovery trials in a counter-balanced order. Maximal oxygen uptake ( $VO_2max$ ), Fatmax, individual anaerobic threshold (IAT), individual ventilatory threshold (IVT), and LT were determined during a graded exercise test. Different recovery methods were performed at a similar time of the day after three 2 min wrestling match. Lactate concentration was obtained at rest, and at 0, 5, 10, 15 and 20 min of post-match. **RESULTS:** In wrestler, Fatmax was significantly correlated with LT ( $r=0.47$ ,  $P < 0.05$ ) and lactate concentration (mean $\pm$ SD) significantly increased during the match from ( $1.7 \pm 0.2$  mmol.L $^{-1}$ ) to ( $15.1 \pm 1.3$  mmol.L $^{-1}$ ). At 5 minute, IVT method provides greater reduce in blood lactate (79%  $\Delta La$ ) and in other time point (10, 15 and 20 min) Fatmax intensity provides more reduce. **CONCLUSION:** Fatmax intensity is the most effective method for

removal lactate concentration in wrestlers. There may be a relationship between improve in endurance capacity and training at the Fatmax intensity.  
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Gierczuk D, Sadowski J. (2015) Dynamics of the development of coordination motor abilities in freestyle wrestlers aged 16-20. *Archives of Budo / Science of Martial Arts*, VOLUME 11 | 79-85

**Abstract: Background & Study Aim:** The aim of the study was changes in the levels of selected indices of coordination motor abilities (CMA) in freestyle wrestlers during a 4-year training process.

**Material & Methods:** The tests were carried out fivefold with one-year interval periods between each of them. They included the same group of wrestlers (n=15) from the sports club "Radomka". Twelve selected indices describing 7 CMA were subjected to analysis during the four-year continuous research.

**Results:** It was observed that changes in the levels of CMA in freestyle wrestlers aged 16-20 occurred at different times, in different directions, with different intensity levels and had their own distinctive character. The greatest changes in the levels of CMA were discerned at the age of 16-17, where the bulk of CMA under investigation, kinesthetic differentiation and balance in particular, developed considerably.

Moreover, it was noted that at the age of 19 and above a quick reaction ability still evolved.

**Conclusions:** Oriented individualised development of CMA in competitors at every stage of training may positively affect the process of learning and improving sports technique and the selection of effective strategies in performance.

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Gorelov AA, Nikitin SN, Sushchenko VP, Nikiforov NN. (2015). Origins and development of Yakut national wrestling hapsagay in domestic combat sports. *Theory and Practice of Physical Culture*, #3, accessed at: <http://www.teoriya.ru/ru/node/3510>.

**Introduction.** From the earliest times wrestling as a fight, as the art of hand-to-hand combat was one of the main components of soldiers' training. Many nations regarded wrestling as a martial art. Since extreme antiquity people have been seeking, finding, accumulating and passing to his offspring different ways of combat that ensured his advantage over opponents. Accidentally found movements turned into fighting techniques; they, in turn, were reinforced by all kinds of tactical tricks and ploys that improved from one generation to another, creating the rudiments of national kinds of wrestling. One of such kinds, that have reached us from antiquity, is the Yakut national wrestling **hapsagay**, which literally means "a competition in agility". It is popular in all cities and regions of the Republic of Sakha (Yakutia). Children become familiar with this national kind of martial art from an early age. As a kind of martial art it has been one of the basic components of the art of war for many centuries. At the same time, despite the fact that the hapsagay wrestling has been included both in the All-Union, and then in the All-Russian sports classification for quite a long time, theory and practice of combat sports have no scientific evidence about its origin and patterns of development. This study examines the accumulated analytical material on the formation and development of the Yakut national wrestling hapsagay.

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Gul M, Turkmen M, Dogan A, and Soyguden A. (2015). Lost Tradition in Kirkpinar Oil Wrestling: Importance of *Kispet* and Ceremony of *Kispet* Wearing. *International Journal of Wrestling Science*, 5, 52–55.

**ABSTRACT.** The pressures of globalization have contributed to the disappearance of some traditional sports, as well as various other elements of national culture. The annual Kirkpinar oil-wrestling tournament, in Edirne in Turkish Thrace, has been held since 1362. In recent times it has lost many of its traditional rituals, despite its inclusion in 2010 in UNESCO's "List of the Intangible Cultural Heritage of Humanity." The ceremonies associated with wearing the *kispet* (the leather pants worn by the oil wrestler, also called *kisbet*) is one example of this loss of tradition. This ceremony contained both old Turkish beliefs and Islamic themes. The *kispet* is very important for the *pehlivan* (the name given to the oil wrestler, meaning hero). Today's wrestlers do not practice or know these old traditions and rituals, even though the *kispet* is still worn when wrestling. This historical research is important for keeping oil wrestling and its traditions alive, as well as its role in Turkish national heritage. It is the aim of this research to examine the disappearance of the ceremony associated with wearing the *kispet*, and its place as an indispensable element of Kirkpinar oil wrestling. Live interviews and literature-tracking methods were used in this research. The results are a description of the ceremonies that are a part of wearing the *kispet*, which is characterized as a ritual in traditional Kirkpinar oil wrestling, having deep sociocultural and spiritual meaning.

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- Gunning PI. (2015). Hardy Fingallians, Kildare trippers and 'The Devil Ye'll Rise' scufflers: wrestling in modern Ireland. *Sport in Society*, 2016 Vol. 19, No. 1, 110–129, Published online: 03 Nov 2015. <http://dx.doi.org/10.1080/17430437.2015.1038917>  
 This article advances a synoptic monograph of the principal representations that particularise Ireland's wrestling arena from modern times to the twentieth century. Providing a delineated critique of themes that include participation, patronage and promotion, particular focus is centred on providing an enhanced understanding of the predominant Irish wrestling style, namely Collar-and-Elbow, considering the Carriaght (Backhold) style also. Evaluating Irish wrestling's scant historiography, the codified practices and structures of Collar-and-Elbow, relevant similarities to folk wrestling styles within the Atlantic Archipelago are also catalogued. When detailing wrestling's role as public entertainment, attendant expressive episodes of social disorder are explored. Customary contentions that the principal cause for the sport's ultimate decline was British coercive legislation are challenged. The validity of recent assertions concerning the sport, to include a claim that Irish wrestling was irregularly conducted after the 1830s, are calibrated.  
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- Gupta V, Dhawan N, Bahl J. (2015) Minor trauma causing stroke in a young athlete. *Case. Rep. Neurol. Med.* Volume 2015, Article ID 182875, 3 pages <http://dx.doi.org/10.1155/2015/182875>  
**Abstract:** A 17-year-old Caucasian male presented with sudden dizziness, ataxia, vertigo, and clumsiness lasting for a couple of hours. He had a subtle trauma during a wrestling match 2 days prior to the presentation. A CT Angiogram (CTA) and MRI showed left vertebral artery dissection (VAD). The patient was treated with anticoagulation with heparin drip in the ICU. The patient was discharged home on the third day on Lovenox-warfarin bridging. This case underscores the importance of considering VAD as a differential diagnosis in patients with sports-related symptoms especially in activities entailing hyperextension or hyperrotation of neck. Due to a varied latent period, often minor underlying trauma, and subtle presentation, a low index of suspicion is warranted in timely diagnosis and treatment of VAD. Considering recent evidence in treatment modality, either antiplatelet therapy or anticoagulation may be used for treatment of VAD.  
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- Jäggi U, Joray CP, Brühlhart Y, Luijckx E, Rogan S. (2015) [Injuries in the Martial Arts Judo, Taekwondo and Wrestling - A Systematic Review].[Article in German] *Sportverletz Sportschaden*. 2015 Dec; 29(4):219-25. doi: 10.1055/s-0041-106939. Epub 2015 Dec 21.  
**BACKGROUND:** Martial arts such as judo, taekwondo and wrestling are regulated, usually athletic duels. The aim is to score better than your opponent or to win. As with any type of sport, athletes in martial arts sustain minor and major injuries, which may have many negative consequences. In addition, sports injuries and their rehabilitation generate high costs to the healthcare system. In contrast to the FIFA 11+ warm-up program, no preventive programs have been postulated for injury prevention in these martial arts. Therefore, the aim of this systematic review was to summarise the latest research findings and to evaluate whether initial recommendations can be given for the reduction of injuries in the martial arts judo, wrestling and taekwondo. **METHODS:** To gain an overview of the latest research findings, we searched for systematic reviews in PEDro, PubMed, Cochrane and the internet search engine Google Scholar. The methodological quality of these reviews was assessed using the Critical Appraisal Tool for a Systematic Review (CASP), and data was extracted on the risk of injury, injury location and injury type. **RESULTS:** It was found that all three review articles are of low to moderate methodological quality. Regarding injury location, it became evident that the extremities are particularly vulnerable to injury in all three martial arts. Effusion was observed to be the most common type of injury. **CONCLUSION:** Due to the moderate methodological quality and the injury type of effusion, it is not possible to formulate recommendations for injury prevention. Moreover, uniform definitions should be developed to describe sports injuries.  
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- Jlid, M. C., H. R. Kachlouf, R. B. Maaoui, M. S. Chelly, and T. Paillard. Ground surface nature can influence visual information contribution in postural control. *J Sports Med. Phys. Fitness*, 2015.  
**Abstract:** In sport, the nature of ground surface is likely to influence the contribution of visual information on postural control. Boxing and wrestling are respectively practiced on firm and soft ground surfaces. The aim was to compare the postural control of boxers with that of wrestlers on stable (firm) and unstable (soft and dynamic) ground surfaces, with and without deprivation of vision. Fifteen male international boxers and 15 male international wrestlers presenting the same anthropometrics characteristics and the same

number of years of sports practice were recruited. Spatio-temporal parameters of displacement of the centre of feet pressure (COP) were measured on a force platform in static (firm and foam surfaces with eyes open and eyes closed) and dynamic conditions (medio/lateral and antero/posterior directions with eyes open and eyes closed). The result mainly showed a significant vision x group interaction in the antero/posterior direction for the dynamic postural condition ( $p < 0.017$ ). This indicated that the contribution of visual information was greater for the boxers than for the wrestlers in challenging condition ( $p = 0.030$ ). Supplementary studies would be required to confirm if the nature of ground surface influences or not the contribution of visual information because the specificity of motor skills can also influence it.

