2016

Annual Compilation of Wrestling Research

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INTERNATIONAL NETWORK OF WRESTLING RESEARCHERS (INWR)

ADVANCING OUR SPORT THROUGH KNOWLEDGE

FAIRE PROGRESSER NOTRE SPORT PAR LA CONNAISSANCE

ПРОДВИЖЕНИЕ НАШЕГО СПОРТА ЧЕРЕЗ ЗНАНИЕ

PROGRESO PARA NUESTRO DEPORTE MEDIANTE CONOCIMIENTO

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2016 Wrestling Research Bibliography

This compilation of published wrestling-related research during 2016 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)

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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.*

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We publish the ***International Journal of Wrestling Science*** which is the only journal dedicated to the study of the world's oldest sport.

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International Journal of Wrestling Science

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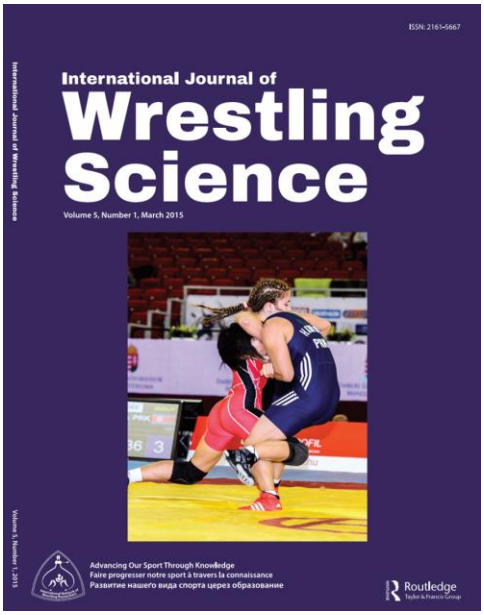

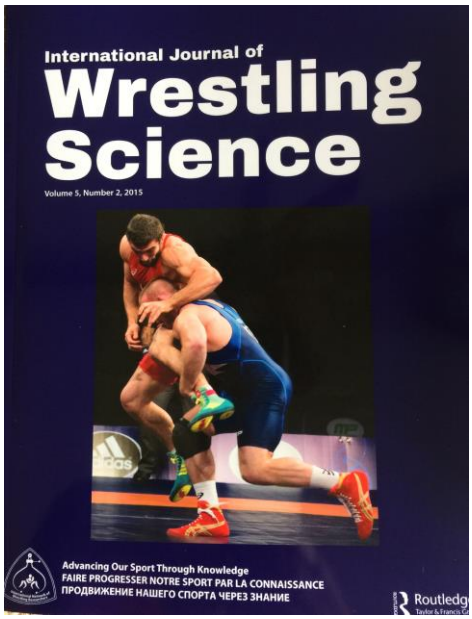

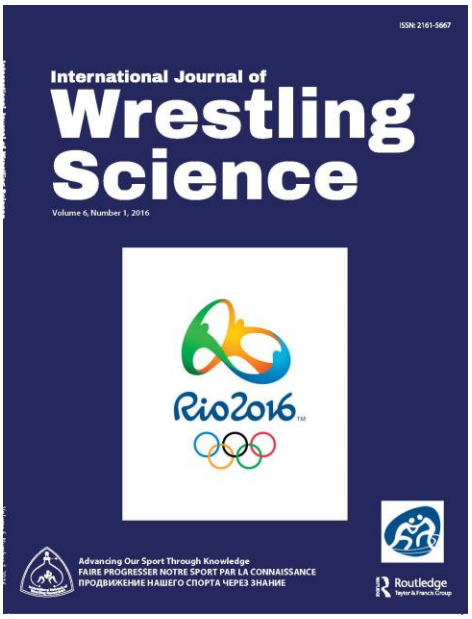

Topics include:

- training science
- physiology
- psychology
- sports medicine
- biomechanics
- nutrition
- pedagogy
- history
- sociology
- sports management

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2016 Wrestling Research Bibliography

Anderson, B.J., McGuire, D.P., Reed, M., Foster, M., & Ortiz, D. (2016). Prophylactic Valacyclovir to Prevent Outbreaks of Primary Herpes Gladiatorum at a 28-Day Wrestling Camp: A 10-Year Review. *Clinical Journal of Sport Medicine*, 26(4), 272-278.

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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Arakchiyski, Z., & Stanchev, N. (2016). Biomechanical model of the wrestling bridge. *Activities in Physical Education & Sport*, 6(1), 86-89.

This report is an attempt to define the appropriate applied useful approach to study the force structure of athlete in wrestling bridge posture. The kinematic structure and mechanical principles of the proposed mechanical and mathematical model are combined to give the coaches some background information about the structure of the bridge and to define the concept of quantitative evaluation of the existing forces in order to optimize the technical and physical preparation of the athletes. Wrestling bridge is modeled by simple mechanical plane model composed of two half-arches linked via three movable connections (joints) and loaded with external force. The model is considered as absolutely rigid body, and allows based on construction design and the magnitude of the external load forces to quantify the force reactions in all three movable pivotal connections in the horizontal and vertical directions. Initially, it is assumed that the external load acting in the direction of the weight of the athlete and the equations do not include internal forces. Subsequently, in order to get closer to the real wrestling conditions, the model is account that usually the action of the external force is directed at a certain angle. The analysis of the resulting equations indicates that the magnitude of the reactions at the horizontal direction is influenced by the height of the bridge, while the length of the bridge is related to the magnitude and distribution of the vertical support reactions. An important advantage of the proposed model is the

ability to quantify the estimated maximum wrestling bridge endurance strength based on data for the bridge kinematics and the static force of the wrestlers' torso and legs.
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Ashack, K.A., Burton, K.A., Johnson, T.R., Currie, D.W., Comstock, R.D., & Dellavalle, R.P. (2016). Skin infections among US high school athletes: A national survey. *Journal of the American Academy of Dermatology*, 74(4), 679-684. doi:S0190-9622(15)02469-X [pii];10.1016/j.jaad.2015.10.042

BACKGROUND: Skin infections have long been a reported problem among high school athletes, particularly wrestlers. There has yet to be a national study describing the epidemiology of skin infections across multiple high school sports. OBJECTIVE: We sought to report the epidemiology of skin infections among US high school athletes. METHODS: High school sports-related skin infections resulting in time loss were reported by a convenience sample of US high schools from 2009/2010 through 2013/2014 via High School Reporting Information Online. RESULTS: During the study, 474 skin infections were reported among 20,858,781 athlete exposures, a rate of 2.27 per 100,000 athlete exposures. The largest number of skin infections occurred in wrestling (73.6%) followed by football (17.9%). The most common infections were bacterial (60.6%) and tinea (28.4%) infections. Body parts most often affected were the head/face (25.3%) followed by the forearm (12.7%). LIMITATIONS: The study included only high schools with National Athletic Trainers' Association-affiliated athletic trainers, which may limit generalizability. However, using athletic trainers as data reporters improved data quality. CONCLUSIONS: Skin infections are an important subset of high school sports-related adverse events. An understanding of the epidemiology of sports-related skin infections should promote awareness and drive evidence-based prevention efforts.

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Barcal JN, Thomas JT, Hollis BW, Austin KJ, Alexander BM, & DE, L.-M. (2016). Vitamin D and Weight Cycling: Impact on Injury, Illness, and Inflammation in Collegiate Wrestlers. *Nutrients, 8*(12), 15. doi:10.3390/nu8120775

This study explored the link between vitamin D status and frequency of skin infections, inflammation, and injury in college wrestlers during an academic year. METHODS: Serum 25-hydroxyvitamin D (25(OH)D) (n = 19), plasma cytokine (TNF-α, IL-6, IL-10) (n = 18) concentrations, and body weight/composition were measured and injury/illness/skin infection data were collected in fall, winter, and spring. RESULTS: In the fall, 74% of wrestlers had vitamin D concentrations <32 ng/mL which increased to 94% in winter and spring. Wrestlers lost an average of 3.4 ± 3.9 kg ($p < 0.001$) during the season with corresponding decreases in fat mass and increases in lean mass ($p < 0.01$). An inverse association between 25(OH)D concentrations and total body mass and body fat percentage was observed at all-time points ($p < 0.01$). Concentrations of cytokines were highly variable among individuals and did not change across time ($p > 0.05$). Correlations between vitamin D status, cytokines, or frequency of illness, injury, or skin infections were not observed. CONCLUSIONS: A high prevalence of vitamin D insufficiency (<32 ng/mL) and deficiency (<20 ng/mL) was observed in wrestlers and was associated with higher adiposity. It remains unclear if higher vitamin D status would reduce injury, illness, and skin infection risk.

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Baudouinx, C., & Szymanski, S. (2016). Testing the Testers: Do More Tests Deter Athletes from Doping? *International Journal of Sport Finance*, 11(4), 349-363.

This paper examines whether increasing the frequency of testing deters athletes from doping. Since data is not available to analyze this problem directly, an indirect approach is required. We use the relationship between testing and Olympic performance to infer the relationship between testing and doping. This requires a variety of assumptions, the most important of which is that doping improves Olympic performance. The results suggest that in some sports, such as track & field (athletics) and wrestling, carrying out more tests does deter athletes from taking drugs. In other sports where doping is believed to be more common, though, there is no evidence of a negative relationship between testing and doping. This is notably the case in cycling. This suggests that for some sports, increasing the frequency of testing may be a simple solution to the problem of doping. In other sports, though, the problem may have deeper roots.

Bernacka, R.E., Sawicki, B.é., Mazurek-Kusiak, A., & Hawlena, J. (2016). Conforming and nonconforming personality and stress coping styles in combat athletes. *Journal of Human Kinetics*, 50(2), 225-233.

The main objective of this study was to investigate whether the personality dimension of conformism/nonconformism was a predictor of stress coping styles in athletes training combat sports, and to present the characteristics of this personality dimension in the context of the competitors' adaptive/innovative sport performance. Scores of 346 males practising combat sports such as kick boxing, MMA, thai boxing, boxing and wrestling were analyzed. The participants completed the Creative Behaviour Questionnaire (KANH III) measuring the conformity/nonconformity personality dimension and the Coping Inventory for Stressful Situations (CISS) measuring stress coping styles. The comparative analyses were conducted only for the groups of conformists and nonconformists. Differences in stress coping styles between conformists and nonconformists training combat sports were found as nonconformists tended to prefer the task-oriented coping style. Conclusively, a higher rate of nonconformity was associated with increasingly frequent occurrence of task-oriented coping and decreasingly frequent emotion-oriented coping.
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Braun, T., Kahanov, L., Dannelly, K., & Lauber, C. (2016). CA-MRSA infection incidence and care in high school and intercollegiate athletics. *Medicine & Science in Sports & Exercise*, 48(8), 1530-1538.

Purpose: Position papers offer solutions to manage community-associated methicillin-resistant Staphylococcus aureus (CA-MRSA), yet few studies establish the infection rate, management protocols, and referral practices among student-athletes. Over the 2012-2013 and 2013-2014 school years, we assessed the annual CA-MRSA infection incidence, sport risk, referral practices, and management steps among high school and intercollegiate athletics. Methods: This study targeted high school and intercollegiate athletic programs in the Northeastern United States. For the 2012-2013 study, 156 athletic trainers completed a one-time questionnaire. In the 2013-2014 study, 87 athletic trainers reported data bimonthly during the academic year. Each questionnaire targeted demographic information, physician-confirmed CA-MRSA infection occurrence, and management of CA-MRSA infections and bacterial skin lesions. Results: The CA-MRSA infection incidence was 15.5 per 10,000 athletes (95% confidence interval [CI], 13-19) in 2012-2013 and 16.3 per 10,000 athletes (95% CI, 13-21) in 2013-2014. The CA-MRSA infection incidence was higher in wrestling and football compared to the general student-athlete population. During the 2012-2013 study, the wrestling incidence rate was 90.2 per 10,000 (95% CI, 62-132); the football incidence rate was 42.3 per 10,000 (95% CI, 31-59). In the 2013-2014 study, the wrestling incidence rate was 89.0 per 10,000 (95% CI, 50-158); the football incidence rate was 61.4 per 10,000 (95% CI, 42-90). In both studies, primary care and general physicians

received over 60% (2012-2013: 60.5%, n = 133; 2013-2014: 66.5%, n = 125) of referrals. In the 2012-2013 study, respondents indicated that student-athlete isolation and setting decontamination were common management steps used (58.1%, n = 306). Conclusions: The incidence of CA-MRSA infections among student-athletes remains high. Therefore, it is critical that sports medicine providers continually reassess management protocols and best practices.

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Brooks, M.A., Peterson, K., Biese, K., Sanfilippo, J., Heiderscheit, B.C., & Bell, D.R. (2016). Concussion Increases Odds of Sustaining a Lower Extremity Musculoskeletal Injury After Return to Play Among Collegiate Athletes. *American Journal of Sports Medicine*, 44(3), 742-747.

Background: Previous studies have identified abnormalities in brain and motor functioning after concussion that persist well beyond observed clinical recovery. Recent work suggests subtle deficits in neurocognition may impair neuromuscular control and thus potentially increase risk of lower extremity musculoskeletal injury after concussion. Purpose: To determine the odds of sustaining an acute lower extremity musculoskeletal injury during the 90-day period after return to play from concussion in a cohort of National Collegiate Athletic Association (NCAA) Division I collegiate athletes. Study Design: Cohort study; Level of evidence, 3. Methods: Included in this study were 87 cases of concussion among 75 athletes (58 men; 17 women) participating in NCAA Division I football, soccer, hockey, softball, basketball, wrestling, or volleyball at a single institution from 2011 to 2014. The 90-day period after return to play for each case of concussion was reviewed for acute noncontact lower extremity musculoskeletal injury. Each 90-day period after return to play was matched to the same 90-day period in up to 3 controls. Control athletes without a history of concussion in the previous year were matched to concussed athletes by sport team/sex, games played, and position. A total of 182 control (136 men; 46 women) 90-day periods were reviewed for acute injury. Conditional logistic regression was used to assess the association between concussion and subsequent risk of acute lower extremity musculoskeletal injury. Results: The incidence of acute lower extremity musculoskeletal injury was higher among recently concussed athletes (15/87; 17%) compared with matched controls (17/182; 9%). The odds of sustaining an acute lower extremity musculoskeletal injury during the 90-day period after return to play were 2.48 times higher in concussed athletes than controls during the same 90-day period (odds ratio, 2.48; 95% CI, 1.04-5.91; P = .04). Conclusion: Concussed athletes have increased odds of sustaining an acute lower extremity musculoskeletal injury after return to play than their nonconcussed teammates. The study results suggest further investigation of neurocognitive and motor control deficits may be warranted beyond the acute injury phase to decrease risk for subsequent injury.

