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The ***International Journal of Wrestling Science*** is a peer-reviewed journal for all those professionals working in the field of wrestling sport science. Issues will be published quarterly. Topics include training science, physiology, psychology, sports medicine, biomechanics, pedagogy, history, sociology, and sports management. Regular features of the journal include:

- Original Papers
- Review Articles
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Editor's Remarks for Supplement Containing the Annual Review of Wrestling Research



This year-end supplement contains the annotated bibliography of wrestling research I have previously published separately as the Annual Review of Wrestling Research. Each year, an annotated bibliography of the scientific research, published in English, during the year in review, is compiled and shared with those who work in the wrestling community. It is my hope that this work will spark further research, along with helping to educate those who are in a position to apply this knowledge.

Yours sincerely,

David Curby
David Curby, EdD, USA
Director INWR

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Volume 1 Supplement December 2011

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TABLE OF CONTENTS

ANNOTATED BIBLIOGRAPHY OF WRESTLING RESEACH FROM 2011	5
ANNUAL SCORING ANALYSIS OF WORLD CHAMPIONSHIPS BY PROF. DR. HAROLD TÜNNEMANN	
<i>FREESTYLE</i>	21
<i>WOMEN'S FREESTYLE</i>	32
<i>GRECO-ROMAN</i>	41
WORLD CHAMPIONSHIP 2011-ANALYSIS AND SOME RECOMMENDATIONS BY FILA PRESIDENT RAPHAËL MARTINETTI	53
STRICT APPLICATION OF THE CURRENT WRESTLING RULES (FILA Document)	56

Annotated Bibliography of Wrestling Research in 2011

Ackerman, K. E., G. S. Skrinar, E. Medvedova, M. Misra, and K. K. Miller. Estradiol Levels Predict Bone Mineral Density in Male Collegiate Athletes: A Pilot Study. *Clin. Endocrinol. (Oxf)*, 2011.

Keywords: Amenorrhea/Body Composition/Body Mass Index/Body Weight/bone/dual energy x-ray absorptiometry/Testosterone

Abstract: Objective: Strenuous training commonly results in amenorrhea, which contributes to bone loss in some female collegiate athletes. However, the impact of athletic training on endocrine function and bone mineral density (BMD) in male collegiate athletes is less well understood. The objective of the study was to investigate the specific endocrine determinants of BMD in male collegiate runners and wrestlers, including the potential impact of gonadal steroid levels. Design: Cross-sectional study Patients: 26 division I collegiate male athletes (wrestlers, runners, and golfers) Measurements: Main outcome measures included 1) BMD endpoints measured by dual energy x-ray absorptiometry (DXA); 2) endocrine endpoints: total and free estradiol, total and free testosterone; 3) body composition endpoints: fat-free and fat mass, measured by DXA; and 4) exercise endpoints: maximal oxygen uptake (VO₂ max), number of miles run weekly, and grip strength. Results: Free and total estradiol levels were important positive determinants of BMD. In contrast, total and free testosterone levels were not significant predictors of BMD at any skeletal site (except for free testosterone at the radius). In addition, fat-free mass, % ideal body weight, total body weight, body mass index (BMI), and hours per week of resistance training were positive predictors of BMD. VO₂ max was a negative predictor of BMD. Mean BMD was higher at all skeletal sites in the wrestlers compared to the runners and a comparison group (golfers). Conclusions: Our data suggest that estradiol levels, BMI, and resistance training are more important determinants of BMD in male collegiate athletes than testosterone.

Editor's Note: *The high bone mass possessed by the wrestlers is of course good news for the sport, however weight loss could be included as a factor in future studies. Such studies should also include various age groups as well as women wrestlers.*

Aghamirian, M. R. and S. A. Ghiasian. A clinico-epidemiological study on tinea gladiatorum in Iranian wrestlers and mat contamination by dermatophytes. *Mycoses* 54:248-253, 2011.

Keywords: epidemiology/Epidermophyton/mats/Tinea/transmission/Trichophyton

Abstract: Dermatophytosis is still being considered as one of the major public health problems in wrestlers. OBJECTIVES: To identify the prevalence, clinical pattern, aetiological agents and the predominant transmission route of dermatophytoses in Iranian wrestlers, a study was carried out in 2008. In total, 270 wrestlers from eight wrestling salons were evaluated. Classical mycological techniques were performed on 135 skin scraping samples of 110 wrestlers suspicious for dermatophytoses and 240 touch preparation samples of wrestling mats. Diagnosis of the fungus type was made based on macroscopical and microscopical characteristics of the colonies. 19.2% of the evaluated wrestlers were inflicted with tinea gladiatorum. The head and neck were the most prevalent (36.5%) areas of involvement, followed by arms and forearms (28.8%), trunk (21.2%), as well as groin and knee (13.5%). The mean age of patients was 21 years and the most frequent age group was 10-19 years (51.9%). Trichophyton tonsurans was the most frequently isolated species representing 82.7% of isolates, followed by T. rubrum (5.8%), T. mentagrophytes var. interdigitale and Epidermophyton floccosum (3.8% each), and T. mentagrophytes var. mentagrophytes and T. verrucosum (1.9% each). Of 24 wrestling mats surveyed, 33.3% were heavily contaminated with T. tonsurans. Tinea gladiatorum in Iran is a common phenomenon among wrestlers, transmission pattern of which appears to be through man-to-man and mat-to-man contact. Furthermore, the clinical features of the disease are not consistent with those of the general population of Iran