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Kafkas, M. E., Taskiran C, Sahin KA, Ozen G, Taskapan C, Ozyalin F, and Skarpanska-Stejnborn A. (2015) The examining of acute changes of elite Free Style wrestlers during one-day tournament. ***J Sports Med. Phys. Fitness***. Nov 11 [EPUB ahead of print].

**Abstract:** AIM: The purpose of this study was to examine free radical production, muscle damage and inflammation responses of well-trained wrestlers to a simulated one-day tournament of Free-Style wrestling. **METHODS:** Twelve elite competitive wrestlers had (mean (SD) age: 24.09 (6.20) years, body mass: 74.09 (11.50) kg, and body height: 174.90 (8.8) cm, and also they competed for national teams, completed five matches according to the official Olympic wrestling tournament regulations. Blood sampling was collected before and after fifth match. Baseline blood testing was measured 10.00 a.m. and then matches started 12.00 a.m. Each match was implemented within one hour. Also, the resting time was 45 min following each match. The measurements were analyzed by "Wilcoxon Signed Ranks", which is used to test for significant differences between pre- and post test. **RESULTS:** The post-match LDH, CK, and IL-6 levels were significantly increased compared with the baseline status. However, baseline MDA levels were not found significantly different compared with post-match. **CONCLUSION:** The current study ensured that one-day Free-Style wrestling tournament brings about significantly increasing on CK, LDH of muscle damage markers. Also, inflammatory status showed a progressive worsening during the course of one-day tournament. The study showed enhanced muscle damage markers and inflammatory status after one-day Free-Style wrestling tournament. Therefore, it appears that one-day Free-Style wrestling tournament imposes significant physiological demands on wrestlers that may adversely affect their performance and inflammatory status, thereby putting the athletes in a greater risk for injury.

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Kaya A. (2015). Survival of the International Federation of Associated Wrestling Styles: A Personal Retrospective. ***INTERNATIONAL JOURNAL OF WRESTLING SCIENCE***, 5, 63–65.

**ABSTRACT.** This paper addresses the survival story of International Federation of Associated Wrestling Styles (FILA) as well as personal reflections and experiences on reshaping the organization during the campaign for survival after the International Olympic Committee (IOC) removed wrestling from the program of the Olympic Games on February 2, 2013.

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Khodaei, M., L. Olewinski, B. Shadgan, and R. R. Kinningham. (2015). Rapid Weight Loss in Sports with Weight Classes. ***Curr. Sports Med. Rep.***, 14:6, 435-441.

**Abstract:** Weight-sensitive sports are popular among elite and nonelite athletes. Rapid weight loss (RWL) practice has been an essential part of many of these sports for many decades. Due to the limited epidemiological studies on the prevalence of RWL, its true prevalence is unknown. It is estimated that more than half of athletes in weight-class sports have practiced RWL during the competitive periods. As RWL can have significant physical, physiological, and psychological negative effects on athletes, its practice has been discouraged for many years. It seems that appropriate rule changes have had the biggest impact on the practice of RWL in sports like wrestling. An individualized and well-planned gradual and safe weight loss program under the supervision of a team of coaching staff, athletic trainers, sports nutritionists, and sports physicians is recommended.

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Kerr, A., Slater, G., Byrne, N. and Chaseling, J. (2015). Validation of Bioelectrical Impedance Spectroscopy to Measure Total Body Water in Resistance-Trained Males ***International Journal of Sport Nutrition and Exercise Metabolism***, 25, 494 -50

The three-compartment (3-C) model of physique assessment (fat mass, fat-free mass, water) incorporates total body water (TBW) whereas the two-compartment model (2-C) assumes a TBW of 73.72%. Deuterium dilution (D2O) is the reference method for measuring TBW but is expensive and time consuming. Multifrequency bioelectrical impedance spectroscopy (BIS SFB7) estimates TBW

instantaneously and claims high precision. Our aim was to compare SFB7 with D2O for estimating TBW in resistance trained males (BMI >25kg/m<sup>2</sup>). We included TBWBIS estimates in a 3-C model and contrasted this and the 2-C model against the reference 3-C model using TBWD2O. TBW of 29 males (32.4 ± 8.5 years; 183.4 ± 7.2 cm; 92.5 ± 9.9 kg; 27.5 ± 2.6 kg/m<sup>2</sup>) was measured using SFB7 and D2O. Body density was measured by BODPOD, with body composition calculated using the Siri equation. TBWBIS values were consistent with TBWD2O (SEE = 2.65L; TE = 2.6L) as were %BF values from the 3-C model (BODPOD + TBWBIS) with the 3-C reference model (SEE = 2.20%; TE = 2.20%). For subjects with TBW more than 1% from the assumed 73.72% (*n* = 16), %BF from the 2-C model differed significantly from the reference 3-C model (Slope 0.6888; Intercept 5.093). The BIS SFB7 measured TBW accurately compared with D2O. The 2C model with an assumed TBW of 73.72% introduces error in the estimation of body composition. We recommend TBW should be measured, either via the traditional D2O method or when resources are limited, with BIS, so that body composition estimates are enhanced. The BIS can be accurately used in 3C equations to better predict TBW and BF% in resistance trained males compared with a 2C model.

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Kiningham, R. and A. Monseau. Caring for Wrestlers. *Curr. Sports Med. Rep.* 14:404-412, 2015.

Abstract: Wrestling is a popular high school and college sport with an injury and illness rate second only to football. It is important that the physician providing medical care for wrestlers be familiar with the unique characteristics of wrestling and the associated common injuries and medical problems. Common orthopedic injuries include shoulder, elbow, and finger dislocation; prepatellar bursitis; knee medial collateral ligament sprains; and cervical strains. Skin infections are the most common cause of missed mat time for wrestlers. Physicians need to be able to identify and treat these infections, and know the rules regarding return to wrestling once an infection has been identified. Other conditions that are common include auricular hematomas, epistaxis, and brow lacerations. Physicians also need to be familiar with the medical issues involved with rapid weight loss and weight cycling, and understand the high school and college weight certification rules.

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Koryagina Yu. V., Roguleva L.G., Zamchiy T.P. (2015) Transcranial electrostimulation to optimize

psychophysiological functions in single combat wrestlers and weightlifters. *Theory and Practice of Physical Culture*, 3, accessed at: <http://www.teoriya.ru/ru/node/3501>

Summary: Introduction. The urgent goal of sports science and practice is searching for new, effective techniques and methods to optimize the functional state of the body and rehabilitation of athletes. The system of neurohumoral regulation is the basic system, that limits physical working capacity under strenuous muscular activity, and therefore the methods that directly affect it are of particular interest. Transcranial stimulation is one of such methods. The method of transcranial electrical stimulation (TES) is the most approved and widely used all over the world. Transcranial electrical stimulation selectively activates the brain structures that produce endorphin, serotonin and other neurotransmitters, using a pulsed electrical stimulation applied through the head skin electrodes. The safety and effectiveness of TES has already been proven. This method is actively used in various fields of medicine, but when it comes to its use in sport only the first steps are being made in this aspect and it still requires a thorough scientific basis. The purpose of the work was to identify the impact of transcranial electrical stimulation on the psychofunctional state of athletes involved in martial arts and weightlifting. **Conclusion.** Therefore the immediate effect of a single TES session at rest is seen in the increase of the cardiovascular system efficiency. When used after a competitive load TES promotes acceleration of processes of immediate recovery of the autonomic and central nervous systems in athletes. The course application of TES optimizes the regional blood flow of the brain and of the distal parts of the lower extremities as well as the work of the brain when performing hand-eye coordination tasks. TES is a promising physiomet method for optimizing the functional state of athletes in the process of adaptation to training and competition loads. TES is recommended as a course (10 sessions of 30 minutes) and as a single application/session (1 session of 20 min) to accelerate the process of immediate recovery after the competition and training loads.

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Krenn, B. (2015). The effect of uniform color on judging athletes' aggressiveness, fairness, and chance of winning. *J Sport Exerc Psychol*, 37, 207-212.

Abstract: In the current study we questioned the impact of uniform color in boxing, taekwondo and wrestling. On 18 photos showing two athletes competing, the hue of each uniform was modified to blue,

green or red. For each photo, six color conditions were generated (blue-red, blue-green, green-red and vice versa). In three experiments these 108 photos were randomly presented. Participants (N = 210) had to select the athlete that seemed to be more aggressive, fairer or more likely to win the fight. Results revealed that athletes wearing red in boxing and wrestling were judged more aggressive and more likely to win than athletes wearing blue or green uniforms. In addition, athletes wearing green were judged fairer in boxing and wrestling than athletes wearing red. In taekwondo we did not find any significant impact of uniform color. Results suggest that uniform color in combat sports carries specific meanings that affect others' judgments.

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Kumartasli M, Alp M., Yilmaz E, Gokbel S. (2015) Comparison of depression levels of elite wrestling and taekwondo athletes. *Turkish Journal of Sport and Exercise*, <http://selcukbesyod.selcuk.edu.tr/sumbtd/index> Year: 2015 - Volume: 17 - Issue: 1 - Pages: 67-70 DOI: 10.15314/TJSE.2015112540

**Abstract:** The aim of this study was to compare depression levels of elite wrestling and taekwondo athletes. To the study, 130 elite wrestlers and 130 elite taekwondo athletes who were now competing in the league between Universities. "Beck Depression Inventory" was used as a tool for collecting data. According to the scale consists of 21 questions used to determine the severity of the depressive symptoms, the reliability and validity coefficient values was found to be 86. The statistical analysis of the data, the frequency distribution analysis and "Independent t test" was applied. As a result of test depression levels of elite wrestling and taekwondo athletes, the difference between groups was found to be statistically significant ( $p < 0.05$ ). In conclusion, elite wrestler were defined more depressive than elite taekwondo athletes, so both of branches needed to be psychiatric examination according to possibility situation of the inventory.

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Kutlu, M., E. Demirkan, and M. E. Ozbek. Assessments of world and national level wrestling teams at a pre world championship competition: hydration, body composition and body mass alterations. *J Sports Med. Phys. Fitness* 55:305-312, 2015.