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Bujak, Z., Gierczuk, D., Hubner-Wozniak, E., & Saulite, S. (2016). Anthropometric profile and anaerobic capacity of martial arts and combat sports athletes*. Ido Movement for Culture-Journal of Martial Arts Anthropology*, 16(2), 55-59.

Aim: The aim of the present study was to compare selected anthropometric parameters and anaerobic capacity in representatives of two types of hand-to-hand combat as an example of differences between training in martial arts and combat sports. Methods. The study included 28 taekwon-do athletes (M age = 19.7 yr., SD = 2.21, years of training = 7.9 yr., SD = 1.89) and 28 Greco-Roman wrestlers (M age = 19.0 yr., SD = 1.78, years of training = 6.9 yr., SD = 1.95) at a high competitive national level. Fundamental parameters of anaerobic capacity as well as selected biometric indices were assessed. Results. Taekwondo athletes demonstrated body mass lower by 5.9% ($p>0.05$) and body height higher by 1.5% ($p>0.05$) than wrestlers. Also, their level of adiposity was lower (by 19.3%, $p<0.05$). Taekwondo athletes achieved higher values of maximal power (by 1.2 W/kg, $p<0.001$) and total work (by 28.5 J/kg, $p<0.001$).

Conclusions. The type of a hand-to-hand combat requires a different bioenergetic potential and anthropometric profile of competitors.

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Chaabene, H., Negra Y, Bouguezzi R, Mkaouer B, Franchini E, Julio U, & Y., H. (2016). Physical and physiological profile of wrestler athletes: Short review. *Journal of Strength and Conditioning Research*. doi:10.1519/JSC.0000000000001738

Wrestling is one of the oldest combat sports, disputed since the ancient Greek Olympic Games. This combat sport discipline has caught the attention of scientists since 1943 which is the date that matches the appearance of the first scientific research dealing with wrestling. The current short review aimed to summarize and critically analyze the scientific literature related to wrestling's physical and physiological attributes and to provide practical recommendations for testing/training together with new perspective and areas of future scientific research. Regardless of gender and wrestling-styles, an optimal level of cardiorespiratory fitness is important to help sustaining effort throughout the duration of the match and to stimulate the recovery process between periods. With regards to the anaerobic power and capacity, the available studies were in agreement about their critical importance towards reaching high-level wrestling success since these variables have discriminated well between successful and less-successful wrestlers regardless of age, weight-classes, and wrestling-styles. Physical fitness parameters such as maximal dynamic strength, isometric strength, explosive strength, and strength-endurance are closely related to high-level wrestling performance. However, flexibility level appears not to be one of the key fitness variables that help to reach high-level wrestling success. Overall, to achieve high-level wrestling performance, training should be directed to develop anaerobic power and capacity, aerobic power, maximal dynamic and isometric strength, explosive strength, and strength endurance.

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Chapman, J., & Woodman, T. (2016). Disordered eating in male athletes: a meta-analysis. *Journal of Sports Science*, 34(2), 101-109. doi:10.1080/02640414.2015.1040824

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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Cheng, M.F., Chen, Y.Y., Jang, T.R., Lin, W.L., Chen, J., & Hsieh, K.C. (2016). Total body composition estimated by standing-posture 8-electrode bioelectrical impedance analysis in male wrestlers*. Biology of Sport*, 33(4), 399-405.

Standing-posture 8-electrode bioelectrical impedance analysis is a fast and practical method for evaluating body composition in clinical settings, which can be used to estimate percentage body fat (BF%) and skeletal muscle mass in a subject's total body and body segments. In this study, dual-energy X-

ray absorptiometry (DXA) was used as a reference method for validating the standing 8-electrode bioelectrical impedance analysis device BC-418 (BIA8, Tanita Corp., Tokyo, Japan). Forty-eight Taiwanese male wrestlers aged from 17.9 to 22.3 years volunteered to participate in this study. The lean soft tissue (LST) and BF% in the total body and body segments were measured in each subject by the BIA8 and DXA. The correlation coefficients between total body, arm, leg segments impedance index (BI, ht^2/Z) and lean soft tissue mass measured from DXA were $r = 0.902, 0.453, 0.885$, respectively ($p < 0.01$). In addition, the total body and segmental LST estimated by the BIA8 were highly correlated with the DXA data ($r = 0.936, 0.466, 0.886$, $p < 0.01$). The estimation of total body and segmental BF% measured by BIA8 and DXA also showed a significant correlation ($r > 0.820$, $p < 0.01$). The estimated LST and BF% from BIA8 in the total body and body segments were highly correlated with the DXA results, which indicated that the standing-posture 8-electrode bioelectrical impedance analysis may be used to derive reference measures of LST and BF% in Taiwanese male wrestlers.

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Cohn, L., Murray, S.B., Walen, A., & Wooldridge, T. (2016). Including the excluded: Males and gender minorities in eating disorder prevention. *Eating Disorders*, 24(1), 114-120.

The article recommends eating disorder prevention programs to be gender inclusive. Topics discussed include the multi-cultural male ED, the higher risk of developing ED in people identified as lesbian, gay, bisexual, transgender, and questioning (LGBTQ), athletes such as wrestlers, gymnasts and jockeys, and body builders, and focusing research and prevention of binge eating disorder (BED) in men.

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Curby, D.G. (2016). Effect of Uniform Color on Outcome of Match at Senior World Wrestling Championships 2015. *International Journal of Wrestling Science*, 6(1), 62-64. doi:10.1080/21615667.2016.1210266

ABSTRACT: Published research after the 2004 Olympic Games indicated that in the combat sports of boxing, taekwondo, Greco-Roman wrestling, and freestyle wrestling, the combatants in red won more often than those in blue in each sport. This prompted several subsequent studies, including team sports, the role of judges and officials, and other factors that could contribute to a unfair bias against what is thought to be a random and benign assignment of uniform color. To further examine a possible competitive bias in wrestling because of uniform color, this study examined the results from the 2015 Senior World Wrestling Championships. The results of all 952 bouts, women's freestyle, Greco-Roman, and freestyle were reviewed, and the color associated with either winning or losing (red or blue) was recorded. A total of 458 winners wore red and 494 wore blue. These data were then assembled in a 2 by 2 contingency table for chi square analysis. The χ^2 statistic was = 2.7227 and $p = .098931$. This result is not significant at $p < .05$, indicating that there was no relation between the color of the uniform and the match outcome.

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Dizdarevic, I., Low, S., Currie, D.W., Comstock, R.D., Hammoud, S., & Atanda, A., Jr. (2016). Epidemiology of Elbow Dislocations in High School Athletes. *American Journal of Sports Medicine*, 44(1), 202-208. doi:0363546515610527 [pii];10.1177/0363546515610527

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 injuries removal from play and are more likely to require surgical treatment than nondislocation-associated elbow. 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
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Dokmanac, M., Curby, D.G., & Petkovic, M. (2016). Restoring Greco-Roman Wrestling: Some Research and Philosophy. *International Journal of Wrestling Science*, 6(1), 16-21. doi:10.1080/21615667.2016.1201552

ABSTRACT: To make a contribution to the improvement of Greco-Roman wrestling, an effort was initiated to identify some causes for the decline in the technical level and scoring in Greco-Roman wrestling over the past 10 years. This analysis aimed to demonstrate how this preventative style of wrestling (holding fingers/wrists in a standing position) has a negative effect on the execution of self-focused, action-oriented wrestling techniques in the Greco-Roman style. To demonstrate the significant effect of holding fingers/wrists has on a wrestling match, an analysis of all medal matches of the 2015 World Wrestling Championships in Las Vegas, Nevada, was performed and quantified. The time parameters measured in each match were the total time of the match, total time in the standing position, and total time in par terre position. Wrestling in the standing position was further specified as time spent in normal contact, time without contact, and contact made by holding fingers/wrists. The amount of match time spent without contact, plus contact made by holding fingers/wrists is defined as obstructive/preventative wrestling. Wrestling in the standing position is the focus of this study and comprises 86% and 84% of the entire match time for the gold and bronze medal matches, respectively, with the balance being wrestled in the par terre position. From these data are derived the percent of time in standing spent in obstructive/preventative wrestling actions of grasping and locking of fingers and wrists, as well as time without contact. Means of 78% and 72% were found for gold and bronze medals, respectively. On the basis of these data, it is evident how much time is spent where there is no possibility to perform wrestling techniques, because the wrestlers are holding fingers or are completely separated without close contact in the wrestling standing position.

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Dong, D. (2016). 中国男子自由胶队体能训练中的问题审视： 理论与实践的启示. / Discussions of Strength and Conditioning on Men Freestyle Wrestling Team in China：Enlightenment of Theory and Practice. *Journal of Tianjin Institute of Sport* / Tianjin Tiyu Xueyuan Xuebao, 31(3), 191-197.

Based on the test and investigation, the periodic arrangement, aerobic training, anaerobic training, strength training for male free style wrestling was analyzed. The "plate period" was significant in strength and conditioning with inconsistent duration time the duration time of training plan on man

freestyle wrestling was longer (about 3month) and the purpose was not clear ; The special endurance training focused on the "lactate threshold, with low intensity aerobic training(>75%HRmax), and the maximal oxygen uptake was increasing with different level athletes, meanwhile, there was a significant inverse relationship between maximal oxygen uptake and power down rate. In addition, some inconsistent had been found between training plan and practice. The "High intensity interval" and "Special strength endurance" were the basic model for the physical training, and power down rate (50%) was significant with lower foreign athletes (43%), the training effect was not significant. Finally, this article provided some enlightenment from training ratio of strength and aerobic, training ways and duration time, training and monitoring in order to promote the training level.

Evtyfiev, A. C. (2016). Подготовка арбитров в спортивной борьбе. / Training of referees in wrestling. *Slobozhansk Scientific and Sports Newsletter*, 51(1), 26-29.

Purpose: the analysis of problems in the training of referees in wrestling. Material & Methods: theoretical analysis and generalization of literary sources, pedagogical observation. Results: the analysis and generalization of the opinions of experts shows that the success of the complex of judicial activities caused by the judges' experience, knowledge of the techniques and tactics of wrestling and a high level of development of professionally important psycho-physiological functions. Conclusions: given the lack of professional officiating freestyle and Greco-Roman wrestling, the preference shall be given independent forms of training short-term precompetitive workshops not only for training, but and for testing of individual capabilities of individual judges.

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Franchini, E., & Takito, M. (2016). Home advantage in combat sports during the Olympic Games. *Sport Sciences for Health*, 12(3), 287-290.

Purpose: To determine if there is a home advantage effect in combat sports (boxing, fencing, judo, taekwondo and wrestling) in the Olympic Games during the period between 1996 and 2012. Methods: This study analyzed the performance of United States of America, Australia, Greece, China and Great-Britain in this period, considering only boxing, fencing, judo, taekwondo and wrestling. Relative frequency was calculated considering number of medals won by each country as a percentage of the total number of medals disputed in these sports. A multilevel mixed-effects Poisson regression was used to estimate the incidence rate ratio (IRR) and 95 % confidence intervals (95 % CI) for the association of factor of interest as hosting country and country. In multilevel analyses, total number of medals disputed in each sport was included as the exposure in the models. As athletes in each sport changed over time, they were included as random parameters. All significance tests were 2-tailed, and p values less than 0.05 were considered statistically significant. Results: There was a home advantage effect for total number of medals [IRR = 1.97 (1.38-2.80); p < 0.001], gold [IRR = 2.62 (1.45-4.73), p = 0.001] and silver medals [IRR = 2.13 (1.09-4.17); p = 0.027] adjusted for the total number of medals disputed in each situation, country and sport. However, there was no effect for bronze medals [IRR = 1.40 (0.78-2.51); p = 0.267]. Conclusion: This study provided evidence for the home advantage effect in combat sports during the Olympic Games disputed between 1996 and 2012 for total number of medals, gold and silver medals, doubling the quantity won when competing at home.

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Giannoulakis, C., Burch, L., & Brgoch, S. (2016). Social Media Usage in Nonprofit Wrestling Organizations: A Cross-Platform Analysis*. International Journal of Wrestling Science*, 6(1), 22-33. doi:10.1080/21615667.2016.1185483

ABSTRACT: This case study examined the social media use of USA Wrestling during the 2014 National Collegiate Athletic Association Division I Wrestling Championships in the United States. We performed a cross-platform content analysis of the organization's Facebook, Twitter, YouTube, and Instagram accounts during the 3 days of the event using a relationship-marketing framework. In addition, we conducted qualitative interviews with employees involved with the National Governing Body's social media implementation. Results indicated predominant use of Twitter and YouTube, with 375 posts occurring during the 3-day event as compared with 8 posts on Facebook and Instagram, cumulatively. Such an approach contradicted interviewees' responses on the popularity of Facebook. Overall, the organization placed particular emphasis on information-sharing posts across the 4 platforms pertaining to wrestling and athletes during the event. We discuss the theoretical and practical implications for wrestling-related organizations.

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Gierczuk, D., Lyakh, V., Sadowski, J., & Bujak, Z. (2016). Speed of Reaction and Fighting Effectiveness in Elite Greco-Roman Wrestlers. *Perceptual and Motor Skills,* doi:10.1177/0031512516672126

The purpose of the study was to determine the changes in simple reaction time and to define correlations between simple reaction time and technical and tactical actions performed by elite Greco-Roman wrestlers during a match. Twenty Greco-Roman wrestlers (M age = 19.5 years, SD = 1.8) from the Wrestling Sports Centre in Radom participated in the study. Simple reaction time (including reaction time and movement time) before a match and after the first, the second, and the third round was analyzed. The wrestlers' reaction time and movement time changed in the course of performance. Wrestlers with higher sports achievements demonstrated a smaller decrement in simple reaction time and performed more technical and tactical actions during a match. The strongest correlations were observed between both reaction time and movement time and the number of technical and tactical actions performed during the last round. Quick reaction was a significant factor in determining the match outcome, which is revealed at submaximal intensity of the effort during a match.

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Grushko, A., Bochaver, K., Shishkina, A., Kabanov, D., Konstantinova, M., Vavaev, A., & Kasatkin, V. (2016). Psychological and psychophysiological profile in combat sports. *Revista de Artes Marciales Asiaticas*, 11(2), 70-71.

Results in combat sport competition represent a combination of a variety of factors including psychological and psychophysiological skills. The purpose of current study was to compare psychological and psychophysiological variables (reaction time & hand-eye coordination, visual attention and memory, motivation and anxiety) of athletes with different sport experience and type of combat sports.

Hibberd, E.E., Kerr, Z.Y., Roos, K.G., Djoko, A., & Dompier, T.P. (2016). Epidemiology of Acromioclavicular Joint Sprains in 25 National Collegiate Athletic Association Sports*. American Journal of Sports Medicine*, 44(10), 2667-2674.

Background: No previous studies have described the incidence of acromioclavicular (AC) joint injuries in a large sample of National Collegiate Athletic Association (NCAA) student-athletes. Such data are needed

to understand the injury prevalence, mechanisms of injury, and recovery patterns in NCAA student-athletes. Purpose: To describe the epidemiology of AC joint sprain injuries in 25 NCAA championship sports. Study Design: Descriptive epidemiology study. Methods: AC joint sprains were analyzed from the NCAA Injury Surveillance Program during the 2009-2010 to 2014-2015 academic years. AC joint sprain injury rates, rate ratios, and injury proportion ratios (IPRs) were reported with 95% CIs. Results: In the 25 NCAA sports examined during the 2009-2010 to 2014-2015 academic years, a total of 844 AC joint sprains were reported, for a rate of 1.72 per 10,000 athlete-exposures (AEs). The majority of AC joint sprains were reported in football (50.4%, n = 425). Most AC joint sprains occurred in competitions (66.0%, n = 557), and the competition rate was 8.58 times the practice rate (95% CI, 7.44-9.89). In sex-comparable sports (ie, soccer, basketball, ice hockey, lacrosse, baseball/softball, indoor track, outdoor track, cross-country, tennis, and swimming and diving), the AC joint sprain rate in men was 4.67 times that of women (95% CI, 3.56-6.14). Most AC joint sprains were caused by player contact (54.7%, n = 462), followed by surface contact (29.0%, n = 245). Of all AC joint sprains, 47.5% resulted in a time loss of <24 hours, and 5.9% were severe. In addition, 9.7% were recurrent, and only 1.0% required surgery. In sex-comparable sports, male athletes had a larger proportion of injuries due to player contact than did female athletes (IPR, 1.50; 95% CI, 1.06-2.13); female athletes had a larger proportion of injuries due to surface contact than male athletes (IPR, 1.55; 95% CI, 1.01-2.38). Also, compared with women, men had a larger proportion of AC joint sprains that were recurrent (IPR, 10.29; 95% CI, 1.45-72.90). Conclusion: The highest rates of AC joint sprains occurred in men's football, ice hockey, and wrestling as well as women's ice hockey. Most AC joint sprains across all sports occurred because of a contact mechanism, particularly from player-player contact. Further research into the specific activities and exposures at the time of injury may lend a better understanding of the causation of these injuries and lead to appropriate interventions to decrease their incidence and severity.

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Hojjat, H., Svider, P.F., Lin, H.S., Folbe, A.J., Shkoukani, M.A., Eloy, J.A., & Zuliani, G. (2016). Adding Injury to Insult: A National Analysis of Combat Sport-Related Facial Injury. *Annals of Otology, Rhinology & Laryngology*, 125(8), 652-659. doi:0003489416644617 [pii];10.1177/0003489416644617

OBJECTIVES/HYPOTHESIS: To estimate the incidence of patients presenting to emergency departments (EDs) for facial trauma sustained from participation in combat sports and evaluate injury patterns and patient demographics. METHODS: The National Electronic Injury Surveillance System (NEISS) was evaluated for facial injuries from wrestling, boxing, and martial arts leading to ED visits from 2008 to 2013. Relevant entries were examined for injury mechanism, location, type, as well as other patient characteristics. RESULTS: There were 1143 entries extrapolating to an estimated 42 395 ED visits from 2008 to 2013. Injury rates for boxing, marital arts, and wrestling were, respectively, 44, 56, and 120 injuries per 100 000 participants. Males comprised the majority (93.7%). A plurality of injuries involved lacerations (46.0%), followed by fractures (26.2%) and contusions/abrasions (19.3%). The proportion of fractures was highest among boxers (36.9%). Overall, the most common mechanisms of injury were punching, kicking, and head butting. CONCLUSIONS: The significant number of ED visits resulted from combat sports facial trauma, reinforcing the importance of familiarity with injury patterns among practitioners managing facial trauma. As most injuries involve individuals younger than 19 despite guidelines suggesting children and adolescents avoid combat sports, these findings may be used for patient education and encouragement of the use of personal protective equipment. Furthermore, injury patterns reported in this analysis may serve as an adjunct for enhancing clinical history taking and physical examination.

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Hou, Xihe, Wang, Renwei, Wu Weibing, Li He, Sheng, Zetian. (2016). 侯希贺, 王人卫, 吴卫兵, 李合, & 盛泽田. (2016). 高温高湿环境下高水平古典式摔跤运动员运动热调节反应及补液干预的作用 / The Greco-Roman Wrestling Athletes' Heat Adjustment in Hot and Humid Environment and the Effect of Rehydration. *Journal of Chengdu Sport University*, 42(3), 122-126.

Objective: To investigate Greco-roman wrestling athletes' heat adjustment in hot and humid environment and the effect of rehydration. Methods: 8 wrestling athletes, aged 16.1±2.3, having VO2max of 44.5ml/kg/min and trained for 3.8±1.7 years, were chosen as subjects. The subjects were arranged to do exercises respectively in environment of normal temperature and humidity, in hot and humid environment and in hot and humid environment with rehydration. The interval between every two exercise processes was 10 days and the exercise intensity was 70%VO2max. Athletes' core body temperature was tested before and after every experiment, and their blood lactic acid and heart rate were tested during the experiments, and their sweat was collected for the test of sweat electrolytes before and after every experiment. Results: (1) In hot and humid environment, athletes' core body temperature, blood lactic acid, heart rate and sweat ion density were all significantly higher than in environment of normal temperature and humidity, while athletes' exercise duration becomes much shorter; (2) In hot and humid environment, rehydration can dramatically lower athletes' core body temperature, while increase athletes' exercise duration. Conclusion: hot and humid environment can generate a significant influence on athletes' exercise ability. Their core body temperature, blood lactic acid, heart rate increased significantly, their sweat ion loss is obvious, and their exercise duration becomes shorter. Rehydration has a positive role in reducing the loss of sweat ion and maintaining exercise ability.

Iermakov, S., Podrigalo, L., Romanenko, V., Tropin, Y., Boychenko, N., Rovnaya, O., & Kamaev, O. (2016). Psycho-physiological features of sportsmen in impact and throwing martial arts. *Journal of Physical Education & Sport*, 16(2), 433-441.

Studying of sportsmen's functional state is important aspect of their training. Analysis and assessment of workability permit to prognosticate success and give basis for determination of sportsmanship's factors. The purpose of the work: study and comparative analysis of elite martial arts sportsmen's psycho-physiological features for prognostication of their successfulness and optimization of training. Material and methods: in the research 50 martial arts sportsmen participated. First group (n=28, age - 22.86±0.95 years) consisted of impart martial arts representatives (karate, taekwondo, Mixed Martial Arts). Second group (n=22, age - 22.27±1.09 years) consisted of sportsmen, practicing throwing kinds of wrestling (free style wrestling, Greco-Rome wrestling, Judo). All participants were elite sportsmen. We used battery of tests: assessment of simple motor abilities, chrono- reflex metering, tapping test, responses of choice and distinguishing, and reproduction of geometric figures. Results: we confirmed similarity of sportsmen's functional state owing to likeness of most tests' results. First group's sportsmen had confidently more touches in tests for simple motor qualities. They chose one from five colors quicker, as well as required half of screen. They had substantially less deviations from pre-set patterns (reproduction of line and shape of geometric figure). The most important qualities for success in fight were determined. For impact kinds they were: responses of choice, coincidence of shape and mean quantity of touches in motor tests. For sportsmen of throwing kinds of wrestling they were: response to audio signal, response of choice of required half of screen, reproduction of temp and line, speed of line drawing and quantity of touches in tapping test. Conclusions: we have proved importance of wrestlers' psychophysiological features as factors of success. Results of impact kinds' sportsmen illustrate better mobilization, more optimal readiness for action and more developed differentiation; better space characteristics, more optimal regulation of muscles' tonus.

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Isaev, A.V., Korshunov, A.V., Leonov, S.V., Sanoyan, T.R., & Veraksa, A.N. (2016). Quantitative and Qualitative Indicators of Developing Anticipation Skills in Junior Wrestling Athletes. *Procedia - Social and Behavioral Sciences, 233*, 186-191. doi:http://dx.doi.org/10.1016/j.sbspro.2016.10.191

The present article analyses the possibilities of the usage of anticipation: the study of its mechanisms and processes of development. There is a particular interest in the anticipation issue in sport, where the probabilistic forecast of the situation is crucial for winning. The paper presents the results of testing methods for anticipation skills in junior wrestling. The main objective of the study was to find psycho-physiological and behavioral indicators to quantitatively and qualitatively evaluate the degree of anticipation. The skills formation procedure was based on the reinforcement of the correct choice of behaviour in simulated situations of decision-making using multiple choices technique. Stimuli were videos of simulated situations in wrestling. Simultaneous recording of oculomotor activity and registration of multi-channel electroencephalogram (EEG) was carried out. The results showed the effectiveness of the proposed method. After completing training the number of errors and the decision taking time span reduced. Expert assessment of the main qualifying factors showed a significant increase of the test group. On the psychophysiological level, there is a reduction of oculomotor activity in selecting the right answers, reducing the number of fixations, the number of fixations and saccades reverse on the text of questions and answers.

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James, L.P., Robertson, S., Haff, G.G., Beckman, E.M., & Kelly, V.G. (2016). Identifying the performance characteristics of a winning outcome in elite mixed martial arts competition. *Journal of Science and Medicine in Sport*. doi:http://dx.doi.org/10.1016/j.jsams.2016.08.001

Abstract: Objectives: To determine those performance indicators that have the greatest influence on classifying outcome at the elite level of mixed martial arts (MMA). A secondary objective was to establish the efficacy of decision tree analysis in explaining the characteristics of victory when compared to alternate statistical methods. Design: Cross-sectional observational. Methods: Eleven raw performance indicators from male Ultimate Fighting Championship bouts (n = 234) from July 2014 to December 2014 were screened for analysis. Each raw performance indicator was also converted to a rate-dependent measure to be scaled to fight duration. Further, three additional performance indicators were calculated from the dataset and included in the analysis. Cohen's d effect sizes were employed to determine the magnitude of the differences between Wins and Losses, while decision tree (chi-square automatic interaction detector (CHAID)) and discriminant function analyses (DFA) were used to classify outcome (Win and Loss). Results: Effect size comparisons revealed differences between Wins and Losses across a number of performance indicators. Decision tree (raw: 71.8%; rate-scaled: 76.3%) and DFA (raw: 71.4%; rate-scaled 71.2%) achieved similar classification accuracies. Grappling and accuracy performance indicators were the most influential in explaining outcome. The decision tree models also revealed multiple combinations of performance indicators leading to victory. Conclusions: The decision tree analyses suggest that grappling activity and technique accuracy are of particular importance in achieving victory in elite-level MMA competition. The DFA results supported the importance of these performance indicators. Decision tree induction represents an intuitive and slightly more accurate approach to explaining bout outcome in this sport when compared to DFA.

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James, L.P., Haff, G.G., Kelly, V.G., & Beckman, E.M. (2016). Towards a Determination of the Physiological Characteristics Distinguishing Successful Mixed Martial Arts Athletes: A Systematic Review of Combat Sport Literature. *Sports Medicine*. doi:10.1007/s40279-016-0493-1

BACKGROUND: Mixed martial arts (MMA) is a combat sport underpinned by techniques from other combat disciplines, in addition to strategies unique to the sport itself. These sports can be divided into two distinct categories (grappling or striking) based on differing technical demands. Uniquely, MMA combines both methods of combat and therefore appears to be physiologically complex requiring a spectrum of mechanical and metabolic qualities to drive performance. However, little is known about the physiological characteristics that distinguish higher- from lower-level MMA athletes. Such information provides guidance for training interventions, performance testing and talent identification. Furthermore, while MMA incorporates techniques from both grappling and striking sports, it is unknown precisely how these disciplines differ physiologically. Understanding the relationship between higher-level competitors in grappling and striking combat sports can provide further insight into the development of the optimal performance profile of a higher-level MMA athlete. OBJECTIVE: This article aims to analyze the scientific literature on MMA and the primary combat sports underpinning it to determine the physiological adaptations that distinguish superior competitors, with a view to defining the optimal physiological profile for higher-level MMA performance. Furthermore, this article will explore the differences in these capabilities between grappling- and striking-based combat sports in the context of MMA. METHODS: A literature search was undertaken via PubMed, Web of Science, SportDiscus and Google Scholar. The following sports were included for systematic review based on their relevance to MMA: mixed martial arts, boxing, Brazilian jiu-jitsu, judo, karate, kickboxing, Muay Thai and wrestling. The inclusion criteria allowed studies that compared athletes of differing competition levels in the same sport using a physiological performance measure. Only male, adult (aged 17-40 years), able-bodied competitors were included. The search history spanned from the earliest record until September 2015. RESULTS: Of the eight combat sports searched for, five were represented across 23 studies. Sixteen investigations described maximal strength or neuromuscular power variables, while 19 articles reported anaerobic or aerobic measures. The results indicate that a number of strength, neuromuscular power and anaerobic variables distinguished higher- from lower-level combat sport athletes. However, these differences were less clear when groups were stratified within, rather than between competition grades. Greater aerobic power was generally not present amongst superior combat sport competitors. CONCLUSION: There appear to be differing physiological profiles between more successful grappling and striking combat sport athletes. This is represented by high-force demands of grappling sports causing an upwards shift of the entire force-velocity relationship driven by an increase in maximal strength. In comparison, smaller increases in maximal force production with more notable enhancements in lighter load, higher velocity actions may better identify superior performance in striking sports. Anaerobic capabilities largely distinguished higher- from lower-level combat sport athletes. In particular, longer-term anaerobic efforts seem to define successful grappling-based athletes, while superior competitors in striking sports tend to show dominance in shorter-term measures when compared with their lower-level counterparts. Given the demand for both forms of combat in MMA, a spectrum of physiological markers may characterize higher-level competitors. Furthermore, the performance profile of successful MMA athletes may differ based on combat sport history or competition strategy.