Keywords: Adolescent/Adult/Body Composition/Body Mass Index/Electric

Conductivity/Humans/Male/Specific Gravity/Urinalysis/Urine/chemistry/Wrestling/Young Adult

**Abstract:** AIM: This study examined the changes in hydration status, body composition and body mass alterations during the camping period a pre world championship, World (N.=14) and National (N.=38) senior wrestlers (N.=52) preparing for the World Championships. METHODS: Urine specific gravity, conductivity and color measurements with, body composition analyses were conducted at the beginning of the camp and the end of the camp. RESULTS: In general, no significant differences were obtained between the world and national wrestlers in body mass and fat percentage (83.3+/-20-84.9+/-18 kg; 12+/-6%-11.2+/-4%, respectively). However, a significant difference was detected in the changes of body mass between groups (world decreased [800+/-1 g] - national increased [600+/-1 g] [ $P < 0.05$ ]). Body fat percentage was also observed to have a similar bias with a decrease and increase, but the changes were not significantly different ( $P > 0.05$ ). No significant differences ( $P > 0.05$ ) were observed between pre- and post-test values of urine specific gravity, conductivity or color for both national team wrestlers.

**CONCLUSION:** Wrestlers achieved to adjust to weight category in a close of period through competition weigh in. Dehydration training programs should be sustained during the whole camp seasons including the last days before the weighing process for matches.

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Lee, K., J. Onate, S. McCann, T. Hunt, W. Turner, and M. Merrick. The Effectiveness of Cervical Strengthening on Decreasing Neck Injury Risk in Wrestling. *J Sport Rehabil.*, 2015. DOI: <http://dx.doi.org/10.1123/jsr.2015-0101>

**Abstract:** Clinical Scenario: In wrestling, athletes often support a large amount of weight on their heads or are forced into extreme ranges of motion. These suboptimal movement conditions lead to a high prevalence of neck injuries in wrestlers. A large portion of the work done by the cervical musculature in wrestling is theorized to be eccentric or isometric types of contractions. Strengthening of these cervical muscles is clinically considered to play a vital role in being competitive on the wrestling mat. The cervical stability provided by strengthening these muscles may also play a part in injury prevention among wrestlers. Focused Clinical Question: Does increased cervical strength lead to a decreased risk of injury in wrestling? Summary of Search, "Best Evidence" Appraised, and Key Findings: The literature was searched for studies of level 4 evidence or higher using the Oxford Centre for Evidence-Based Medicine level of evidence system that investigated the relationship between cervical strength and injury risk in

wrestling. No studies were found comparing cervical strength to injury risk in wrestling, but two related studies were found and have been included in this critically appraised topic. Clinical Bottom Line: There is poor evidence to support that there is a relationship between cervical strength and injury risk in wrestling. Strength of Recommendation: There is grade C evidence to support that increased cervical strength decreases the risk of injury in wrestling.

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López-González D. (2015). Technical Profile of Top Four Women's Wrestling Teams in the 2014 Senior World Championships and Correlations With Selected Performance Variables. *International Journal of Wrestling Science*, 5, 35–41.

**ABSTRACT.** The technical profile of the top four women's wrestling teams in the 2014 Senior World Championships is presented, with the significant relationships between its technical arsenal and selected performance indicators, including the final individual place, characterized from 290 scoring technical-tactical combinations (TTC) executed by these athletes during the tournament. After classification into technical groups, technical profiles by team were obtained and their frequencies were correlated with indicators of the result (final individual place), as well as with the type of victory or loss and activity interval indicators. The significant values found point to specific techniques as related with the performance, which could be important and easily provided to coaches of women wrestlers as they prepare for competitions.

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Maroon, J. C., R. Winkelman, J. Bost, A. Amos, C. Mathyssek, and V. Miele. Chronic traumatic encephalopathy in contact sports: a systematic review of all reported pathological cases. *PLoS. One*. 10:e0117338, 2015. Abstract: Chronic traumatic encephalopathy (CTE) is a neurodegenerative disease associated with head trauma. Although initially believed to affect only boxers, the at-risk population has expanded to encompass a much wider demographic, including American football players, hockey players, wrestlers, and military veterans. This expansion has garnered considerable media attention and public concern for the potential neurodegenerative effects of head trauma. The main aim of this systematic review is to give a complete overview of the common findings and risk factors for CTE as well as the status quo regarding the incidence and prevalence of CTE. This systematic review was performed using PubMed and MEDLINE and includes all neuropathologically confirmed cases of CTE in the medical literature to date, from the first published case in 1954 to August 1, 2013 (n = 153). The demographics, including the primary source of mTBI (mild Traumatic Brain Injury), age and cause of death, ApoE genotype, and history of substance abuse, when listed, were obtained from each case report. The demographics of American football players found to have CTE are also presented separately in order to highlight the most prevalent group of CTE cases reported in recent years. These 153 case reports of CTE represent the largest collection to date. We found that a history of mTBI was the only risk factor consistently associated with CTE. In addition, we found no relationships between CTE and age of death or abnormal ApoE allele. Suicide and the presence of premorbid dementia was not strongly associated with CTE. We conclude that the incidence of CTE remains unknown due to the lack of large, longitudinal studies. Furthermore, the neuropathological and clinical findings related to CTE overlap with many common neurodegenerative diseases. Our review reveals significant limitations of the current CTE case reporting and questions the widespread existence of CTE in contact sports.

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Mavliev FA, Nazarenko AS, Zotova FR, Nabatov AA (2015) [Changes in hemodynamic and stabilographic characteristics at orthostatic tests in athletes practicing wrestling.] article in Russian *Teoria i Praktika Fiziceskoj Kul'tury Theory and Practice of Physical Culture*. 11 November p 21-23.

The characteristics of the reaction of the balance and circulatory functions of wrestlers and persons not doing sports on the orthostatic stimulation are presented in the given paper. Indicators of circulation were obtained using rheography of the balance function (on a stabilometric platform). The examined young men were divided into two groups, of not involved in sports (11) and professional wrestlers (13). Wrestlers were used as an example to show the opportunity to adapt the balance function to regular exercises associated with occasional changes of the body position. The presence of statistically significant differences in the CFD and cardiovascular indicators both at rest and in response to an orthostatic test in wrestlers, and persons not doing sports suggest the influence of specifics of sports activity on the quality of the balance function and its display when changing a body position.

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Michael B. (2015) 'Just don't hit on me and I'm fine': Mapping high school wrestlers' relationship to inclusive masculinity and heterosexual recuperation. *International Review for the Sociology of Sport*, Vol. 50(8) 912–928.

**Abstract:** This article examines the gender and sexual understandings of high school wrestlers, mainly through the lens of *inclusive masculinity theory*. It does so by exploring the level of acceptance participants exhibited toward gay wrestlers, as well as by how they made sense of and negotiated the popular claim: 'wrestling is gay.' Through 10 months of ethnographic research and 15 qualitative interviews, this research shows that the high school wrestlers in my study were by and large gay friendly, accepting both their presumably gay teammate and other openly gay wrestlers, but not without their own qualifications. While they were inclusive in this regard, they also took offense to the characterization that 'wrestling is gay.' How the wrestlers responded to this specific claim expands the literature on heterosexual recuperation, namely by illustrating how groups maintain heterosexual boundaries without referencing homophobia or heterosexuality explicitly.

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Mills, S. C. Mandatory mouthguard rules for high school athletes in the United States. *Gen. Dent.* 63:35-40, 2015.

**Abstract:** High school athletes seem particularly predisposed to dental injury, but athletic mouthguards have an excellent track record of success in reducing the severity and incidence of dental injuries in sports. Therefore, it has been suggested that mouthguards be made mandatory for high school athletes who participate in sports with risk of injury. The National Federation of State High School Associations currently recommends that mouthguards be mandated for high school football, lacrosse, ice hockey, and field hockey players as well as for wrestlers who are wearing orthodontic appliances. Different states have tried to mandate additional sports with varying degrees of success. This article summarizes the process that leads to rule changes for high school athletes at the national level and discusses the history of 4 states-Minnesota, Maine, New Hampshire, and Massachusetts-that have tried to mandate mouthguards for different sports. Common complaints that lead to the cessation of mouthguard rules, such as speech considerations, breathing ability, and cleanliness, are discussed.

Mohammad T, Farzad N, Mohammad TG, and Ranjbar K. (2015). The impact of rapid weight loss on the leptin, adiponectin levels, and insulin resistance among adult free style wrestlers. *J Sports Med. Phys. Fitness*, 55, 805-812.

**Abstract:** AIM: Recent studies, shows the effective role of adipose tissue as an active endocrine organ. Leptin level increases in obese bodies while adiponectin as an antirisk factor reduction that contributes to decrease insulin resistance and anthropometric profiles. Hence, expected to the negative effects of weight loss on wrestlers' physiological function; leptin and adiponectin behaviors and insulin resistance in young wrestlers during their rapid weight loss program were examined. METHODS: Fifteen young (23+/-1 yr) freestyle wrestlers with (weight 67.6+/-0.8 kg, BMI 22.5+/-0.2 kg/m(2)) in two (60 and 66 kg) weight categories were selected randomly. Caloric intake and anthropometric characteristics measured by standard methods. The leptin and adiponectin hormones and insulin resistance index were measured by sandwich and HOMA-IR methods respectively. Wrestlers performed a week rapid weight loss Protocol (average of 4% of body weight loss) under the supervision of their coach. Eventually, selected factors were measured after 12 and 24 hours of recovery, again. RESULTS: The rapid weight loss (4%) program had a significantly reduced impact on anthropometric factors; leptin level, insulin resistance, and increased beta cell function, while the changes of adiponectin were not significant after weight loss. CONCLUSION: Findings of this study shows that dramatic decrease in anthropometric factors follow the weight loss program that having a significant decrease on leptin, L/A ratio and HOMA-IR, without significant changes in adiponectin levels. These changes may have harmful physiological effects on wrestlers' bodies but they can be useful to regulate of fatty acid, glucose metabolism, and insulin resistance.

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Motevalli, M. S., V. J. Dalbo, R. S. Attarzadeh, A. Rashidlamir, P. S. Tucker, and A. T. Scanlan. (2015) The effect of rate of weight reduction on serum myostatin and follistatin concentrations in competitive wrestlers. *Int. J Sports Physiol Perform*, 10, 139-146.

**Abstract:** PURPOSE: To evaluate anthropometric measures and serum markers of myostatin-pathway activity after different weight-reduction protocols in wrestlers. METHODS: Subjects were randomly assigned to a gradual-weight-reduction (GWR) or rapid-weight-reduction (RWR) group. Food logs were collected for the duration of the study. Anthropometric measurements and serum samples were collected after an 8-h fast at baseline and after the weight-reduction intervention. Subjects reduced body mass by

4%. The GWR group restricted calories over 12 d, while the RWR group restricted calories over 2 d. A series of 2x5 repeated-measures (RM) ANOVAs was conducted to examine differences in nutrient consumption, while separate 2x2 RM ANOVAs were conducted to examine differences in anthropometric measures and serum markers. When applicable, Tukey post hoc comparisons were conducted. Significance for all tests was set at  $P < .05$ . RESULTS: There were no between-groups differences for any anthropometric measure ( $P > .05$ ). Subjects in both groups experienced a significant reduction in body mass, fat mass, lean mass, and percent body fat ( $P < .05$ ). There were no between-groups differences in serum markers of myostatin-pathway activity ( $P > .05$ ), but subjects in the RWR condition experienced a significant increase in serum myostatin ( $P < .01$ ), a decrease in follistatin ( $P < .01$ ), and an increase in myostatin-to-follistatin ratio ( $P < .001$ ). CONCLUSION: Although there were no between-groups differences for any outcome variables, the serum myostatin-to-follistatin ratio was significantly increased in the RWR group, possibly signaling the early stages of skeletal-muscle catabolism.  
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Noh, J. W., B. S. Park, M. Y. Kim, L. K. Lee, S. M. Yang, W. D. Lee, Y. S. Shin, J. H. Kim, J. U. Lee, T. Y. Kwak, T. H. Lee, J. Y. Kim, J. Park, and J. Kim. (2015). Analysis of combat sports players' injuries according to playing style for sports physiotherapy research. *J Phys. Ther. Sci*, 27, 2425-2430.

Abstract: [Purpose] This study describes the characteristics of injuries in strike and non-strike combat sports, and the results are intended for use in the area of sports physiotherapy research. [Subjects and Methods] The study was conducted on 159 athletes involved in a variety of combat sports. The participants included elite college players of the following sports: judo (47), ssireum (19), wrestling (13), kendo (30), boxing (16), and taekwondo (34). Of the participants, 133 were male and 26 were female. In the case of ssireum and boxing, all of the athletes were male. [Results] In the case of the combat sports, the types of injury and injured regions differed according to playing style. Dislocation and injuries to the neck, shoulders, and elbows were more frequent in the non-strike sports, while injuries to the wrists and hands were more frequent in the strike sports. There was a high incidence of sprains, strains, bruises, and injuries to the lower limbs in both groups. [Conclusion] We suggest that the characteristics of injuries in combat sports differ according to playing style, and our study will therefore provide physical therapists and researchers with information that can be used to prevent injury.

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Noormohammadpour, P., M. Rostami, R. Nourian, M. A. Mansournia, F. S. Sarough, F. Farahbakhsh, and R. Kordi. (2015). Association Between Hearing Loss and Cauliflower Ear in Wrestlers, a Case Control Study Employing Hearing Tests. *Asian J Sports Med*, June; 6(2): e25786.

Abstract: BACKGROUND: According to anecdotal findings, some wrestling coaches and wrestlers believe that cauliflower ear might lead to hearing loss. Our preliminary study showed that the prevalence of hearing loss reported by the wrestlers with cauliflower ear is significantly higher than this rate among wrestlers without cauliflower ear. To the best of our knowledge, no other study has confirmed this finding employing hearing tests. OBJECTIVES: To evaluate and to compare the prevalence of hearing loss among wrestlers with and without cauliflower ears employing hearing tests. PATIENTS AND METHODS: The subjects were randomly selected from 14 wrestling clubs in Tehran. Subjects were 201 wrestlers with cauliflower ears (100 wrestlers with one cauliflower ear and 101 wrestlers with two cauliflower ears) and 139 wrestlers without cauliflower ears. All the participants in this study were interviewed to collect information on demographic factors and medical history of risk factors and diseases related to hearing loss. The subjects in both groups underwent otoscopic and audiologic examinations. RESULTS: Audiometric examination results at the frequency range of 0.5 - 8 KHz showed that the prevalence of hearing loss among cauliflower ears was higher than this rate among non-cauliflower ears. Also, the percentage of positive history of ear infections among cauliflower ears (8.4%) was about two times more than this finding among non-cauliflower ears (4.9%). This difference tended to be significant (OR: 1.86,  $P = 0.06$ , 95% CI: 0.98 - 3.53). CONCLUSIONS: To the best of our knowledge, this is the first study showing that the prevalence of hearing loss among cauliflower ears is higher than this rate among non-cauliflower ears confirmed by audiological tests. This emphasizes that, more preventive measures such as mandatory ear gear for wrestlers are required.

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Ohya T, Wataru T, Hagiwara M, Oriishi M, Hoshikawa M, Nishiguchi S, and Suzuki Y. (2015). Physical Fitness Profile and Differences Between Light, Middle, and Heavy Weight-Class Groups of Japanese Elite Male Wrestlers. *International Journal of Wrestling Science*, 5, 42–46.

**ABSTRACT.** We investigated the physical fitness of Japanese elite male wrestlers and compared results by groupings of weight classes. Twenty-two elite Japanese male wrestlers (*light*, participants' body weight

59–65 kg,  $n = 7$ ; *middle*, 71–88 kg,  $n = 8$ ; and *heavy*, 99–122 kg,  $n = 7$ ) recruited from wrestling squads participating in national training camps participated in this study. The 90-s maximal anaerobic power test (90-MAT) and maximal graded exercise test (MGT) were performed on a cycle ergometer. Relative peak power during the 90-MAT did not differ among groups (light:  $9.0 \pm 0.4 \text{ W}\cdot\text{kg}^{-1}$ , middle:  $9.3 \pm 0.4 \text{ W}\cdot\text{kg}^{-1}$ , heavy:  $9.0 \pm 0.5 \text{ W}\cdot\text{kg}^{-1}$ ,  $p > 0.05$ ), but mean relative power in the heavy group was lower than that in the other groups (heavy:  $4.5 \pm 0.5 \text{ W}\cdot\text{kg}^{-1}$  vs. light:  $5.3 \pm 0.3 \text{ W}\cdot\text{kg}^{-1}$ ,  $P = 0.006$ , effect size [ES] = 1.83; vs. middle:  $5.3 \pm 0.4 \text{ W}\cdot\text{kg}^{-1}$ ,  $P = 0.009$ , ES = 1.61). Relative  $\dot{V} \cdot \text{O}_2$ peak during the MGT was lower in the heavy group than that in the other groups. The present study provides baseline physiological data that can be used in the prescription of individual training programs for wrestlers.

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Paoli, A., A. Bianco, and K. A. Grimaldi. The Ketogenic Diet and Sport: A Possible Marriage? *Exerc Sport Sci Rev.* 43:153-162, 2015.

**Abstract:** The ketogenic diet (KD) is used widely as a weight loss strategy and, more rarely, as therapy for some diseases. In many sports, weight control is often necessary (boxing, weightlifting, wrestling, etc.), but the KD usually is not considered. Our hypothesis is that KD might be used to achieve fat loss without affecting strength/power performance negatively. **E-mail: antonio.paoli@unipd.it**

Pfister T, Pfister K, Hagel B, Ghali WA, Ronksley PE. (2015) *Br J Sports Med* Published Online First: November 30, doi:10.1136/bjsports-2015-094978

**Abstract:** Objective: conduct a comprehensive systematic review and meta-analysis of studies assessing the incidence of concussion in youth athletes. Specifically, we estimate the overall risk of concussion in youth sports and compare sport-specific estimates of concussion risk. Design Systemic review and meta-analysis. Data sources A search of Medline, Embase (1980 through September 2014), and SportDiscus (1985 through September 2014) supplemented by manual searches of bibliographies and conference proceedings. Inclusion criteria: We included studies if they met the inclusion criteria of study design (prospective cohort study), relevant sports identified from the literature (eg, American football, rugby, hockey, lacrosse, soccer/football, basketball, baseball, softball, wrestling, field hockey, track, taekwondo, volleyball and cheerleading), population (males and females  $\leq 18$  years old), and outcome (concussion). Results: Of the 698 studies reviewed for eligibility, 23 articles were accepted for systematic review and 13 of which were included in a meta-analysis. Random effects models were used to pool overall and sport-specific concussion incidence rates per 1000 athlete exposures (AEs). The overall risk of concussion was estimated at 0.23 (95% CI 0.19 to 0.28). The three sports with the highest incidence rates were rugby, hockey and American football at 4.18, 1.20 and 0.53, respectively. Lowest incidence rates per 1000 AEs occurred in volleyball, baseball and cheerleading at 0.03, 0.06 and 0.07, respectively. Quality of the included studies varied, with the majority of studies not reporting age and gender specific incidence rates or an operational definition for concussion. Conclusions There are striking differences in the rates of incident youth concussion across 12 sports. This systematic review and meta-analysis can serve as the current sport-specific baseline risk of concussion among youth athletes. **peronksl@ucalgary.ca**

Podlivaev B. (2015). Model Wrestlers in Freestyle Women's Wrestling. *International Journal of Wrestling Science*, 5, 22–27.

**ABSTRACT.** The efficiency of the training process in freestyle women's wrestling is largely conditional on the athletes' fitness and the model of their condition at various stages of long term training. One of the most important components of female athletes' training is modeling their condition and the correction of the basic parameters of the training process based on the data of complex control. Development of the given "wrestler model" in freestyle women's wrestling is based on long-term research; it includes characteristics that reflect the state of various systems of the female athlete's body: the cardiorespiratory system (CRS), the neuromuscular system (NMS), and the central nervous system (CNS). "Weak" training links of athletes under review were discovered on the basis of research results. Methods of improvement were suggested.

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Portnyagin II, Torgovkin VG, Nikolaev ND (2015) Individualization of training process of students, freestyle wrestlers *Theory and Practice of Physical Culture*, № 10 • 2015 Октябрь | October accessed at: <http://www.teoriya.ru/ru/node/3651>

**Abstract:** The present paper is dedicated to the analysis of various approaches to the individualization of the training process of wrestlers with a view of improvement of functional capabilities of their bodies for the efficient training for the season. In order to effectively manage the training of student-wrestlers the authors took measures for purposeful organization of the structure of the processes of their training, adjusted the course of the set programmed training process with a manageable systematic mechanism. When creating an optimal management pattern of training, we have developed objective guidelines of technical and tactical actions of fighters, distinguished by the fact that technical and tactical actions were taught by the scale of rank of supports of biomechanical body parts in man. We have designated it as an aspect of individualization and improving of technical characteristics of wrestlers. Individual approach helps improve the technical skills of both gifted athletes with relevant morphofunctional characteristics, and athletes with poorly developed functional characteristics within the framework of the accelerated formation of technical and tactical characteristics of the wrestlers. This helps individualize wrestlers' training for their best sports performance during the regular season and when training students in a university.