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Jensen, A.R., Maciel, R.C., Petrigliano, F.A., Rodriguez, J.P., & Brooks, A.G. (2016). Injuries sustained by the mixed martial arts athlete. *Sports Health*. doi:1941738116664860

CONTEXT: Mixed martial arts (MMA) is rapidly growing in popularity in the United States and abroad. This combat sport joins athletes from a wide variety of martial art disciplines, each with characteristic and distinguishing injury profiles, together in competition. Because of increasing participation by

professionals and amateurs alike, injuries sustained by MMA athletes have been on the rise. EVIDENCE ACQUISITION: A review of relevant publications using the search term mixed martial arts and each of its component combat sports (eg, Muay Thai, Brazilian jiu-jitsu) from 1980 through 2015 was completed using PubMed and Google Scholar. STUDY DESIGN: Clinical review. LEVEL OF EVIDENCE: Level 5. RESULTS: The majority of studies on MMA injuries evaluate those sustained during competition, which range in incidence from 22.9 to 28.6 per 100 fight-participations. Striking-predominant disciplines such as boxing, karate, and Muay Thai have high rates of head and facial injuries, whereas submission-predominant disciplines such as Brazilian jiu-jitsu, judo, and wrestling have high rates of joint injuries. CONCLUSION: Numerous studies have evaluated injuries in athletes who participate in MMA and its component disciplines during competition but much remains to be discovered about injuries sustained during training and in specific patient populations such as adolescents and women.

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Jlid, M.C., Kachlouf, H.R., Maaoui, R., Chelly, M.S., & Paillard, T. (2016). Ground surface nature can influence visual information contribution in postural control. *The Journal of Sports Medicine and Physical Fitness, 56*(12), 1476-1481.

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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Johnson, B.K., & Comstock, R.D. (2016). Epidemiology of chest, rib, thoracic spine, and abdomen injuries among united states high school athletes, 2005/06 to 2013/14. *Clinical Journal of Sport Medicine*. doi:10.1097/JSM.0000000000000351 [doi]

OBJECTIVE: Describe chest and abdominal injury epidemiology among US high school athletes. DESIGN: Retrospective analysis of longitudinal surveillance data. SETTING: Injury data from 2005/06 to 2013/14 academic years were collected using an internet-based surveillance system. PARTICIPANTS: A large sample of US high schools. ASSESSMENT OF RISK FACTORS: Injuries sustained as a function of sport. MAIN OUTCOME MEASURES: Chest, rib, thoracic spine, and abdominal injuries sustained during high school athletic events. RESULTS: Overall 1487 chest, rib, thoracic spine, and abdominal injuries occurred during 30 415 179 athletic exposures (AEs); an injury rate of 4.9 injuries per 100 000 AEs. Over half (56.8%) of injured athletes were evaluated by another medical provider in addition to the athletic trainer, and 34 injuries (2.3%) required surgery. Diagnostic techniques, including x-ray, magnetic resonance imaging or computed tomography were used in 729 (49.0%) injuries. The injury rate was higher in boys' (6.8) than girls' (2.0) sports [rate ratio (RR), 3.43; 95% CI, 3.04-4.10]. Football (47.7%) accounted for the

highest proportion of injuries followed by wrestling (18.5%), boys' soccer (4.6%), and girls' soccer (3.7%). The rate of injury was higher in competition than practice, (RR, 2.86; 95% CI, 2.59-3.23). Only 57.7% of injured athletes were able to return to play within 1 week. CONCLUSIONS: Chest and abdominal injuries in high school sports although relatively rare, can result in loss of playing time and frequently prompt medical evaluation. Thus, they present a physical and economic burden. To optimize prevention, further studies can focus on subgroup risk factor identification to drive development of targeted prevention strategies.

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Jung, H., Lee, N., & Park, S. (2016). Interaction of ACTN3 gene polymorphism and muscle imbalance effects on kinematic efficiency in combat sports athletes. *Journal of Exercise Nutrition and Biochemistry*, 20(2), 1-7. doi:10.20463/jenb.2016.06.20.2.1

PURPOSE: The purpose of this study was to determine the interaction of ACTN3 gene polymorphism and muscle imbalance effects on kinematic efficiency changes in combat sports athletes. METHODS: Six types of combat sports athletes (Judo, Taekwondo, boxing, kendo, wrestling, and Korean Ssireum) participated in the study. ATCN3 gene polymorphism and muscle imbalance in lower extremity were evaluated followed by analysis of differences of moment in hip, knee, and ankle joint during V-cut jumping and stop. To examine the moment difference due to an interaction of ATCN3 polymorphism and muscle imbalance, all participants were divided into 4 groups (R+MB, R+MIB, X+MB, and X+MIB). RESULTS: There was no significant difference of hip, knee, and ankle joint moment in R allele and X allele during V-cut jumping and stop based on ACTN3 gene polymorphism. Otherwise, muscle imbalance of knee moment in X-axis and ground reaction force of knee in Z-axis showed a higher significance in muscle imbalance during V-cut jumping and stop compared to muscle balance ($p<0.05$). In addition, joint analysis showed that muscle imbalance in X allele group had significantly higher knee moment of V-cut ground reaction force in X-axis and higher ankle moment of jumping ground reaction force in X and Z-axis compared to muscle balance with R and/or X group ($p <0.05$). CONCLUSION: This study confirmed that muscle imbalance in lower extremity of combat athletes might induce higher risk factors of sports injury incidence than genetic factor and training might reduce the ratio of sports injury risk incidence.

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Kafkas ME, Taşkiran C, Şahin Kafkas A, Özen G, Taşkapan Ç, Özyalin F, & A., S.-S. (2016). Acute physiological changes in elite free-style wrestlers during a one-day tournament. *Journal of Sports Medicine and Physical Fitness*, 56(10), 1112-1119.

BACKGROUND: 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 with mean age (±SD) of 24.09±6.20 years, body mass 74.09±11.50 kg, and body height 174.90±8.8 cm and who had 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 at 10:00 a.m. and then matches started at 12:00. Each match was implemented within one hour. Also, the resting time was 45 minutes following each match. The measurements were analyzed by Wilcoxon Signed Ranks Test, which is used to test for significant differences between pre- and post-test. RESULTS: The post-match lactate dehydrogenase (LDH), creatine kinase (CK), and interleukin (IL)-6 levels were significantly increased compared with the baseline status. However, baseline malondialdehyde levels were not found significantly different compared with post-match. CONCLUSIONS: 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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Kameas, N., Albanidis, E., & Barbas, I. (2016). The Decency of Strength and the Strength of Decency: A Philosophical Approach to the Sport of Wrestling. *International Journal of Wrestling Science*, 6(1), 11-15. doi:10.1080/21615667.2016.1151089

ABSTRACT: The standard of the ancient Greek ideal of "noble competition," timelessly constitutes the ultimate proposal for decent manifestation of human strength on all levels: physical/somatic, intellectual, emotional, mental, and spiritual. The logic of sportsmanship in ancient Greek culture, especially in athletics and education, contains in its core the sport of wrestling. Thus, in this study, the qualitative characteristics of wrestling were analyzed to demonstrate, philosophically, the value of this sport as a chance/possibility for development and culturing of human existence. Reference points of this study were as follows: (a) the ancient Greek literature (Homer, Pindar, Isocrates, Xenophon Lucian,), (b) ancient Greek philosophers (Heraclitus, Empedocles, Plato, Aristotle), (c) modern philosophers (Friedrich Nietzsche), and (d) contemporary studiers. The reasoning course of the study was initiated by the primary struggle of natural elements and the presence of primordial war instinct in Man, (b) continued with the beneficial influence of the ancient Greek athletic standard of fair play in the totality of human nature, and (c) the central role of wrestling in the edifice of the agonistic ancient Greek civilization emerged while stressing the moral, intellectual, and spiritual dimension of this sport and its distinct pedagogical value timelessly.

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Karanika, S., Kinamon, T., Grigoras, C., & Mylonakis, E. (2016). Colonization with methicillin-resistant staphylococcus aureus and risk for infection among asymptomatic athletes: A systematic review and meta-analysis. *Clinical Infectious Diseases*, 63(2), 195-204. doi:ciw240 [pii];10.1093/cid/ciw240

BACKGROUND: Athletes are a vulnerable population for methicillin-resistant Staphylococcus aureus (MRSA) infection. Our aim was to determine MRSA colonization in asymptomatic athletes and estimate the risk for subsequent MRSA infection. METHODS: We searched the PubMed and EMBASE (through 29 October 2015) for studies on MRSA colonization among asymptomatic athletes. RESULTS: The pooled prevalence of MRSA colonization among athletes was 6% (95% confidence interval [CI], 1,13), and it was higher in the United States (8%; 95% CI, 2,17). USA300 was the most common strain detected (22%), and 62% and 36% of isolates were resistant to clindamycin and trimethoprim/sulfamethoxazole, respectively. The prevalence of MRSA colonization among collegiate athletes reached 13% (95% CI, 4,25). Sports with the highest prevalence among collegiate athletes were wrestling (22%; 95% CI, 0,85), football (8%; 95% CI, 3,15) and basketball (8%; 95% CI, 0,28). The risk for MRSA skin and soft tissue infection within 3 months after documented colonization among MRSA-colonized athletes was significantly higher than for noncolonized athletes (relative risk = 7.37, 95% CI, [2.47,21.94]). Decolonization treatment among colonized athletes decreased significantly the risk for infection (relative risk reduction = 0.33; 95% CI, .03,4.28). CONCLUSIONS: The prevalence of MRSA colonization among asymptomatic athletes is comparable to that among individuals with chronic illness, it is higher among collegiate athletes and can be twice that for patients in intensive care units. Importantly, colonization is associated with a >7-fold increase in the incidence of subsequent MRSA infection. Infection control and decontamination protocols for this population need to be studied and implemented with urgency.

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Karimi, M. (2016). Validity of Special Judo Fitness Test in Iranian Male Wrestlers. *International Journal of Wrestling Science*, 6(1), 34-38. doi:10.1080/21615667.2016.1172141

ABSTRACT: In assessment of high-intensity exercise performance, strong linear relations have been found between laboratory and field measures of anaerobic fitness. The present study aimed to determine the validity of the special judo fitness test among Iranian male wrestlers. Thirty well-trained male wrestlers performed the special judo fitness test (the Ippon seoi nage technique) in 3 series of 15, 30, and 30 s with 10-s rest interval between trials. Also, a 30-s Wingate test on a cycle ergometer was used to measure anaerobic fitness in the laboratory condition. Heart rate (HR) and blood lactate concentration were measured at baseline, immediately after, and 1 min after trials. In addition, the fatigue index was calculated. Data were analyzed using a paired t test and Pearson's correlation coefficient ($p < .05$). There was a significant correlation between the results of HR changes and lactate concentration changes between the two tests: $r(29) = 0.88$, $p < .01$, and $r(29) = 0.89$, $p \leq .01$, respectively. The Bland-Altman and the intraclass correlation coefficient methods revealed medium agreement between test and retest of the special judo fitness test on test index (ICC = 0.4399; ± 1.96, 95% CI [1.82, 2.76]). The special judo fitness test is a valid field test to assess anaerobic fitness of male wrestlers. The test can be used as a field test to evaluate anaerobic fitness in wrestling.

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Karninčić, H., Baić, M., & Slačanac, K. (2016). Mood Aspects of Rapid Weight Loss in Adolescent Wrestlers. *Kinesiology, 48*(2), 229-236.