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Ramirez-Velez, R., R. Argothyd, J. F. Meneses-Echavez, M. Beatriz Sanchez-Puccini, C. A. Lopez-Alban, and D. D. Cohen. Anthropometric characteristics and physical performance of Colombian elite male wrestlers. *Asian J Sports Med.* 5:e23810, 2014.

**Abstract:** BACKGROUND: Wrestling was an important part of the ancient Olympic Games and is still one of the most popular events of the modern Olympic Games. Studies indicate that general physiologic profile of successful wrestlers is high anaerobic power and capacity, muscular strength, above average aerobic power, exceptional flexibility, fat free mass, and a mesomorphic somatotype. OBJECTIVES: The objective of the present study was to evaluate anthropometric characteristics and physical performance of elite male wrestlers. PATIENTS AND METHODS: The Colombian Wrestling Team was evaluated while in preparation for the Olympic Games (n = 21; age, 27.9 +/- 6.7 years). Athletes were tested on anthropometric and fitness parameters: body composition, somatotype distribution according to Heath-Carter, aerobic capacity, vertical jump, and anaerobic power. RESULTS: The evaluations showed a mean body fat percentage of 13.6% +/- 3.0% (95% CI, 12.2%-15%), muscle mass of 46.4% +/- 2.2% (95% CI, 45.4%-47.4%), Ponderal index of 41.0 +/- 1.8 (95% CI, 40.2-41.8), body adiposity index (BAI) 25.1 +/- 3.6 (95% CI, 23.5-26.8), and somatotype distribution mesomorphic-ectomorph (5.3-1.6-3.8). Mean aerobic capacity was 45.9 +/- 6.6 mL/kg/min (95% CI, 42.8-48.9), vertical jump was 36.4 +/- 6.6 cm (95% CI, 11.8-16.6), and anaerobic power was 92.6 +/- 19.5 kg/s (95% CI, 83.7-101.5). CONCLUSIONS: These results provided a profile of elite wrestlers that could be used as training targets for developing athletes. The results may also provide information for training and tactical planning.

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Roiger, T., L. Weidauer, and B. Kern. (2015). A longitudinal pilot study of depressive symptoms in concussed and injured/nonconcussed National Collegiate Athletic Association Division I student-athletes. *J Athl. Train.* 50, 256-261.

Keywords: Adolescent/Athletes/psychology/Athletic Injuries/complications/Brain Concussion/Depression/diagnosis/etiology/physiopathology/Female/Humans/Longitudinal Studies/Male/Mental Status Schedule/Pilot Projects/Sports/Students/Young Adult

**Abstract:** CONTEXT: Depression, which affects millions of Americans each year, among them collegiate student-athletes, can be caused by a wide range of circumstances, including sport-related injuries. OBJECTIVE: To longitudinally examine the extent to which National Collegiate Athletic Association Division I student-athletes demonstrated postinjury depressive symptoms. DESIGN: Descriptive epidemiologic study. SETTING: National Collegiate Athletic Association Division I collegiate athletics. PATIENTS OR OTHER PARTICIPANTS: Concussed, injured/nonconcussed, and healthy Division I collegiate student-athletes (aged 18-22 years) competing in men's basketball, football, and wrestling and women's basketball, soccer, and volleyball. MAIN OUTCOME MEASURE(S): Participants completed the Center for Epidemiologic Studies Depression Scale at baseline and at 1 week, 1 month, and 3 months postinjury. We measured differences in depressive scores among concussed, injured/nonconcussed, and healthy participants. Longitudinal changes in postconcussion depressive symptoms were also examined. RESULTS: No differences in baseline depressive symptoms among subgroups were noted. After an increase between baseline and 1 week (4.3, 95% confidence interval [CI] = 0.41, 8.16, P = .02), depressive symptoms in the concussion group decreased between 1 week and 1 month (-2.7, 95% CI = -4.96, -0.47, P = .01) and between 1 week and 3 months (-4.0, 95% CI = -6.50, -1.49, P = .004). The injured/nonconcussed group showed differences between baseline and 1 week (4.6, 95% CI = 1.08, 8.17,

P = .009) and between baseline and 1 month (3.2, 95% CI = -0.05, 6.30, P = .03). No significant differences were present in depressive symptoms between concussed participants and injured/nonconcussed participants at any of the postinjury time points. **CONCLUSIONS:** Depression may present as a postinjury sequela in Division I collegiate athletes. Athletes who sustain a concussion or other injury resulting in time lost from practice or competition need to be observed carefully for signs and symptoms that may indicate depression. Tools such as the Center for Epidemiologic Studies Depression Scale can be valuable in helping clinicians to recognize and manage depressive symptoms in these individuals.

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Romanov VV, I.E. Vasil'kov, Vasil'kov AI, Savel'ev DS. (2015). Intensity of exercise in competitive matches of combat sambo wrestlers. *Theory and Practice of Physical Culture*, 6, accessed at: <http://www.teoriya.ru/ru/node/3823>

**Abstract:** Combat sambo is a rather complex and diverse sport in terms of technique. The importance of monitoring of various parameters of load in the final stages of pre-season training was defined in the paper. According to research in the field of martial arts, in addition to the regular assessment of the athlete's fitness level, various load parameters need to be continuously monitored, especially in the final stages of pre-season training to provide more effective control in the course of the training process. The experimental studies of the features of intensity of competitive matches of sambo wrestlers were conducted in the period of training for major competitions and in sports sambo when training for the World Cup 2014. The possibility of using a heart rate monitor to determine heart rate in the training and competitive processes were considered. High, and also in many cases linear, relationship between heart rate and the indicator of intensity of work makes it possible to consider heart rate as a highly informative characteristic for estimation of the condition of an individual and his reaction to the executable load. The basic load characteristics were studied using the heart rate monitor Polar Team System during competitive bouts of combat sambo wrestlers. The efficiency of the technology of determination of training and competitive loads for elite combat and sport sambo wrestlers has been experimentally proved. An assessment of the organization of the training process at the final stage of the pre-season training of combat sambo wrestlers was estimated on the basis of the given research.

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Saryg S.K., Lopsan A.D., Buduk-ool L.K. (2015). Heart rate indicators of volleyball players and freestyle wrestlers. *Theory and Practice of Physical Culture*, 3, accessed at: <http://www.teoriya.ru/ru/node/3502>

**Introduction.** Sports activity is a specific type of activity, a specially organized process aimed at detecting human reserve capabilities. Objective criteria for assessing the level of functional fitness of an athlete are physiological indicators reflecting the functioning of the sympathetic and parasympathetic sections of the human nervous system, especially the mechanisms of vegetative regulation of the functioning of the cardiovascular system. In recent decades much attention has been paid to the research of heart rate during adaptation to training and competitive loads. Heart rate and force are very sensitive to any stress stimulation and indicate the state of their regulatory systems and regulatory and adaptive capabilities of the body. They improve depending on the degree of increase of parasympathetic regulation, developing in the course of training [5]. The growing sympathetic regulation under physical or emotional stress leads to decreased adaptive capabilities of heart rate and affects the baseline heart rate characteristics.

Heart rate variability (HRV) research is being widely used for athletes to estimate the effect of training loads. The issue of neurohumoral mechanisms of heart rate regulation is among the most researched in sports physiology and medicine at the moment, due to the fact that heart rate shows the fundamental relations in functioning of not only the cardiovascular system, but the whole body, as it reflects the functioning of the autonomic nervous system. The method of studying HRV is simple to measure, informative, highly resistant to inaccuracies and measurement errors and therefore is very reliable. At the same time, the number of works related to the study of heart rate variability of athletes is extremely small. This accounts for the relevance of the present research.

The purpose of the research was to examine heart rate indicators of volleyball players and freestyle wrestlers of the College of Olympic reserve in Kyzyl (Republic of Tyva). **Materials and methods.** A research was conducted involving an assessment of the resting functional state of the cardiovascular system (CVS) of volleyball players and freestyle wrestlers of the College of Olympic reserve of the Republic of Tyva (COR RT). There were 55 Tuvinian young men of various skill levels in total, including 21 volleyball players and 34 wrestlers aged 15 to 22 (mean age – 17.52±0.29). The training load was 2 hours 6 days a week.

The functional state of CVS was assessed by the indicators of heart rate (HR), systolic (SBP) and diastolic (DBP) blood pressure, mean arterial pressure (MAP) by the formula of J.B. Hickam, cardiac index (CI), indicator of vegetative balance (Kerdo index) by the technique of Gene V.G., adaptive capacity (AC) by the method of R.M. Baevsky, physical fitness index (PFI) and double product (DP) [3].

Time baseline indicators of heart rate variability were assessed: standard deviation of the RR interval (SDNN, ms), root mean square of successive differences of cardiointervals (RMSSD, ms), share of successive intervals that differ by more than 50 ms (pNN50, %), coefficient of variation of number of intervals R-R (CV, %) using VNS-Rhythm device produced by the Neurosoft Company (Ivanovo, Russia). Spectral indices of heart rate variability were also studied: total spectral power (TP, ms<sup>2</sup>), high frequency spectrum power (HF, ms<sup>2</sup>), power of waves in normalized units (HF norm, n.u. and LF norm, n.u.) and their ratio LF/HF. Mathematical processing of the research results was carried out using the STATISTICA 6 software. Differences were considered statistically significant at p<0.05.

**Results and discussion.** Significant differences between the volleyball players and the wrestlers in terms of the studied parameters have not been detected in the study of HR, SBP and DBP. The values corresponded to the physiological norm (Table 1). Great "economic

efficiency” [4] of the functioning of the hemodynamics system is characteristic of the volleyball players compared with the wrestlers, which is manifested by a smaller value of CI. MAP, CI, Kerdo indices and AC values of all the athletes indicated overstraining of CVS. Fatigue had been detected according to the MAP index of the examined volleyball players and wrestlers. Physical or mental loads of the afferent systems during operation are the major cause of fatigue. AC, as an indicator of the degree of adaptation of the whole body, has detected strain of the mechanisms of adaptation to physical loads, i.e. sufficient functional capacities are provided at the expense of the functional reserves. It has been found that if adaptive characteristics worsen, the AC values increase, specific changes emerge leading to illness [1]. CI revealed eukinetik type of blood circulation, indicating the moderately high peripheral resistance of the systemic circulation. DP characterizing the systolic heart function indicates the average functional capacity of heart muscles and the average maximum aerobic capacity. Quantitative estimation of PFI provides important information about health status and capabilities of the body. So the necessary measures can be taken to prevent disease and improve PFI. The examined trainee athletes’ PFI is “above average”, which means unsafe health status, since the average physical fitness level can be regarded as critical.

Table 1. *Indicators of central hemodynamics of volleyball players and wrestlers of the College of Olympic reserve in a state of relative rest (M±m)*  
The methods of time-line and spectral analysis were chosen for HRV analysis. Table 2 shows indicators of HRV time-line analysis in the compared groups. As seen from Table 2, the average duration of the normal cardio intervals RRNN of the wrestlers is 6.44 % longer and amounts to 942.9±26.5 compared with the volleyball players whose value is 882.1±60.6 (p>0.05).

SDNN is the most common indicator for the overall assessment of HRV. According to published data, a change of SDNN value indicates a shift of the autonomic balance towards predominance of one of the ANS divisions: increase of SDNN indicates that the parasympathetic part is growing, and decrease of the values shows that the sympathetic regulation of the heart rate is strengthening [5]. In our research, the trainee wrestlers’ SDNN level is high (76.5±8.87) unlike that of volleyball players (47.9±5.97) (p>0.05), indicating strengthening of the parasympathetic regulation of heart rate which is consistent with the published data of other authors (Table 2).

Table 2. *Time-line indicators of heart rate variability of volleyball players and wrestlers of the College of Olympic reserve in a state of relative rest (M±m)*

Sport	n	HR (bpm)	SBP (mm Hg)	DBP (mm Hg)	Kerdo Index (n.u.)	MAP, (mm Hg)	CI (l/min/m <sup>2</sup> )	AC, (n.u.)	PFI, (n.u.)	DP (n.u.)
Volleyball players	21	70.05±1.90	115.09±2.21	68.09±1.84	1.87±2.98	83.76±8.38	3.09±0.10	2.26±0.06	0.73±0.02	80.76±2.85
Wrestlers	34	69.12±1.69	116.38±1.19	67.15±1.25	1.18±2.87	83.56±6.12	3.20±0.12	2.36±0.04	0.75±0.02	80.53±2.24

Indicator	Sport	
	Volleyball players (10)	Wrestlers (15)
RRNN, ms	882.1±60.6	942.9±26.5*
SDNN, ms	47.9±5.97	76.5±8.87*
RMSSD, ms	43.4±8.58	78.8±12.5*
pNN50, %	23.3±6.54	45.0±5.89*
CV, %	5.30±0.40	7.98±0.78*

Note: \* p<0.05 – compared with volleyball players.

In our study, the RMSSD indicator of the wrestlers tended to be high (78.8±12.5) compared with that of the volleyball players (43.4±8.58) (p>0.05), which also reflects some predominance of the parasympathetic division over the sympathetic one (Table 2). According to the published works of M.A. Popova et al. (2013) it has been established that involvement in extreme sports does not have a unidirectional influence on the SDNN and RMSSD indicators of the time-line analysis, and their increase reflects activation of the parasympathetic ANS [6]. The indicator of the number of pairs of successive cardio intervals NN that differ by more than 50 ms during the entire recording (pNN50, %) was also higher in case of wrestlers, by 48.2 % (p<0.05). Higher pNN50 value promotes more active parasympathetic nervous system. The wrestlers’ variability coefficient (CV) was slightly high (7.98±0.78) compared with that of the volleyball players (5.30±0.40) (p>0.05), indicating a certain increase of the total regulation indicator.

The following results were obtained while analyzing the spectral baseline indicators (Table 3). Total spectral power indicator (TP) of the wrestlers was higher (6757.7±604.4) than that of the volleyball players (2673.4±481.0) (p>0.05), which indicates an increase in the activity of the parasympathetic part (Table 2). This indicates a greater impact on the heart of regulatory actions aimed at recovering after loads. These findings are consistent with the published data that indicates that physical exercise contributes to the growth of the overall power of HRV which is associated with the activation of the vagal tone in the autonomic nervous system [9].

Table 3. *Spectral indicators of heart rate variability of volleyball players and wrestlers of the College of Olympic reserve in a state of relative rest (M±m)*

Indicator	Sport	
	Volleyball players (10)	Wrestlers (15)
TP, ms <sup>2</sup>	2673.4±481.0	6757.7±604.4 *
HF, ms <sup>2</sup>	873.6±231.8	310.4±1034.6

LF norm, n.u.	52.7±5.59	44.5±5.12
HF norm, n.u.	47.2±5.59	55.4±5.12
LF/HF	1.53±0.40	1.59±0.74

Note: \*  $p < 0.05$  – compared with volleyball players.

Results of the analysis of the other spectral values of heart rate (HF, LF norm, HF norm and LF/HF), reflecting the activity of the autonomic nervous system in all the athletes, have not shown significant changes (Table 3).

Conclusions. The research found no significant differences in the cardiovascular system of the Tuvian trainee volleyball players and wrestlers, but the functional state indicates the presence of strain of the adaptation mechanisms. The level of physical fitness is rated as “above average”. While analyzing the autonomic regulation of heart rate of the trainee athletes engaged in freestyle wrestling the parasympathetic type of the autonomic nervous system has been identified, which ensures an optimal supply of oxygen to the body of an athlete while at rest and a recovery after loads, an economization of the cardiovascular system activity.

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Sawczyn S, Jagiełło W, Valentin I Fetisov VI, Mishchenko VS. (2015) Dependence of work capacity recovery after strenuous training sessions upon individual predisposition of skilled wrestlers to work under different energy modes. *Archives of Budo / Science of Martial Arts*, 11, 197-207.

**Abstract:** Background & Study Aim: It is known that a fatigue and recovery response underlies the efficient of elite athletes' training. Individualities of recovery response in skilled wrestlers training may relate to differ in capacities of anaerobic alactate, lactate and aerobic systems and in some important characteristics of special work capacity of athletes. On this basis relation between energy capacities and rate of special work capacity recovery after heavy training sessions of wrestler has been suggested. The aim of the study was the dependence of the recovery rate of special work capacity characteristics (6 hours after strenuous training sessions of different type) upon predisposition of skilled wrestlers to work in different energy regimes. **Material & Methods:** A total of 31 free-style male wrestlers, aged 19-26 (mean 22.9), weighing 63–89 kg, of a national and international levels, with 5-13 years of competitive wrestling experience participated in the study. The recovery of special work capacity 6 hours after three common types of strenuous training sessions differing in preferential realization of anaerobic alactate, glycolytic (lactate) and aerobic energy sources were studied. The speed-strength and special endurance capacities wrestling tests were used. The specific speed-strength characteristics were evaluated by speed of some elements of technical actions (TA) during video registration and dynamic force assessment.

**Results:** A subjectively perceived (immediately after the session) heaviness of training load was extremely high and did not differ significantly for sessions of different training direction. Six hours after the training sessions, most of analyzed indices of special work capacity and TA were decreased relative to initial values. The decrease was related to the type of the session differing by preferential usage of power regimes of anaerobic alactate, anaerobic glycolytic (lactate) and aerobic character (energy mode). There existed connection between domination in wrestler of these or those aspects of energy capacities and degree of special work capacity and TA recovery after heavy training loads in sessions of different types. **Conclusion:** The recovery of special work capacity characteristics six hours after the session turned to be the highest, when individual energy predisposition matched preferential orientation of training session. Practical significance of the study may consist in the advance of additional criteria for regimes of training load repetition with account for individual predisposition of wrestlers.

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Sayenga D. (2015) The Centenarian File - The Uncancelled Berlin Games. *Amateur Wrestling News* November 15<sup>th</sup>, p 20.

Shenoy, R., E. Mostow, and G. Cain. (2015) Eczema herpeticum in a wrestler. *Clin. J Sport Med.* 25, 18-19.

**Abstract:** Eczema herpeticum (EH), first described in 1887, is characterized by a disseminated skin infection consisting of dome-shaped papules and is associated with fever, lymphadenopathy, and malaise. The condition commonly occurs on the trunk, head, and neck and is associated with numerous skin conditions, including atopic dermatitis. It is a result of a superimposed herpes simplex virus infection on otherwise compromised skin. It is a rapidly spreading infection, and early antiviral treatment is essential. Herpes gladiatorum is a common infection in the wrestling population, and atopic dermatitis is a common skin condition in the general population. Together, these 2 conditions can greatly increase the risk of EH infection. It is important for both sports medicine physicians and dermatologists to be aware of the risk of EH infection in this population, the presenting signs and symptoms, and be ready to respond quickly with antiviral treatment.

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Sommerfield LM, McAnulty SR, McBride JM, Zwetsloot JJ, Austin MD, Mehlhorn JD, Calhoun MC, Young JO, Haines TL, Utter AC. (2015). Validity of Urine Specific Gravity when Compared to Plasma Osmolality as a Measure of Hydration Status in Male and Female NCAA Collegiate Athletes. *J Strength Cond Res*. 2015 Dec 18. [Epub ahead of print]

The purpose of this study was to evaluate the response of urine specific gravity (Usg) and urine osmolality (Uosm) when compared to plasma osmolality (Posm) from euhydration to 3% dehydration and then a 2-hr rehydration period in male and female collegiate athletes. Fifty-six National Collegiate Athletic Association (NCAA) wrestlers (mean  $\pm$  SEM); height  $1.75 \pm 0.01$  m, age  $19.3 \pm 0.2$  years, and body mass (BM)  $78.1 \pm 1.8$  kg and twenty-six NCAA women's soccer athletes; height  $1.64 \pm 0.01$  m, age  $19.8 \pm 0.3$  years, and BM  $62.2 \pm 1.2$  kg were evaluated. Hydration status was obtained by measuring changes in Posm, Uosm, Usg and BM. Male and female subjects dehydrated to achieve an average BM loss of  $2.9 \pm 0.09\%$  and  $1.9 \pm 0.03\%$ , respectively. Using the medical diagnostic decision model, the sensitivity of Usg was high in both the hydrated and dehydrated state for males (92%) and females (80%). However, the specificity of Usg was low in both the hydrated and dehydrated states for males (10% and 6%, respectively) and females (29% and 40%, respectively). No significant correlations were found between Usg and Posm during either the hydrated or dehydrated state for males or females. Based on these results, the use of Usg as a field measure of hydration status in male and female collegiate athletes should be used with caution. Considering that athletes deal with hydration status on a regular basis, the reported low specificity of Usg suggests that athletes could be incorrectly classified leading to the unnecessary loss of competition.