The aims of this paper were: a) to present weight reduction habits of adolescent wrestlers; b) to establish differences in mood states between weight groups; and c) to determine relations between weight loss and indicators of hydration with mood states. Adolescent wrestlers do resort to rapid weight loss (RWL) regimens in their training process and competition - 70.1% of the subjects reduced their body mass and the reduction regime usually lasted one week. Similar habits have been reported in other studies despite the well evidenced detrimental effects of RWL. Urine specific gravity (USG) values suggest that all the subjects were in the state of dehydration ranging from a mild to a high one. The groups of low weight (LW) and middle weight (MW) wrestlers reduced their body mass significantly more than others (BM; $p<.05$) and their sensation of fatigue was significantly higher ($p<.05$). The variables body mass reduction and %BM reduction were correlated with negative mood states, whereas the indicators of hydration in one of the groups (MW) established ambiguous relations with dehydration and positive mood states.
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Karninčić*, H., Penjak, A., Cavala, M. (2016).* Pink-Blue Gender Labelling: An Overview of the Origins of Inequality in Women's Wrestling. *Anthropologist, 24(3): 844-852*

The objective of this paper involves two related ideas. The first one is to provide a historical overview of women's wrestling from ancient times until the present day. The second one is to determine the influence of historical context on the development of women's wrestling and, more generally, on the position of women in a wider sports sphere. The historical overview provides an example of women's wrestling in Sparta, Rome, Antioch and China. The overview examines women's positions within the institutions that nurtured wrestling in Nubia, Japan, India, Iran, Turkey and Greece. The correlations are then drawn between women's wrestling in the ancient and the modern worlds. Women's roles in wrestling have always been closely related to the position of women within sport, as well as to their position in society in general. With the exception of women's wrestling in Antioch, all other examples presented depict varying states of sexual inequality within this sport.
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Kerr, Z.Y., Roos, K.G., Djoko, A., Dalton, S.L., Broglio, S.P., Marshall, S.W., & Dompier, T.P. (2016). Epidemiologic Measures for Quantifying the Incidence of Concussion in National Collegiate Athletic Association Sports. *Journal of Athletic Training*. doi:10.4085/1062-6050-51.6.05

CONTEXT: Injury rates compare the relative frequency of sport-related concussions across groups. However, they may not be intuitive to policy makers, parents, or coaches in understanding the likelihood of concussion. OBJECTIVE: To describe 4 measures of incidence (athlete-based rate, athlete-based risk, team-based rate, and team-based risk) during the 2011-2012 through 2014-2015 academic years. DESIGN: Descriptive epidemiology study. SETTING: Aggregate injury and exposure data collected from the National Collegiate Athletic Association Injury Surveillance Program in 13 sports (men's baseball, basketball, football, ice hockey, lacrosse, soccer, and wrestling and women's basketball, ice hockey, lacrosse, soccer, softball, and volleyball). PATIENTS OR OTHER PARTICIPANTS: Collegiate student-athletes. INTERVENTION(S): Sport-related concussion data from the National Collegiate Athletic Association Injury Surveillance Program during the 2011-2012 through 2014-2015 academic years were analyzed. MAIN OUTCOME MEASURE(S): Concussion rates per 1000 athlete-exposures (AEs), concussion risk, average number of concussions per team, and percentage of teams with at least 1 concussion. RESULTS: During the 2011-2012 through 2014-2015 academic years, 1485 concussions were sustained by 1410 student-athletes across 13 sports. Concussion rates ranged from 0.09/1000 AEs in men's baseball to 0.89/1000 AEs in men's wrestling. Concussion risk ranged from 0.74% in men's baseball to 7.92% in men's wrestling. The average +/- SD number of concussions per team ranged from 0.25 +/- 0.43 in men's baseball to 5.63 +/- 5.36 in men's football. The percentage of teams with a concussion ranged from 24.5% in men's baseball to 80.6% in men's football. CONCLUSIONS: Although men's wrestling had a higher concussion rate and risk, men's football had the largest average number of concussions per team and the largest percentage of teams with at least 1 concussion. The risk of concussion, average number of concussions per team, and percentage of teams with concussions may be more intuitive measures of incidence for decision makers. Calculating these additional measures is feasible within existing injury.
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Khanbabazadeh, M., Serajian, A., & Rashidlamir, A. (2016). Digit Ratio, Testosterone/Cortisol Levels, and Hand Grip Strength Among Elite Iranian Wrestlers. *International Journal of Wrestling Science*, 6(1), 53-57. doi:10.1080/21615667.2016.1197707

ABSTRACT: Wresting is a weight-categorized sport with many handgrips used during the competition. Many studies have reported some predictors of hand grip strength, but none of them has studied the complete hand dimensions and hormone levels in elite wrestlers. Thus, the aim of this study is to investigate the relations among digit ratios and various hand dimensions, anthropometrical characteristics, grip strength, and testosterone/cortisol levels among elite Iranian male wrestlers. For this purpose, 13 male Iranian national team wrestlers voluntarily participated in this study. The finger parameters were evaluated using the Visnapuu method, and a salivary hormonal assay was performed using an enzyme-immunoassay kit. Statistical analysis was conducted using SPSS 19. The statistical analysis of data showed significant correlations ($p < .05$) between hand grip strength and hand-specific variables including finger perimeters P1, P2, P3, P5; finger lengths of the thumb, index, middle, ring and little finger lengths (TL, IFL, MFL, RFL, LFL, respectively); and the ratios of the index finger length to the little finger length (I:L), and the index finger length to the ring finger length (2D:4D), with the highest correlation being observed between the index finger length and handgrip strength ($r = 0.85$, $p = .001$). Furthermore, additional anthropometrical characteristics including wrist girth, arm span, shoulder width (biacromial breadth) and forearm girth were found to have strong correlations with hand grip strength ($r = 0.77$, $r = 0.77$, $r = 0.73$ and $r = 0.70$, respectively) and thus can be used as simple predictors of hand grip strength in wrestling.

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Knoche, L.W., Belitz, C.E., & Snyder, B.S. (2016). Effects Of Carbohydrate Mouth Rinsing On Depleted-State Wrestlers Using A Yo-yo Ir Level 2 Intermittent Test: 262 Board #99. *Medicine & Science in Sports & Exercise, 48(5 Supplement 1)*. doi:10.1249/01.mss.0000485193.97398.8a.

Recent literature has suggested that carbohydrate mouth rinsing may benefit endurance performances but produces less ergogenic effects in power sports such as hockey and sprinting. It has been suggested that the nutritional state and hydration status may affect the ergogenic ability of carbohydrate mouth rinsing on improving performance. A commonality among wrestlers in competition is reduced performance due to the glycogen and fluid depleted state resulting from the rigors of dietary restriction and dehydration required to make weight. PURPOSE: The purpose of this study was to compare the effects of carbohydrate mouth rinsing in wrestlers in a depleted-state performing YO-YO IR testing compared to an indistinguishable placebo condition. METHODS: Twelve male wrestlers (age 18-22) volunteered for this study which took place over four weeks with each collection period approximately 1 week apart. Participants initially completed a familiarization trial of the YO-YO IR test and one week later completed a self-selected, repeated weight cut within 2 lbs. of their weight category and baseline YO-YO IR test. Participants then completed two trials of mouth rinse or placebo using a randomized, double-blinded, counterbalanced design. After weigh-in, wrestlers mouth rinsed with an artificially sweetened 6.4% maltodextrin carbohydrate solution or indistinguishable placebo for 10 seconds (expectorating solution). After a standardized warm up, another mouth rinse was provided and YO-YO IR testing commenced. Final distances were recorded once test subjects were no longer able to complete the pacer run in the given time. RESULTS: There was no significant difference in distance covered between treatments (Placebo 1261.8 ± 424 / CHO 1221.8 ± 285 meters). There appears to be a learning/training effect as baseline distance (1127.3 ± 370) was significantly different from visit 4 (1276.4 ± 326) independent of treatment condition ($p < 0.05$). CONCLUSIONS: Carbohydrate mouth rinsing was not ergogenic compared to placebo in wrestlers making weight for a YOYO IR-2 test. However, there was a learning effect between baseline shuttle run verses last trial run. The YOYO IR in the depleted state might require more familiarization to see if distance covered balances out and has no effect.
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Kondo, E.S., Keisuke; Motonaga, Keiko; Osawa, Takuya; Sagayama, Hiroyuki; Yamada, Yosuke; Nakajima, Kohei; Kamei, Akiko; Takahashi, Hideyuki. (2016). Thoracic Gas Volume Changes after Weight Loss and Regain Associated with Body-Fat Measurement in Wrestlers: 1986 Board #138 *Medicine & Science in Sports & Exercise*., 48(5S Supplement 1). doi:10.1249/01.mss.0000486659.10976.05

PURPOSE: The measurement of the thoracic gas volume (VTG) affects the accuracy of body composition estimation using air displacement plethysmography (ADP). A previous study reported that the VTG increased after 16-month mild weight loss (WL) program in overweight and obese women. However, little is still known about the effects of rapid WL and weight regain (WR) on the VTG, regarding body composition assessment in athletes who have low body fat. We examined the effect of rapid WL and WR on the VTG and investigated the accuracy of ADP after rapid WL and WR in wrestlers. METHODS: Eight male collegiate wrestlers completed 53-hour rapid WL (6% of body weight, BW) based on each wrestler's own method, and followed by 13-hour WR with a prescribed diet. The BW, VTG, body volume (BV), body density (D) were assessed by ADP, and the % body fat, fat mass (FM), fat free mass (FFM) were calculated by Siri's equation at baseline (BL), post-WL and post-WR. The body composition was estimated by measuring the VTG at each time point, with the VTG measured at the baseline (VTG-BL) or the VTG being predicted using a software program (predicted VTG). RESULTS: The BW significantly decreased at post-WL (from 73.7 ± 8.0 to 69.0 ± 7.7 kg, $P < 0.001$) and significantly increased at post-WR (from 69.0 ± 7.7 to 71.8 ± 7.7 kg, $P < 0.001$). At the baseline, the predicted VTG (3.51 ± 0.16 L) was not significantly different from the measured VTG (3.56 ± 0.69 L), although no significant correlation between these two values was observed. The measured VTG significantly increased at post-WL (from 3.56 ± 0.69 to 3.96 ± 0.70 L, $P < 0.05$) and then decreased at post-WR (from 3.96 ± 0.70 to 3.67 ± 0.69 L,

P < 0.01), but the predicted VTG did not significantly change. Compared with FM estimated using actual VTG, the reduction in the FM during WL was significantly overestimated 0.8 ± 0.6 kg (P < 0.05) when either the VTG-BL or the predicted VTG was used. The overestimated change in the FM was beyond the physiological adaptation of energy imbalance during the short-term experiment. CONCLUSIONS: The VTG changes during rapid weight loss and regain in wrestlers. The changes in FM were overestimated when either the VTG-BL or the predicted VTG was used. Therefore, the VTG should be measured with ADP during weight loss or gain programs. This work was supported by JISS internal funding sources for research.

Korobeynikov G.V., Latyshev S. V., Latyshev N.V., Korobeynikova L.G., & Goraschenko A.U. (2016). General laws of competition duel and universal requirements to technical-tactic fitness of elite wrestlers. *Physical Education of Students, 1*, 37-42. doi:10.15561/20755279.2016.0105

Purpose: to determine and formulate general technical-tactic laws (rules) of competition duel in modern free style wrestling. Material: competition functioning of free style wrestlers at Olympic Games has been analyzed. Results of authors' own pedagogic observations and advanced experience of free style wrestling specialists have been generalized. Results: it was found that victory in duel can be resulted only from attacking tactic of duel. It was determined that wrestlers' activity (quantity of actual attacks in unit of time) varies from 1 to 2.2 attacks per minute. Reliability of attack (ratio of quantity of assessed attacks to quantity of actually fulfilled attacks) is within 0.33-0.63. Reliability of defense (ratio of quantity of successfully repelled opponent's attacks to general quantity of his actual attacks) is from 0.55-0.78. Efficiency of fighting in stance is within 0.6-1.3 points per minute. Efficiency of ground fighting is 1.3-2.3 points per minute. Conclusions: coach shall bring the formulated laws in compliance with specificity of his functioning and consider them, when planning training process of junior wrestlers.
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Korobeynikov, G., Korobeynikova, L., Iermakov, S., & Nosko, M. (2016). Reaction of heart rate regulation to extreme sport activity in elite athletes. *Journal of Physical Education & Sport,* 16(3), 976-981.

Purpose: to study elite athletes (wrestlers) heart rate regulation reactions to extreme sport activity. Material: were studied of 21 elite wrestlers who specialized of Greco-Roman Wrestling. The heart rate regulation was studied via the cardiomonitor ≪Polar-RS800CX≫. The statistical, spectral and scattergrams parameters of heart rate variability (HRV) were investigated. Results: the results indicate increase of stress level of autonomic heart rate regulation's mechanisms with inhibition of elite athletes' sympathetic and parasympathetic activity in competition condition. The precompetition reaction of elite athletes is characterized by decline of determinism and increase of stochastic organization of system of heart rate regulation in competition activity. Under extreme psycho-emotional load in competition condition the predominance of higher autonomic centers over cardio-vascular centre with transition on the neuro-humoral subcortical and metabolic centers of heart rate regulation in elite athletes were observed. Conclusions: under extreme psycho-emotional load in competition condition predominance of higher autonomic centers over cardio-vascular centre with transition on the neuro-humoral subcortical and metabolic centers of heart rate regulation were observed in elite athletes.

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Kpatcha, T., Agbonon, A., & Gbeassor, M. (2016). Food plants used during traditional wrestling in Kabye land of Togo. *Pan African Medical Journal*, 23, 25. doi:10.11604/pamj.2016.23.25.7719 [doi];PAMJ-23-25

INTRODUCTION: In the traditional sports like the fight, natural products from minerals, animals and plants are used to increase physical resistance and performance. For a better understanding of this practice, an ethnopharmacological survey was carried out in kabye land, North of Togo, to identify current plants used as foods plants during traditional wrestling. METHODS: Ethnopharmacological data

were collected through semi-structured method and personal interviews in the Kabye locality during traditional wrestling. At least, twelve villages were surveyed in the study. RESULTS: Results indicated that 57 plants are widely used by local people as food plants generally during wrestling time. These plants are used traditionally for many others purposes. CONCLUSION: We concluded that these plants may serve as sources for pharmacological investigations in physical performance improvement.
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Kroshus, E., Kerr, Z.Y., DeFreese, J.D., & Parsons, J.T. (2016). Concussion Knowledge and Communication Behaviors of Collegiate Wrestling Coaches. *Health Community*, 1-7. doi:10.1080/10410236.2016.1196417

Sport coaches can play an important role in shaping a team's approach to concussion safety through their communication with team members. However, across all sports, there is limited knowledge about factors that make coaches more or less likely to engage in safety-supportive communication. The objectives of this study were to assess the concussion-related knowledge and attitudes of wrestling coaches, as well as the extent to which they engage in autonomy-supportive coaching practices, and to determine how these factors are related to communication with athletes in support of concussion safety. Data were collected through an online survey of head coaches of National Collegiate Athletic Association (NCAA) wrestling teams (n = 89, 40.5% response rate). On average, coaches answered five out of a possible nine knowledge questions correctly and were significantly more likely to think it was acceptable for an athlete to continue playing after sustaining a concussion during a national qualifying competition as compared to during an early-season competition. Engaging in autonomy-supportive coaching behaviors was the coach factor explaining the largest percentage of variability in communication. Findings suggest that while knowledge deficits and attitudes about the acceptability of continued play while symptomatic during more consequential competitive matches should be addressed in educational programming for collegiate wrestling coaches, these changes alone may not be a sufficient for adequately increasing concussion safety communication. Targeting more distal factors such as autonomy-supportive approaches to coaching may hold promise for intervention design and should be explored in future prospective research.
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Lee, K., Onate, J., McCann, S., Hunt, T., Turner, W., & Merrick, M. (2016). The Effectiveness of Cervical Strengthening on Decreasing Neck Injury Risk in Wrestling. *Journal of Sport Rehabilitation, 0*(0), 1-17. doi:doi:10.1123/jsr.2015-0101

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.

Loyer, F., & Loudcher, J.F. (2016). Le Catch et son Histoire en France: Representations et Dynamiques Socio-historiques d'un Loisir Spectacle (1900-1970). / Freestyle Wrestling and its History in France: Socio-historical Representations and Dynamics of a Leisure Spectacle (1900-1970*). Sport History Review*, 47(1), 26-45.