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Stanec AD, Bhalla JA. (2015). Exploring the Experiences of Elite Female Wrestlers From Developed and Developing Countries. *International Journal of Wrestling Science*, 5: 28–34, 2015

**ABSTRACT.** The sport of wrestling lays claim to being the world's oldest sport, with artifacts from Sumeria depicting wrestling from over 5,000 years ago, and was widely practiced in many ancient cultures (Petrov, 1993). Widespread female involvement in the sport is relatively new compared to male formal amateur competition. For example, while male wrestling has been a part of the program of the modern Olympic Games since 1896, female wrestling debuted at the 2004 Athens Olympic Games. Consequently, the research on elite female wrestlers is limited. Research that has been published exploring issues related to female wrestling has typically been done so at the national level, and primarily examining gender issues (Khan & Ali, 2011; Macro, Viveiros & Cipriano, 2009; Miller, 2010; Stuart & Whaley, 2005).

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Stiffler, M. R., J. L. Sanfilippo, M. A. Brooks, and B. C. Heiderscheid. (2015). Star Excursion Balance Test Performance Varies by Sport in Healthy Division I Collegiate Athletes. *J Orthop. Sports Phys. Ther*, 45,772-780.

**Abstract:** Study Design Cross-sectional. Objectives To describe performance and asymmetry on the Star Excursion Balance Test (SEBT) by sex and sport, and to determine if differences exist within a collegiate athlete population. Background Performance on the SEBT may differ between sexes and levels of competition, though the results of previous studies have been inconsistent. Investigation of performance and asymmetry differences between sports is limited. Sex- and sport-specific reference values likely need to be determined to best assess SEBT performance. Methods Performance on the SEBT was retrospectively reviewed in 393 healthy National Collegiate Athletic Association Division I collegiate athletes from 8 sports. Means, standard deviations, and 95% confidence intervals were calculated for all variables. Normalized reach distance (percent limb length) and asymmetry between limbs were compared for the anterior (ANT), posterolateral (PL), and posteromedial (PM) directions and for the composite (COMP) score using a 2-way analysis of variance (ANOVA) of sex by sport, and a 1-way ANOVA to separately compare sports within each sex. Results Average normalized reach distance ranged from 62% to 69%, 84% to 97%, and 99% to 113% in the ANT, PL, and PM directions, respectively, and from 82% to 92% in the COMP score. Normalized asymmetry ranged from 3% to 4%, 5% to 8%, and 5% to 6% in the ANT, PL, and PM directions, respectively. A significant sex-by-sport interaction ( $P = .039$ ) was observed in the ANT direction, with a sex effect for soccer players ( $P < .001$ ; men less than women). Significant differences were observed in the PL and PM directions and in the COMP score among women's teams, with women's ice hockey players reaching the farthest (COMP, 90.0%). Among men's teams, significant differences were observed in all directions and in the COMP score. Men's ice hockey players (COMP,

91.9%) and wrestlers achieved the farthest distances (COMP, 88.8%). Conclusion Performance on the SEBT varies by team, with a difference between sexes also present for soccer. Performance on the SEBT and potential injury risk should be interpreted within the context of the athlete's sport.  
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Talae M, Nazem F, and Goodarzi MT. (2015). The Impact of 4% Rapid Weight Loss on Leptin, Adiponectin, and Insulin Resistance Among Elite Adult Freestyle Wrestlers. *International Journal of Wrestling Science*, 5, 56–62.

**ABSTRACT.** Rapid weight reduction techniques that emphasize severe restrictions of food intake and water consumption during a short period of time are commonly employed by wrestlers before weigh-in. Along with the negative effects of rapid weight loss on a wrestler's physiological functions, we investigated leptin and adiponectin levels and insulin resistance in young wrestlers during their rapid weight loss program. Fifteen freestyle wrestlers were randomly selected as the subjects. They had a mean of age  $23 \pm 1$  y and anthropometric characteristics of: weight  $67.6 \pm 0.8$ , BMI  $22.5 \pm 0.21$  kg/m<sup>2</sup>, body fat percentage  $6.12 \pm 0.18$ , waist to- hip circumference ratio  $0.82 \pm 0.08$ . Caloric intake (mean 7 days measured by food analyzer software) and anthropometric characteristics were measured by standard methods. The concentrations of the leptin and adiponectin hormones and insulin resistance index were measured with a sandwich ELISA kit method and (HOMA) from fasting glucose and insulin levels, respectively. Rapid weight loss program with a 4% weight loss had a significant impact on anthropometric factors, with decreasing leptin level, insulin resistance, and increased beta cell function, while the levels of adiponectin did not significantly change after weight loss. Rapid weight loss has harmful physiological effects on wrestler's bodies, but can be associated with improvements in the regulation of fatty acid, glucose metabolism, and insulin resistance.

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Tian, Y., Z. He, J. Zhao, D. Tao, K. Xu, A. Midgley, and L. McNaughton. An 8-year longitudinal study of overreaching in 114 elite female Chinese wrestlers. *J Athl. Train.* 50:217-223, 2015.

**Abstract:** CONTEXT: Successful training involves structured overload but must avoid the combination of excessive overload and inadequate recovery. OBJECTIVE: The aim of this study was to determine the incidence of functional overreaching (FOR), nonfunctional overreaching (NFOR), and overtraining syndrome in elite female wrestlers during their normal training and competition schedules and to explore the utility of blood markers for the early detection of overreaching. Classification of FOR, NFOR, and overtraining syndrome was based on the European Congress of Sports Medicine position statement. DESIGN: Case series. SETTING: China Institute of Sport Science. PATIENTS OR OTHER PARTICIPANTS: Over an 8-year period, 114 wrestlers from the women's Asian wrestling team were monitored to help identify if and when they experienced FOR, NFOR, or overtraining syndrome. MAIN OUTCOME MEASURE(S): Creatine kinase, hemoglobin, testosterone, and cortisol were measured throughout the period to identify whether wrestlers were outside the reference intervals (constructed from normal recovery data) during periods of overreaching and not overreaching. RESULTS: Among the 114 athletes, there were 13 (3.6%) instances of FOR, 23 (6.4%) instances of NFOR, and 2 (0.6%) instances of overtraining syndrome. The diagnostic sensitivity for FOR was 38%, 15%, 45%, and 18% for creatine kinase, hemoglobin, testosterone, and cortisol, respectively. The diagnostic sensitivity for NFOR was 29%, 33%, 26%, and 35% for creatine kinase, hemoglobin, testosterone, and cortisol, respectively. Specificity was 79%, 88%, 90%, and 82% for creatine kinase, hemoglobin, testosterone, and cortisol, respectively. Post hoc analysis showed no mean differences in creatine kinase ( $F = 0.5$ ,  $P = .47$ ), hemoglobin ( $F = 3.8$ ,  $P = .052$ ), testosterone ( $F = 0.2$ ,  $P = .62$ ), or cortisol ( $F = 0.04$ ,  $P = .85$ ) between monitoring periods when wrestlers were and were not diagnosed with FOR and NFOR. CONCLUSIONS: Coaches and sports scientists should not use single blood variables as markers of overreaching in elite female wrestlers.

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Torgovkin VG, Kirillin VN, (2015) Study of Adaptation of Freestyle Wrestlers of Republic of Sakha (Yakutia) in Midlands of Russia during Training. *Theory and Practice of Physical Culture*, № 1, accessed at: <http://www.teoriya.ru/ru/node/2812>

**Abstract:** Introduction. Combat sports, particularly wrestling, are undoubtedly among the most remarkable and specific phenomena of sports life in our country and the planet as a whole in the 20th century and in the early 21<sup>st</sup> century. Nowadays it becomes particularly important to develop the technology of training for qualifying and major competitions of the year. While implementing the principles of the training process, the training technology was at the same time individualized in relation to the

capabilities and characteristics of each athlete. This research was carried out according to the plan of the Wrestling Federation of the Republic of Sakha (Yakutia). The purpose of the research was to develop and check the effectiveness of the training process under middle altitude conditions, aimed at improvement of speed and strength endurance of freestyle wrestlers. **Conclusions.** According to the analysis of the findings, in the course of training of athletes of national teams during the year it is advisable to use training sessions intended to improve speed and strength endurance under middle altitude conditions, which should be finished 30 days before the event.

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Viveiros, L, Moreira, A, Zourdos, MC, Aoki, MS, and Capitani, CD. (2015). Pattern of Weight Loss of Young Female and Male Wrestlers. *J Strength. Cond. Res.* 29:11, 3149-3155.

**Abstract:** Pattern of weight loss of young female and male wrestlers. *J Strength Cond Res* 29(11): 3149-3155, 2015-The aim of this study was to investigate the magnitude of rapid weight loss (RWL) of female and male young wrestlers at the Brazilian high-school games. High-school wrestlers (females: n = 16, 13 +/- 2 years; males: n = 15, 13 +/- 2 years) participated in this study. The official weigh-in was conducted 24 hours before competition. Immediately after the official weigh-in, wrestlers completed a hydration habits and a standardized weight loss questionnaires. Twenty-four hours later, wrestlers took part in an unofficial prematch weigh-in. Sodium, potassium, chloride, hematocrit, and hemoglobin were measured immediately before the first competitive match by iSTAT Blood Gas Analyzer. A significant body mass increase was observed from the official weigh-in to the prematch weigh-in (females: 2.7 +/- 1.4 kg and males: 1.5 +/- 0.9 kg;  $p \leq 0.05$ ) with significantly greater body mass increase in females (6.3%) vs. males (3.1%) ( $p \leq 0.05$ ). Rapid weight loss practices were exercised by 42.0% of the wrestlers. Furthermore, 46.2% of those who performed RWL practices reported side effects, which they perceived negatively altered past performance. Despite RWL and subsequent body mass increase, all biomarkers (sodium, potassium, chloride, hematocrit, and hemoglobin) were in the normal range at the prematch weigh-in. The majority (82.0%) of the athletes agreed that hydration habits are important to health and performance. It seems that although wrestlers acknowledge negative performance effects due to RWL, the practice is still exercised among both female and male wrestlers. Therefore, educational programs should be implemented in high-school athletes to discourage RWL and provide information for exercise and nutritional strategies to maintain a healthy body mass and avoid chronic health issues.

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Williams, C., J. Wells, R. Klein, T. Sylvester, and R. Sunenshine. Notes from the field: outbreak of skin lesions among high school wrestlers--Arizona, 2014. *MMWR Morb. Mortal. Wkly. Rep.* 64:559-560, 2015.

**Abstract:** Skin infections are a common problem among athletes at all levels of competition; among wrestlers, 8.5% of all adverse events are caused by skin infections. Wrestlers are at risk because of the constant skin-to-skin contact required during practice and competition. The most common infections transmitted among high school wrestlers include fungal infections (e.g., ringworm), the viral infection herpes gladiatorum caused by herpes simplex virus-1 (HSV-1), and bacterial infections (e.g., impetigo) caused by Staphylococcus or Streptococcus species, including methicillin-resistant Staphylococcal aureus (MRSA). On February 7, 2014, the Maricopa County Department of Public Health was notified of multiple wrestlers who reported skin lesions 2 weeks after participating in a wrestling tournament at school A. The tournament was held on January 24-25 and included 168 wrestlers representing 24 schools. The county health department initiated an investigation to identify cases of skin lesion, determine lesion etiology, identify risks associated with lesion development, and provide guidance for preventing additional cases.

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Wright, GA, Isaacson, MI, Malecek, DJ, and Steffen, JP. (2015). Development and assessment of reliability for a sandbag throw conditioning test for wrestlers. *J Strength Cond Res*, 29(2), 451–457.

The purpose of this study was to develop and analyze a sport-specific conditioning test for wrestling that will incorporate the physiological demands of a match. Sixteen D-III collegiate wrestlers performed 2 tests to assess physical conditioning. The developed test (sandbag test) used a bag filled with sand that was repeatedly thrown over a course of seven 1-minute rounds. Average time per throw (T/T) was determined each round. The sandbag test was compared with a previously established repeated sprint protocol of maximal effort arm cranking on an upper body ergometer (UBE). Mean power output was determined for each sprint. Both the UBE test and the sandbag test were compared using performance decrement (%fatigue), blood lactate (BLa), and peak heart rate (HR<sub>peak</sub>) values. Test-retest reliability for the sandbag test was found to be almost perfect using T/T (intraclass correlation coefficient,  $r = 0.96$ ). No significant differences in % fatigue were found between the UBE test and the sandbag test ( $p = 0.600$ ),

BLa ( $p = 0.283$ ), and HRpeak ( $p = 0.214$ ). Further analysis by weight class (light-weight class [LWC] and heavyweight class [HWC]) found a significant interaction for %fatigue between groups for the sandbag test and UBE ( $p = 0.001$ ), but no interactions were observed for BLa ( $p = 0.198$ ) or HRpeak ( $p = 0.990$ ). Although no significant differences were found in %fatigue between the 2 tests when the data were grouped together, a clear difference was found between the LWC and HWC groups only in the sandbag test, indicating that this test may be more sensitive than the UBE. Coaches can assess their wrestlers with this reliable, inexpensive, and time-efficient sandbag test.

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Yildirim, I. (2015). Associations among dehydration, testosterone and stress hormones in terms of body weight loss before competition. *Am. J Med. Sci* 350:103-108.

**Abstract:** BACKGROUND: In weight class sports, such as judo, taekwondo and wrestling, reducing body weight before competitions is common. However, it is recommended that weight loss per week should not exceed 1.5% of total body weight otherwise, athletes' metabolism and endocrine parameters are negatively affected, which will deteriorate their physiology and psychology and thus decrease their performance. The aim of this study was to determine weight loss and hydration levels after weight loss before competitions among the elite wrestlers and to explore the association between hydration levels, and stress and testosterone. METHODS: This was an observational study. The study was undertaken with 56 voluntary athletes who participated in wrestling championship. With blood samples taken from the wrestlers, glucose, blood urea nitrogen, sodium (Na), cortisol, prolactin and testosterone hormone analyses were evaluated by a specialist at a biochemical laboratory. RESULTS: It was found out that according to plasma osmolarity levels, there were significant differences between those dehydrated and those who maintained euhydration in terms of cortisol and total testosterone levels ( $P < 0.001$ ). It was detected that an association was present between plasma osmolarity, and cortisol ( $r = 0.667$ ) and total testosterone levels ( $r = -0.627$ ) among the elite wrestlers. CONCLUSIONS: It was discovered that elite wrestlers were subjected to quick and high level of weight losses before competitions in a very short time (1-5 days). It was seen that their hydration levels differed due to the weight loss, which was explored to be causing acute dehydration among the wrestlers.

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Zamani, A., M. Omid, A. Hemmatfar, I. Salehi, H. Bazmamoun. (2015). Wrestlers' immune cells produce higher interleukin-6 and lower interleukin-12 and interleukin-13 in response to in vitro mitogen activation. *Iran J Basic Med. Sci* 17:917-2.

**Abstract:** OBJECTIVES: Although recent investigations have shown chronic inflammation and inflammation-associated diseases might be ameliorated by exercise; little is known about the relation between exercise training with anti/pro-inflammatory cytokines. MATERIALS AND METHODS: This cross sectional study was conducted to compare interleukin-4 (IL-4), IL-6, IL-10, IL-12, IL-13, interferon gamma (IFN-gamma) levels in serum, and their in vitro production by whole blood (WB) cells and by peripheral blood mononuclear cells (PBMCs) in response to mitogens lipopolysaccharide and phytohemagglutinin. Twelve elite wrestlers with history of three times per week exercise training for about 9.5 years, and thirteen healthy silent controls were recruited. To analysis the cytokines by enzyme linked immunosorbent assay (ELISA), the blood samples were taken 24 hr after the last training session from the wrestlers. RESULTS: Serum analysis for IL-4, IL-6, IL-10, IL-12, IL-13 and IFN-gamma indicated no statistical difference between the two groups. Meanwhile, 48 hr in vitro activation of WB and PBMCs by the mitogens revealed that IL-6 production was elevated in both WB and PBMCs. Whereas, IL-12 and IL-13 were decreased in supernatant of PBMCs and WB cells cultures, respectively. CONCLUSION: It seems that wrestling cause immune system cells to produce anti-inflammatory myokine IL-6 and decrease production of pro-inflammatory cytokine IL-12 and IL-13.

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Zembron-Lacny, A., E. Ziemann, P. Zurek, and E. Hubner-Wozniak. (2015). Heat Shock Protein 27 Response to Wrestling Training in Relation to the Muscle Damage and Inflammation. *J Strength. Cond. Res.*

**Abstract:** One of the unique features of an exercise is that it leads to a simultaneous increase of antagonistic mediators. On the one hand, exercise elevates catabolic pro-inflammatory cytokines. On the other hand, exercise stimulates anabolic components such as heat shock proteins (HSPs) which protect against stressors. Therefore, the study was designed to evaluate the blood level of HSP27, and its relationship with muscle damage and inflammatory mediators in elite Greco-Roman wrestlers during training periods differed in type and intensity exercise. Ten male wrestlers ( $21.2 \pm 2.1$  yr), were observed during the conditioning camps at pre-season (January), at the beginning of tournament season (April), and during tournament season (June). Twelve healthy and untrained men ( $19.2 \pm 0.4$  yr) was considered a reference group. The serum levels of inflammatory mediators and HSP27 in wrestlers were

significantly different from non-athletes. In wrestlers, reactive oxygen and nitrogen species H<sub>2</sub>O<sub>2</sub>, NO and 3-Nitro, cytokines IL-1 $\beta$  and TNF $\alpha$  as well as HSP27 reached the highest levels at pre-season (January) or tournament season (June) when the special training predominated (>30% training load) over directed training (approx. 10% training load). CK activity also demonstrated the highest level during the same training periods (January 2315 +/- 806 IU/L; June 3139 +/- 975 IU/L). The regression analysis revealed the relationship of HSP27 level with muscle damage (rs=-0.613, P<0.001), and also with inflammatory mediators. The results of this study show that wrestling training modulates HSP27 level which is significantly related with skeletal muscle damage and inflammatory response, and suggest that measure of HSP27 level can be useful diagnostic tool in biochemical assessment of athletes to increase their performance.

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Zuckerman, S. L., Z. Y. Kerr, A. Yengo-Kahn, E. Wasserman, T. Covassin, and G. S. Solomon. (2015). Epidemiology of Sports-Related Concussion in NCAA Athletes From 2009-2010 to 2013-2014: Incidence, Recurrence, and Mechanisms. *Am. J Sports Med*, 43,2654-2662.

**Abstract:** BACKGROUND: The epidemiology of sports-related concussion (SRC) among student-athletes has been extensively researched. However, recent data at the collegiate level are limited. PURPOSE: To describe the epidemiology of SRC in 25 National Collegiate Athletic Association (NCAA) sports. STUDY DESIGN: Descriptive epidemiology study. METHODS: SRC data from the NCAA Injury Surveillance Program during the 2009-2010 to 2013-2014 academic years were analyzed. Concussion injury rates, rate ratios (RRs), and injury proportion ratios were reported with 95% CIs. National estimates were also calculated to examine linear trends across time. RESULTS: During the study period, 1670 SRCs were reported, representing a national estimate of 10,560 SRCs reported annually. Among the 25 sports, the overall concussion rate was 4.47 per 10,000 athlete-exposures (AEs) (95% CI, 4.25-4.68). Overall, more SRCs occurred in competitions (53.2%). The competition rate (12.81 per 10,000 AEs) was larger than the practice rate (2.57 per 10,000 AEs) (competition vs practice, RR = 4.99; 95% CI, 4.53-5.49). Of all SRCs, 9.0% were recurrent. Most SRCs occurred from player contact (68.0%). The largest concussion rates were in men's wrestling (10.92 per 10,000 AEs; 95% CI, 8.62-13.23), men's ice hockey (7.91 per 10,000 AEs; 95% CI, 6.87-8.95), women's ice hockey (7.50 per 10,000 AEs; 95% CI, 5.91-9.10), and men's football (6.71 per 10,000 AEs; 95% CI, 6.17-7.24). However, men's football had the largest annual estimate of reported SRCs (n = 3417), followed by women's soccer (n = 1113) and women's basketball (n = 998). Among all SRCs, a linear trend did not exist in national estimates across time (P = .17). However, increases were found within specific sports, such as men's football, women's ice hockey, and men's lacrosse. CONCLUSION: The estimated number of nationally reported SRCs has increased within specific sports. However, it is unknown whether these increases are attributable to increased reporting or frequency of concussions. Many sports report more SRCs in practice than in competition, although competition rates are higher. Men's wrestling and men's and women's ice hockey have the highest reported concussion rates. Men's football had the highest annual national estimate of reported SRCs, although the annual participation count was also the highest. Future research should continue to longitudinally examine SRC incidence while considering differences by sex, division, and level of competition.

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