At the turn of the 20th century the development of modern sport linked to the industrial age and its quest for speed left little room for the classical Graeco- Roman wrestling, which being too static did not catch the imagination of the Parisan public. A new style emerged, the "catch-as-catch-can ", (attrape comme tu peux), rooted in American culture and similar to traditional English and Scottish styles of wrestling. Audiences at the time were captivated by the variety of holds and the acrobatic element of these moves. However, considered to be too dangerous, the practice gave rise to « free style » or « lutte libre » the Olympic discipline which prohibited any form of actual violence. Amateur wrestling no longer captured the public attention and « catch » took over as the combat sport of spectacle. In an effort to make wrestling a sport, the exuberant free for all and showmanship became more professional in France between the wars. Banned in this format under the Vichy regime and ill-suited as an educational pursuit, catch gained ground after World War II as a stage managed entertainment. Freestyle wrestling caught the imagination not only through the physical attributes of the athlete but evoked the symbolism of a traditional mythology of the strong man and champion of right. However, the 1960s were also notable for the growth of other sporting practices which thanks to the popularity of television broadcasts rivaled this aspect of wrestling. Furthermore, sport now offered a new mythology through a new style of spectacle simultaneously uniting and dividing the spectators in equal measure. From then on catch was condemned: the 1970s viewer could be surprised, but he no longer believed it was a real fight. Catch would therefore have to change in order to survive. Finally, the history of catch is about its different forms and the challenge to turn it into a popular public spectacle.

Au debut du XXemc siecle, le developpement du sport moderne lie a la vitesse et a l'exploit laisse peu de place a la lutte « greco-romaine » qui, trop statique et peu spectaculaire, ne connait plus les faveurs du public Parisien. Une nouvelle forme de pratique plus attractive se developpe, le « catch-as-catch-can »(« attrape comme tu peux »), de culture americaine et proche de plusieurs styles traditionnels anglais et ecossais. Cependant, jugee trop dangereuse, elle donne naissance au « free style » ou « lutte libre », activite olympique qui interdit toutes formes de violence. Mais, peu plebiscite, c'est le « catch », version edulcorde du « catch-as-catch-can », qui s'impose en tant que sport de combat « spectaculaire ». Apres une tentative de sportivisation, la pratique melee d'extravagances et d'exuberances se tourne alors dans l'entre-deux-guerres vers sa professionnalisation en France. Interdite pour cette raison sous Vichy, et peu envisageable de maniere educative, le catch s'impose apres la Seconde Guerre mondiale sous la forme de spectacle theatralise assez localise. L'activite impressionne par les qualites physiques de Fathlete qui s'adjoint aussi les symboles d'une mythologie traditionnelle du heros defenseurdu bien. Cependant, les annees 1960 se caracterisent par une evolution des pratiques sportives qui, grace aux techniques de retransmission televisuelles, peuvent aussi concurrencer le catch sur ce plan. Plus encore, le sport moderne offre une nouvelle mythologie a travers un spectacle qui sollicite une identite politique plus nationale visant a depasser les oppositions et les divisions. Des lors, le catch est condamne. La pratique doit alors se transformer pour survivre. Finalement, l'histoire du catch est celle de ses representations et de sa difficulty a fonctionner comme spectacle reclamant la ferveur du public.

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Lucke-Wold, B.P., Turner, R.C., Logsdon, A.F., Nguyen, L., Bailes, J.E., Lee, J.M., . . . Rosen, C.L. (2016). Endoplasmic reticulum stress implicated in chronic traumatic encephalopathy. *Journal of Neurosurgery*, 124(3), 687-702. doi:10.3171/2015.3.JNS141802

OBJECTIVE: Chronic traumatic encephalopathy is a progressive neurodegenerative disease characterized by neurofibrillary tau tangles following repetitive neurotrauma. The underlying mechanism linking traumatic brain injury to chronic traumatic encephalopathy has not been elucidated. The authors investigate the role of endoplasmic reticulum stress as a link between acute neurotrauma and chronic neurodegeneration. METHODS: The authors used pharmacological, biochemical, and behavioral tools to assess the role of endoplasmic reticulum stress in linking acute repetitive traumatic brain injury to the development of chronic neurodegeneration. Data from the authors' clinically relevant and validated rodent blast model were compared with those obtained from postmortem human chronic traumatic encephalopathy specimens from a National Football League player and World Wrestling Entertainment wrestler. RESULTS: The results demonstrated strong correlation of endoplasmic reticulum stress activation with subsequent tau hyperphosphorylation. Various endoplasmic reticulum stress markers were increased in human chronic traumatic encephalopathy specimens, and the endoplasmic reticulum stress response was associated with an increase in the tau kinase, glycogen synthase kinase-3beta. Docosahexaenoic acid, an endoplasmic reticulum stress inhibitor, improved cognitive performance in the rat model 3 weeks after repetitive blast exposure. The data showed that docosahexaenoic acid administration substantially reduced tau hyperphosphorylation ($t = 4.111$, $p < 0.05$), improved cognition ($t = 6.532$, $p < 0.001$), and inhibited C/EBP homology protein activation ($t = 5.631$, $p < 0.01$). Additionally the data showed, for the first time, that endoplasmic reticulum stress is involved in the pathophysiology of chronic traumatic encephalopathy. CONCLUSIONS: Docosahexaenoic acid therefore warrants further study.

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Miarka, B. (2016). Technical-tactical and physiological demands of wrestling combats. *Revista de Artes Marciales Asiaticas*, 11(1), 18-31.

Technical-tactical and physiological demand analyses of wrestling combats are important because they reveal essential information for the development of contextual training and specific physical preparation of wrestlers. Therefore, the aim of this review is to describe the characteristics of wrestling combats in freestyle, female and Greco-roman styles. The time-motion analysis presented in this article is the main component to carry out inferences on intensity and effort: pause ratio of combat actions. After rules modification in 2013, wrestling combats showed quicker and more diversified actions, especially in the lighter categories. For Greco-roman wrestling, most studies showed takedowns as the most effective techniques in World competitions for the period 2009-2011. For the same period, foot/leg techniques were the most effective in female and freestyle wrestling, followed by takedown attacks. Recent analyses, developed after 2013 rules modification, showed that the decisive offensive actions were applied on foot and in par terre situations - especially gut wrenches techniques and derivatives of suplex movements. The knowledge on the determinant and predominant actions of wrestling combats can be applied in future research, as well as can be used practically for training, physical preparation and assessments of similar combat actions. It also allows interventions to prevent injuries resulting from technical and tactical wrestling actions.

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Miller, M.B., Johnson, C.D., Cooley, R.A., Sharp, H., & Servos, T.A. (2016). Mouthguard usage by middle and high school student-athletes in Houston, Texas. *General Dentistry*, 64(5), 35-38.

This survey recorded utilization levels of stock and custom mouthguards among middle and high school athletes in a US metropolitan area and gathered data on the prevalence of traumatic injuries that have occurred as a consequence of school-based athletic competition. The data also included reasons for the athletes' noncompliance. A 23-question, online survey form was developed. A geographically diverse list of public and private schools in the Houston metropolitan area was identified and included 30 public middle schools, 32 public high schools, 8 private middle schools, and 10 private high schools. The sports surveyed were baseball, basketball, field hockey, football, lacrosse, soccer, softball, volleyball, and wrestling. Only 1 private middle school participated. Only 5 of 32 public high schools and 1 private high school participated, representing response rates of 16% and 10%, respectively. Overall, there were 503 responses, and 56% of the respondents did not have a mouthguard. Among athletes who owned a mouthguard, most (70%) had stock versions purchased in a retail store, while 11% had a custom mouthguard fabricated by a dentist, and 19% had both types. The most frequent reasons cited for not wearing a mouthguard were forgetting to use it and a lack of comfort. The injury rates reported by respondents in the stock and custom mouthguard groups were 26% and 9%, respectively. A consistent, concerted effort by local dental societies should be aimed at school administrators and coaches to encourage enforcement or reinforcement of mouthguard usage policies among high school athletes, but, ultimately, parents need to step up to protect their children.

Muller, J., Muller, S., Stoll, J., Frohlich, K., Otto, C., & Mayer, F. (2016). Back pain prevalence in adolescent athletes. *Scandinavian Journal of Medicine Science and Sports*. doi:10.1111/sms.12664

The research aimed to investigate back pain (BP) prevalence in a large cohort of young athletes with respect to age, gender, and sport discipline. BP (within the last 7 days) was assessed with a face scale (face 1-2 = no pain; face 3-5 = pain) in 2116 athletes (m/f 61%/39%; 13.3 +/- 1.7 years; 163.0 +/- 11.8 cm; 52.6 +/- 13.9 kg; 4.9 +/- 2.7 training years; 8.4 +/- 5.7 training h/week). Four different sports categories were devised (a: combat sports, b: game sports; c: explosive strength sport; d: endurance sport). Analysis was described descriptively, regarding age, gender, and sport. In addition, 95% confidence intervals (CI) were calculated. About 168 (8%) athletes were allocated into the BP group. About 9% of females and 7% of males reported BP. Athletes, 11-13 years, showed a prevalence of 2-4%; while prevalence increased to 12-20% in 14- to 17-year olds. Considering sport discipline, prevalence ranged from 3% (soccer) to 14% (canoeing). Prevalences in weight lifting, judo, wrestling, rowing, and shooting were >/=10%; in boxing, soccer, handball, cycling, and horse riding, </=6%. 95% CI ranged between 0.08-0.11. BP exists in adolescent athletes, but is uncommon and shows no gender differences. A prevalence increase after age 14 is obvious. Differentiated prevention programs in daily training routines might address sport discipline-specific BP prevalence.

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Myers, H., Poletti, M., & Butler, R.J. (2016). Functional Performance on the Upper Quarter Y-Balance Test Differs Between High School Wrestlers and Baseball Players. *Journal of Sport Rehabilitation*, 0(0), 1-20. doi:doi:10.1123/jsr.2015-0168

Context: The Upper Quarter Y-Balance Test (YBT-UQ) is a unique movement test where individuals perform at the limits of their stability; requiring the coordination of balance, proprioception, range of motion, and stabilization. It is not yet clear if performance on the YBT-UQ differs between sports with dissimilar emphasis on upper extremity performance. Objective: The objective of this study is to compare performance on the YBT-UQ between wrestlers, whose sport requires some degree of closed chain activity, and baseball players, whose sport is primarily open kinetic chain in nature. Design: Cross-

Sectional. Setting: High school pre-participation physical assessment. Participants: Twenty-four healthy high school male wrestlers (mean age 16.12 ±1.24) and twenty-four healthy high school male baseball players (mean age 15.79 ±1.25) took part in the study. Interventions: All subjects performed the YBT-UQ which requires the subject to reach in three directions while maintaining a push up position. Main outcome measures: The variables of interest include the maximum reach in each direction as well as the composite score. In addition, asymmetries between limbs for each reach direction were compared. Results: Wrestlers performed significantly better than baseball players in the medial direction, inferolateral direction, and in composite scores. In the medial direction, wrestlers exhibited greater scores (p<0.01) on both left and right limbs, 10.5 ±10.2 %LL and 9.95 ±10.2 %LL, respectively. Significant differences (p<0.01) were also observed in the inferolateral direction with a difference of 11.3 ±12.0 %LL on the left and 8.7 ±11.0 %LL on the right. Composite scores were higher (p<0.01) for the wrestlers with a difference of 7.0% on the left and 7.1% on the right. Conclusion: This study suggests that wrestlers perform better on the YBT-UQ than baseball players. The findings of this study may suggest a sport specific normative data for the YBT-UQ in high school athlete.

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Nasseri, A., & Jafari, A. (2016). Effects of creatine supplementation along with resistance training on urinary formaldehyde and serum enzymes in wrestlers. *Journal of Sports Medicine & Physical Fitness,* 56(4), 458-464.

BACKGROUND: Formaldehyde is a cytotoxic agent produced from creatine through a metabolic pathway, and in this regard, it has been claimed that creatine supplementation could be cytotoxic. Even though the cytotoxic effects of creatine supplementation have been widely studied, yet little is known about how resistance training can alter these toxic effects. This study aimed to determine the effects of short-term creatine supplementation plus resistance training on the level of urinary formaldehyde and concentrations of serum enzymes in young male wrestlers. METHODS: In a double-blind design twenty-one subjects were randomized into creatine supplementation (Cr), creatine supplementation plus resistance training (Cr + T) and placebo plus resistance training (Pl + T) groups. Participants ingested creatine (0.3 g/kg/day) or placebo for 7 days. The training protocol consisted of 3 sessions in one week, each session including three sets of 6-9 repetitions at 80-85% of one-repetition maximum for whole-body exercise. Urine and blood samples were collected at baseline and at the end of the supplementation. RESULTS: Creatine supplementation significantly increased the excretion rate of urinary formaldehyde in the Cr and Cr + T groups by 63.4% and 30.4%, respectively (P<0.05), indicating that resistance training could partially lower this rate by 17.7%. No significant differences were detected in the levels of serum enzymes across time and groups (P>0.05). CONCLUSIONS: These findings indicate that resistance training may lower the increase of urinary formaldehyde excretion induced by creatine supplementation, suggesting that creatine consumption could be relatively less toxic when combined with resistance training.

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Nonoyama, T., Shimazaki, Y., Nakagaki, H., & Tsuge, S. (2016). Descriptive study of dental injury incurred by junior high school and high school students during participation in school sports clubs. *International Dentistry Journal.* doi:10.1111/idj.12250 [doi]

AIM: Students often injure their teeth during participation in school-based sports clubs. This study examined the frequencies and types of dental injuries sustained at school sports clubs and compared the risk of dental injury among different sports. METHODS: Based on injury statistics from the Japan Sport Council of the junior high schools and high schools in seven prefectures during fiscal year 2006, the risk of dental injury was estimated using a rate ratio (RR) by calculating the ratio of occurrence of dental injury under various circumstances. RESULTS: The RRs of exercise-related dental injury for boys and girls in

junior high school were 0.7 (P < 0.001) and 1.3 (P < 0.05), respectively, and for those in high school were 2.6 (P < 0.001) and 2.7 (P < 0.001), respectively. In junior high school, softball (RR = 7.7) for boys and handball (RR = 3.9) for girls commonly led to dental injuries. In high school, Japanese-style wrestling (RR = 18.5) and rugby (RR = 7.3) for boys and handball (RR = 6.5) for girls had high risks for dental injury. Crown fracture was the predominant dental injury among boys and girls attending both junior high school and high school. The proportion of alveolar fracture was higher in school sports clubs than outside school sports clubs among high school boys. Contact or limited-contact sports had significantly higher risks for dental injuries than did noncontact sports. CONCLUSION: The results of this study suggest that teachers and administrators at schools should pay attention to the risk of dental injury among students participating in high-risk sports.

Ozkan, I., & Ibrahim, C.H. (2016). Dehydration, skeletal muscle damage and inflammation before the competitions among the elite wrestlers. *Journal of Physical Therapy Science*, 28(1), 162-168. doi:10.1589/jpts.28.162

The present study aimed to identify weight-loss and hydration levels before competitions among elite wrestlers and determine the skeletal muscle damage and inflammation levels after dehydration. [Subjects] Seventy-two elite wrestlers who participated in the Turkish Wrestling Championship. [Methods] With the help of specialists, 5 cc of blood were drawn from the forearm veins of the wrestlers. Laboratory analyses of Na(+), BUN, Glucose, CK, LDH, AST, ALT, C-RP levels were performed. Using a mathematical formula for hydration the POsm levels of the athletes were calculated. [Results] The wrestlers were divided into two groups based on hydration status. There were significant correlations between hydration indicators of Na(+), BUN and PBWL values. There were significant differences between AST, LDH, CK values and skeletal muscle damage indicators of the two groups, but there were no significant differences between the inflammation levels and C-RP values of the groups. [Conclusion] No differences existed in inflammation levels among the wrestlers, although dehydrated wrestlers suffered from higher level of skeletal muscle damage than wrestlers who were not dehydrated.
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Pallares, J.G., Martinez-Abellan, A., Lopez-Gullon, J.M., Moran-Navarro, R., Cruz-Sanchez, E., & Mora-Rodriguez, R. (2016). Muscle contraction velocity, strength and power output changes following different degrees of hypohydration in competitive Olympic combat sports. *Journal of the International Society of Sports Nutrition*, 13, 1-9.

Background: It is habitual for combat sports athletes to lose weight rapidly to get into a lower weight class. Fluid restriction, dehydration by sweating (sauna or exercise) and the use of diuretics are among the most recurrent means of weight cutting. Although it is difficult to dissuade athletes from this practice due to the possible negative effect of severe dehydration on their health, athletes may be receptive to avoid weight cutting if there is evidence that it could affect their muscle performance. Therefore, the purpose of the present study was to investigate if hypohydration, to reach a weight category, affects neuromuscular performance and combat sports competition results. Methods: We tested 163 (124 men and 39 women) combat sports athletes during the 2013 senior Spanish National Championships. Body mass and urine osmolality (UOSM) were measured at the official weigh-in (PRE) and 13-18 h later, right before competing (POST). Athletes were divided according to their USOM at PRE in euhydrated (EUH; UOSM 250-700 mOsm · kgH_2O^{-1}), hypohydrated (HYP; UOSM 701-1080 mOsm · kgH_2O^{-1}), and severely hypohydrated (S-HYP; UOSM 1081-1500 mOsm · kgH_2O^{-1}),. Athletes' muscle strength, power output and contraction velocity were measured in upper (bench press and grip) and lower body (countermovement jump - CMJ) muscle actions at PRE and POST time-points. Results: At weigh-in 84 % of the participants were hypohydrated. Before competition (POST) UOSM in S-HYP and HYP decreased but did not reach

euhydration levels. However, this partial rehydration increased bench press contraction velocity (2.8-7.3 %; p < 0.05) and CMJ power (2.8 %; p < 0.05) in S-HYP. Sixty-three percent of the participants competed with a body mass above their previous day's weight category and 70 of them (69 % of that sample) obtained a medal. Conclusions: Hypohydration is highly prevalent among combat sports athletes at weigh-in and not fully reversed in the 13-18 h from weigh-in to competition. Nonetheless, partial rehydration recovers upper and lower body neuromuscular performance in the severely hypohydrated participants. Our data suggest that the advantage of competing in a lower weight category could compensate the declines in neuromuscular performance at the onset of competition, since 69 % of medal winners underwent marked hypohydration.

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Pannu, B., Philip, N., & Iyer, V. (2016). Paget-Schroetter Syndrome in a Wrestler With Subsequent Diagnosis of Diffuse Large B-Cell Lymphoma. *Chest, 149*(4, Supplement), A334. doi:http://dx.doi.org/10.1016/j.chest.2016.02.347

INTRODUCTION: Paget-Schroetter syndrome (PSS), also known as effort thrombosis, is a rare syndrome of subclavian-axillary vein deep venous thrombosis (DVT) typically occurring in younger men after heavy upper extremity exertion. Anatomic abnormalities resulting in thoracic outlet syndrome (TOS) are commonly seen. We present a case of PSS in a young wrestler who was later found to have Diffuse Large B-Cell Lymphoma (DBCL) 2 months later. CASE PRESENTATION: A 17 year old high school wrestler, presented with one day history of dull pain, swelling and bluish discoloration of the left arm occurring after a wrestling match the day before. Patient denied any recent history of trauma, surgery, cancer, drug or steroid use as well as personal or family history of thrombophilia. Ultrasound revealed a non-occlusive thrombus in the left subclavian vein and he was started on IV heparin. A venogram demonstrated left subclavian vein occlusion with acute thrombus throughout the innominate vein. He then underwent catheter-directed thrombolytic therapy with alteplase and daily venograms. Due to persistent clot burden, balloon angioplasty was undertaken four days later. He was subsequently discharged on 3 months of warfarin and enoxaparin bridge therapy, and was scheduled for TOS investigations as an outpatient. 2 months after this episode, a diagnosis of DBCL was made during investigation ns for persistent cough. DISCUSSION: Our case highlights the typical presentation of PSS occurring in a young male after heavy exertion. Our case has several distinguishing features including persistence of the thrombus with need for multiple invasive procedures. In addition, the diagnosis of DBCL 2 months after the diagnosis of PSS highlights the need for continued surveillance after any episode of venous thromboembolism, even in cases with an obvious explanation. CONCLUSIONS: PSS is a rare cause of upper extremity DVT. Treatment should be individualized and most patients require a combination of immediate anticoagulation/thrombolytic and mechanical thrombectomy therapy with subsequent surgery aimed at relieving the underlying cause of the TOS. The presence of underlying malignancy should be ascertained at the time of diagnosis and subsequent follow up.

Payzieva, S., Djmaniyazov, D., & Curby, D.G. (2016). The Application of Bioresonance Diagnostics Using Electrical Stimulation of Meridian Systems in the Preparation of Wrestlers. *International Journal of Wrestling Science*, 6(1), 58-61. doi:10.1080/21615667.2016.1208691

ABSTRACT: Athletes are better at their sports today than they have ever been, and much of the improvement can be attributed to an increased focus on training and preparation. Every trainer wants his or her trainee to succeed among best. To achieve set objectives, the trainer raises expectations of the sportsman's efforts in order to yield high results. However, can an athlete's organism take psychological and physical loads, or does he or she have such potential that will unlock and release resources without

harms to health and without resulting in psychological trauma? Operational control of the functional state of sportsmen is an integral part of the training process. Existing methods provide little information or control and can be time-consuming, which limits their widespread use in the sport. The authors aimed to study the use of complex parameters and adaptive capacity in the training cycles of training athletes. The purpose of this research includes estimating the psychophysiological state of wrestlers, by employing a software/hardware complex that uses electropuncture diagnostics and stimulation of biologically active points, which reveals latent pathology of body systems, and possible referral of the athlete to a doctor for more timely treatment. The authors describe their process and results, as well as give recommendations for improving athletes' health.

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Pedro, S.D.G. (2016). Athlete's engagement, resilience, and rate of perceived exertion on Portuguese national- and international-level wrestlers. *International Journal of Wrestling Science, 6*(1), 5-10. doi:10.1080/21615667.2016.1166299

ABSTRACT: Psychological factors are known to influence performances and athletes sports experiences. Within psychological factors known in sports context, resilience and engagement are 2 distinguished factors between successful and unsuccessful athletes. This study aimed to explore the relations between wrestlers' resilience levels and engagement perception. Performance perception and rated perceived exertion were conducted, concerning its relation with engagement and resilience. Results mainly suggest a positive association between athletes' resilience and engagement. Exploring these evidences may contribute to a more significant and deeper knowledge regarding athletes' resilience and engagement and coaches' role in nurturing these factors throughout athletes' sports careers.

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Pfister, T., Pfister, K., Hagel, B., Ghali, W.A., & Ronksley, P.E. (2016). The incidence of concussion in youth sports: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 50(5), 292-297. doi:bjsports-2015-094978

OBJECTIVE: To 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 </=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.

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Polak, E., Seredyński, A., & Przednowek, K. (2016). Physical fitness profiles of junior athletes practicing selected combat sports. *Revista de Artes Marciales Asiaticas, 11*(2s), 28-29. doi:10.18002/rama.v11i2s.4156

Every sport has its specific requirements for physical fitness that depend on the stage of the training process. The physical fitness of the beginners is different than that required from juniors or top-level athletes. Attempts to determine the desired profile and to identify the key elements of physical fitness as well as characterizing top-level athletes in combat sports, are the subject of numerous scientific studies. The aim of this study was i) to determine profiles of overall physical fitness of boys who practice three various combat sports: boxing, Kiokushin karate and freestyle wrestling; ii) to compare their physical fitness to those athletes of Subcarpathian Province team of juniors, who practice other sports; and iii)to compare obtained profiles to those that were suggested for high-level athletes.

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Pryimakov, O., Iermakov, S., Kolenkov, O., Samokish, I., & Juchno, J. (2016). Monitoring of functional fitness of combat athletes during the precompetitive preparation stage. *Journal of Physical Education & Sport*, 16(2), 551-561.

Objective. The objective of the work consisted in substantiating criteria and elaborating differential estimates of functional fitness of highly skilled wrestlers at precompetitive stage of preparation. Material and methods. From 12 to 54 athletes aged 20-28 years, members of the national teams of Ukraine in Greco-Roman and free-style wrestling, and judo participated in studies. Functional fitness and special work capacity of wrestlers were estimated on the basis of the methods of electrocardiography, variation pulsography, pulsometry, gas analysis, physical work capacity testing. Results: The major criteria of wrestlers' functional fitness at rest and in body responses to physical load appeared to be: 1) cardiac function bradycardia and low index of myocardial tension under basal conditions in prone position; 2) high reactivity of cardiovascular system during physical load; 3) economy of physiological system functioning, low tension in regulatory system activity; 4) high level of speed capacities and functional stability of the body of wrestlers during specialized physical loads. The key integrative indices of wrestlers' fitness general structure appeared to be: special work capacity level, general level of functional fitness, mobility of physiological processes, economy, and anaerobic power. Developed mathematical models reflect different variants of interrelations and ratios of the key and integral physiological indices with respect to skill level, weight category and the level of athletes' special work capacity. Formalization of these dependences provides more efficient approach to the issue of controlling, modelling and managing functional fitness and special work capacity of wrestlers at the stage of maximal realization of individual capacities. Conclusions: Increase of specific weight of the key integrative functional indices in special work capacity determination along with the enhancement of wrestlers' skill level represents the most significant criterion for improvement of their fitness structure.

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Reams, L. (2016). The motives of fans attending local intercollegiate wrestling events. *International Journal of Sport Management*, 17(2), 219-234.

Utilizing the Wrestling Consumer Preference Scale (WCPS), local, North American intercollegiate wrestling fans were surveyed regarding their motivational preferences to attend duals. Single sample t-tests were conducted and found the variables of wrestling loyalty, achievement, individual match-ups, individual wrestler affiliation, social, learning opportunity, and entertainment as significant fan motives to attend. Comparisons of motivational preferences across varying lengths (i.e., years) of fandom were also analyzed. A multivariate analysis of variance (MANOVA) was employed and found significant

differences on the variables of achievement, individual match-ups, individual wrestler affiliation, learning opportunity and wrestling loyalist. No significant differences were observed for the entertainment, social and team affiliation variables across varying lengths of fandom. Theoretical and pragmatic implications are provided to conclude the study.

Reljic, D., Feist, J., Jost, J., Kieser, M., & Friedmann-Bette, B. (2016). Rapid body mass loss affects erythropoiesis and hemolysis but does not impair aerobic performance in combat athletes. *Scandinavian Journal of Medicine & Science in Sports*, 26(5), 507-517.

Rapid body mass loss (RBML) before competition was found to decrease hemoglobin mass (Hbmass) in elite boxers. This study aimed to investigate the underlying mechanisms of this observation. Fourteen well-trained combat athletes who reduced body mass before competitions (weight loss group, WLG) and 14 combat athletes who did not practice RBML (control group, CON) were tested during an ordinary training period (t-1), 1-2 days before an official competition (after 5-7 days RBML in WLG, t-2), and after a post-competition period (t-3). In WLG, body mass (-5.5%, range: 2.9-6.8 kg) and Hbmass (-4.1%) were significantly ($P < 0.001$) reduced after RBML and were still decreased by 1.6% ($P < 0.05$) and 2.6% ($P < 0.001$) at t-3 compared with t-1. After RBML, erythropoietin, reticulocytes, haptoglobin, triiodothyronine (FT3), and free androgen index (FAI) were decreased compared with t-1 and t-3. An increase occurred in ferritin and bilirubin. Peak treadmill-running performance and VO_2peak did not change significantly, but performance at 4-mmol lactate threshold was higher after RBML ($P < 0.05$). In CON, no significant changes were found in any parameter. Apparently, the significant decrease in Hbmass after RBML in combat athletes was caused by impaired erythropoiesis and increased hemolysis without significant impact on aerobic performance capacity.

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Seife, C. (2016, 2016). Red does not enhance human performance in the Olympics. Arising from: R. A. Hill & R. A. Barton Nature 435, 293 (2005). Arthur L. Carter Journalism Institute, New York University. Accessed at: http://www. users. cloud9. net/~cgseife/SeifeOlympicsManuscript12February. pdf.

A number of scientists have recently asserted that the color of sportswear can not only alter the behavior of athletes, but can also help competitors defeat their peers. Evolutionary anthropologists R. A. Hill and R. A. Barton claim to have found statistically significant evidence of this effect in the results of the 2004 Athens Olympics. Here, data from the 2008 Beijing Olympics are used to demonstrate that the effect Hill and Barton saw is likely not real.

Shadgan, B., Pakravan, A., Zaeimkohan, H., Shahpar, F.M., & Khodaee, M. (2016). Zika and Rio Olympic Games. *Current Sports Medicine Reports* (Lippincott Williams & Wilkins), 15(4), 298-300.

Zika virus (ZIKV) is an arthropod-borne virus that is mainly transmitted via a bite from a female mosquito of the Aedes species. However, ZIKV can be transmitted sexually or via blood. Due to the recent ZIKV outbreak in South and Central America, many national and international organizations are concerned about the safety of athletes, coaches, staff, and spectators during the Olympic and Paralympic Games. Infected individuals are generally asymptomatic or have mild symptoms. However, ZIKV infection can potentially cause serious complications such as Guillain-Barre syndrome and congenital defects. Preferred diagnosis is based on real-time reverse-transcription polymerase chain reaction from blood and urine. Currently, there is no treatment or immunization available for ZIKV infection, and disease control is limited to preventing mosquito bites.

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Sommerfield, L.M., Mcanulty, S.R., Mcbride, J.M., Zwetsloot, J.J., Austin, M.D., Mehlhorn, J.D., . . . Utter, A.C. (2016). Validity of urine specific gravity when compared with plasma osmolality as a measure of hydration status in male and female NCAA collegiate athletes. *Journal of Strength & Conditioning Research* (Lippincott Williams & Wilkins), 30(8), 2219-2225.

The purpose of this study was to evaluate the response of urine specific gravity (Usg) and urine osmolality (Uosm) when compared with plasma osmolality (Posm) from euhydration to 3% dehydration and then a 2-hour rehydration period in male and female collegiate athletes. Fifty-six National Collegiate Athletic Association (NCAA) wrestlers (mean ± SEM); height 1.75 ± 0.01 m, age 19.3 ± 0.2 years, and body mass (BM) 78.1 ± 1.8 kg and 26 NCAA women's soccer athletes; height 1.64 ± 0.01 m, age 19.8 ± 0.3 years, and BM 62.2 ± 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 ± 0.09% and 1.9 ±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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Sussman, E.S., Ho, A.L., Pendharkar, A.V., & Ghajar, J. (2016). Clinical evaluation of concussion: the evolving role of oculomotor assessments. *Neurosurgical Focus*, 40(4), E7. doi:10.3171/2016.1.FOCUS15610

Sports-related concussion is a change in brain function following a direct or an indirect force to the head, identified in awake individuals and accounting for a considerable proportion of mild traumatic brain injury. Although the neurological signs and symptoms of concussion can be subtle and transient, there can be persistent sequelae, such as impaired attention and balance, which make affected patients particularly vulnerable to further injury. Currently, there is no accepted definition or diagnostic criteria for concussion, and there is no single assessment that is accepted as capable of identifying all patients with concussion. In this paper, the authors review the available screening tools for concussion, with particular emphasis on the role of visual function testing. In particular, they discuss the oculomotor assessment tools that are being investigated in the setting of concussion screening.
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Tirabassi, J., Brou, L., Khodaee, M., Lefort, R., Fields, S.K., & Comstock, R.D. (2016). Epidemiology of high school sports-related injuries resulting in medical disqualification: 2005-2006 through 2013-2014 academic years. *American Journal of Sports Medicine*. doi:0363546516644604

BACKGROUND: Although rare, season- or career-ending injuries in young athletes are concerning because they can result in time lost from sport participation and school, social costs, and economic costs of medical care. PURPOSE: To describe rates and patterns of medically disqualifying (MDQ) injuries among United States high school athletes overall and by sport, sex, type of athletic activity, and mechanism. STUDY DESIGN: Descriptive epidemiological study. METHODS: Sports-related injury data on high school athletes were collected during the 2005-2006 through 2013-2014 academic years from a large national sample of United States high schools via High School Reporting Information Online (RIO). MDQ injuries were defined as season- or career-ending injuries. RESULTS: From 2005-2006 through 2013-2014, High School RIO captured 59,862 total injuries including 3599 MDQ injuries (6.0% of all

injuries). Most MDQ injuries (60.4%) occurred in competition. Football had the highest injury rate (26.5 per 100,000 athlete-exposures), followed by gymnastics (18.6) and wrestling (17.9). MDQ injury rates were higher among girls in the sex-comparable sports of basketball (rate ratio [RR], 1.6; 95% CI, 1.3-2.0), cross-country (RR, 2.6; 95% CI, 1.0-7.5), soccer (RR, 1.6; 95% CI, 1.3-1.9), and track and field (RR, 2.6; 95% CI, 1.7-4.0). Player-player contact (48.2%) was the most common MDQ injury mechanism. The most commonly injured body site was the knee (33.7%). The most common MDQ injury diagnosis was sprains/strains (35.9%); the most common specific MDQ injury was knee sprains/strains (25.4%), with the anterior cruciate ligament being the most commonly injured knee structure. Among boys, fracture was the most common diagnosis in 3 sports, and sprain/strain was the most common in 6 sports. Among girls, sprain/strain was the most common diagnosis in 9 sports, and fracture was the most common only in softball. CONCLUSION: MDQ injuries vary by sport, sex, and type of athletic activity and occur most frequently as a result of player-player contact. These findings should prompt additional research into the development, implementation, and evaluation of targeted injury prevention efforts.

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Tropin, Y., V, R., & Ponomarev, V. (2016). Model characteristics of sensory-motor reactions and perceptions of specific wrestlers of different styles of confrontation. *Slobozhansk Scientific and Sports Newsletter*, 53(3), 99-103.

Purpose: to develop a model describing the characteristics of sensory-motor reactions and perceptions of specific wrestlers of different styles of conducting fight (wrestling). Material & Methods: theoretical analysis and generalization of scientific and methodological literature, modern competitive activity, generalization of best practices, psycho-physiological research methods, methods of mathematical statistics. The investigations, which were attended by 46 athletes engaged in different kinds of wrestling (freestyle, Greco-Roman wrestling, judo, sambo) with expertise from 1 to discharge the master of sports of international class, different ages (from 18 to 35 years). Results: based on the test results determined pedagogical level of psychomotor reactions and perceptions of specific wrestlers basic styles of conducting fight. Conclusions: it determined that the level of development of those or other psychomotor reactions and specific perceptions of athletes has a certain relationship with the typical style of the match.

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Tsushima, W.T., Geling, O., Arnold, M., & Oshiro, R. (2016). Are there subconcussive neuropsychological effects in youth sports? An exploratory study of high- and low-contact sports. *Applied Neuropsychology: Child*, 5(2), 149-155. doi:10.1080/21622965.2015.1052813

This exploratory study was designed to examine the neuropsychological effects of sports-related head trauma-specifically, repetitive subconcussive impacts or head blows that do not result in a diagnosable concussion. The researchers compared the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) neurocognitive test scores of 2 groups of nonconcussed youth athletes (n = 282), grouped according to the frequency of concussions in their respective sports, with the assumption that more subconcussive impacts occur in sports in which there are more reported concussions. The results indicated that high-contact-sport (football) athletes had significantly poorer performance in processing speed and reaction time compared with athletes in low-contact sports (wrestling, soccer, baseball, judo, and basketball). This study into the effects of repetitive subconcussive head trauma tentatively raises concern that participation in high-contact sports, even without evidence of a diagnosable concussion, could result in lowered neuropsychological functioning among high school athletes. Limitations of this exploratory research effort are discussed.

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Tünnemann, H. (2016). Scoring Analysis of the 2015 World Wrestling Championships. *International Journal of Wrestling Science*, 6(1), 39-52. doi:10.1080/21615667.2016.1197028

ABSTRACT: The videos of all matches from the 2015 Senior World Championships were analyzed for scoring and technique. The world championship in a pre-Olympic year, is also the first opportunity for the athletes to qualify the weight class (attained by finishing in the top 6) for their country for the Olympic Games. Countries and qualified weight classes are presented. Attack efficacy, represented by points scored per minute, is presented for the style as a whole, for the top countries and for the weight class champions. The technical structure of the champions, with scoring by type of technique, is also presented. This was done for all three styles-Men's Freestyle, Women's Freestyle and Greco-Roman. All three styles moved in a positive direction in regard to increased activity and scoring as a result of the most recent rules changes. However, Greco-Roman must explore ways to make larger strides in the variety of scoring, especially techniques from the standing position.

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Verbey-Verutis, R.W., & Ashton, M.C. (2016). Economic Redistribution Attitudes in Male Wrestlers. *Personality and Individual Differences, 101*, 523. doi:http://dx.doi.org/10.1016/j.paid.2016.05.334

Woodroffe, L., Donnenwerth, J.J., & Peterson, A.R. (2016). Weight management counseling for wrestling athletes. *Pediatric Annals*, 45(3), e87-e90. doi:10.3928/00904481-20160203-01

Helping a wrestler manage body weight can be a daunting process for a pediatric health care provider. Each high school wrestling program has been mandated by the National Federation of State High School Associations to determine an appropriate weight classification for each individual wrestler. This article discusses how an appropriate weight class is determined, the methods for ascertaining a person's hydration status and body density, and the importance of a fully hydrated and normally nourished state that will allow for optimal athletic performance for a wrestler.

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Yarimkaya, E., Akandere, M., & Altunku, S. (2016). Investigation of the effect of wrestling training on depression levels of children between the ages of 11-14. SSTB *International Refereed Academic Journal of Sports, Health & Medical Sciences* (19), 1-11.

The aim of this research was to investigate whether wrestling training for 8 weeks has an effect on depression levels of children or not. The research group was constituted of 210 students in the range of 11-14 years old who take education in Ankara Sincan Ahi Evran Secondary School with Eryaman Cumhuriyet Secondary School. The research was designed as a test-module with pretest-posttest control group. In the research, "Depression Scale for Children" (Kovacs, 1981) was used as data collecting tools. Regular wrestling training was given to the students in application group for 2 hour 3 days a week throughout 8 weeks. For statistical analysis of the data, SPSS 15.0 software program was used whereas Wilcoxon and Mann-Whitney U tests were applied for comparisons. This research was tested for 0.05 significance levels. It was determined that there was a significant difference in terms of statistics when averages of pre-test and post-test grades of students participated in the research as application group ($p<0.05$). In this regard, it can be concluded that wrestling training with regular participation will have a positive effect on depression levels of children.

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Yong-Sub, S., Seung-Min, Y., Mee-Young, K.I.M., Lim-Kyu, L.E.E., Byoung-Sun, P., Won-Deok, L.E.E., . . . Junghwan, Kim (2016). Analysis of the respirogram phase of Korean wrestling athletes compared with non-athletes for sports physiotherapy research. *Journal of Physical Therapy Science*, 28(2), 392-398.

[Purpose] Respiratory function is important for patients including athletes who require physical therapy for respiratory dysfunction. The purpose of the present study was to analyze the differences in the respirograms between Korean wrestling athletes and non-athletes according to phase for the study of sports physiotherapy. [Subjects and Methods] Respiratory function was measured using spirometry in both the athletes and non-athletes while they were in a sitting position. [Results] Spirometry parameters in the athletes were significantly higher than in the non-athletes. In respirogram phasic analysis, the expiratory area and total area of forced vital capacity were significantly increased in the athletes compared with the non-athletes. The slopes of the forced vital capacity for athletes at slopes 1, 2, and 3 of the A area were significantly increased. In correlative analysis, chest circumference was significantly correlated with slope 3 of the A area of the forced vital capacity. [Conclusion] The results suggest that the differences in changes in the phases of the respirogram between the Korean wrestling athletes and non-athletes may in part contribute to our understanding of respiratory function in sports physiotherapy research.

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Zouita Ben Moussa, A. (2016). Isokinetic strength trunk assessment of athletes. *Annals of Physical and Rehabilitation Medicine, 59S*. doi:10.1016/j.rehab.2016.07.344.

OBJECTIVE: Sport specific consideration, different demands of various sports and specific training reveal differences of trunk strength capacity. The purpose of this study was to identify strength firstly characteristics of isokinetic parameters of trunk of athletes and secondary to detect the difference and the effect of sports. MATERIAL/PATIENTS AND METHODS: Sixteen athletes of national team athletes were recruited for the study: weightlifting and wrestlers to participate in this study. All athletes were healthy and free of any apparent neuromuscular injury or impairment. Torque and angular velocity data were collected using a Biodex® dynamometer system 3. Muscular strengths of the extensors and flexors of the trunk segment, were assessed using the dynamometer. Flexion and extension strengths were tested at velocities of 60°/second and 180°/second respectively for 5 and 10 repetitions (Julia et al., 2010). RESULTS: First results revealed that extensor muscular are statistically stronger and power than flexor muscular at all angular velocities in the total group (P<0.05). The increase of angular velocities 60°/s to 180°/s lead to decrease in PT/BW. Whereas the variation of ratio is not significant. Comparison of the groups shows that a statically differences are obtained only for flexor muscular. Wrestlers are stronger at 60°/s and power at 180°/s than weightlifters (P<0.05). DISCUSSION/CONCLUSION: Our data shows that extensors muscular are statically stronger than flexor muscular at all angular velocities and for all variables, at exception of ratio. These results are comparable to those obtained by O'Donovan (2006) for athletic group (Tae Kwon Do and Kung-Fu). Whereas different of results obtained by Secchi (2010) for higher level of swimmers group. The repetitive mechanical loading and often specific and unique motion impose bigger request of specific muscles groups on the spines of athletes through various sporting requirements in training and competition (Hoskins, 2012). However, this muscle specialization may lead to an imbalance of the forces applied and expose the athletes to injuries (Schiltz, 2009), particularly in sports that carry specific low back demands us weight lifters and wrestling. Isokinetic evaluation is frequently used to assess muscle strength of athletes among different sports. Isokinetic dynamometry testing has been a reliable and validated means of testing athletic strength variables (Jiang, 2013)

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