Editor's Note: *While a school or club can have fungal infections in check, this survey points out the need to employ measures after competition or contact with wrestlers from a different team or country.*

Anzawa, K., T. Mochizuki, A. Nishibu, H. Ishizaki, K. Kamei, Y. Takahashi, M. Fujihiro, and H. Shinoda. Molecular epidemiology of Trichophyton tonsurans strains isolated in Japan between 2006 and 2010 and their susceptibility to oral antimycotics. *Jpn. J. Infect. Dis.* 64:458-462, 2011.

Keywords: dermatology/epidemiology/Fluconazole/Griseofulvin/Itraconazole//Sports/sumo/Tinea/Tinea Capitis/Trichophyton

Abstract: Trichophyton tonsurans has been isolated among judo practitioners, wrestlers, and sumo wrestlers during an epidemic of tinea corporis and tinea capitis in Japan. A previous study using restriction fragment length

polymorphism (RFLP) analysis of the non-transcribed spacer (NTS) region of the ribosomal RNA gene revealed that different sources for the causative fungus in epidemics among judo practitioners and among wrestlers. Many different fungal strains have since been isolated from practitioners of these sports. The present study evaluated fungal characteristics of strains newly isolated between July 2006 and December 2010 using this molecular method. PCR-RFLP analysis using MvaI and AuaI was performed on 263 strains, composed of 186 isolates from judo practitioners, 32 from wrestlers, 30 from sumo wrestlers, 5 from other sports, 7 from family members or friends of the sports practitioner patients, and 3 from sporadic (non-epidemic) cases. Four molecular types, NTS I, II, III, and VII were detected. Of these, NTS I was the most predominant, occurring in 243 of 263 strains (92.4%). All of the 30 strains isolated from sumo wrestlers were classified as NTS I, suggesting that the epidemic among sumo wrestlers originated from an earlier epidemic among judo practitioners. Thirteen strains were classified as NTS II; all were related to wrestling and were isolated mainly from Chubu and Kansai areas in the central part of Honshu island. NTS III was detected in 6 strains, and one strain classified as NTS VII was isolated from a sporadic case of tinea capitis in a Peruvian immigrant. The minimum inhibitory concentrations (MICs) of terbinafine, itraconazole, fluconazole, and griseofulvin on 10 strains of NTS I and NTS II and 4 strains of NTS III were examined; there were no differences in MIC between these molecular types

Barbas, I., I. G. Fatouros, I. I. Douroudos, A. Chatzinikolaou, Y. Michailidis, D. Draganidis, A. Z. Jamurtas, M. G. Nikolaidis, C. Parotsidis, A. A. Theodorou, I. Katrabasas, K. Margonis, I. Papassotiriou, and K. Taxildaris. Physiological and performance adaptations of elite Greco-Roman wrestlers during a one-day tournament. *Eur. J. Appl. Physiol* 111:1421-1436, 2011.

Keywords: cortisol/Creatine/CreatineKinase/Epinephrine/Norepinephrine/Stress/Testosterone/Weight Loss

Abstract: The aim of this study was to determine the effects of a simulated one-day Greco-Roman wrestling tournament on selected performance and inflammatory status indices. Twelve competitive wrestlers (22.1 +/- 1.3 years) completed five matches according to the official Olympic wrestling tournament regulations following a ~6% weight loss. Performance measurements, muscle damage assessment, and blood sampling were performed before and following each match. Performance and inflammatory markers were not affected by weight loss. Mean wrestling heart rate reached ~85% of maximal and lactate concentration exceeded 17 mM. Fatigue rating demonstrated a progressive rise ($P < 0.05$) throughout the tournament, peaking in match 4. Performance demonstrated a progressive deterioration ($P < 0.05$) throughout the tournament, especially in the last two matches ($P < 0.05$), with upper-body measures exhibiting a greater decline ($P < 0.05$) and remaining below baseline ($P < 0.05$) until the end of the tournament. Muscle damage markers increased during the course of the tournament with upper limbs affected more. Creatine kinase activity, CRP levels, IL-6 concentration, and leukocyte counts increased ($P < 0.05$) progressively throughout the tournament, peaking in the last two matches. Cortisol, epinephrine and norepinephrine increased ($P < 0.05$) after each match, but testosterone declined ($P < 0.05$) progressively, reaching a nadir before the last match. This inflammatory response was accompanied by a marked increase ($p < 0.05$) in lipid peroxidation, protein oxidation, and antioxidant status markers indicating the development of oxidative stress. These results suggest that a one-day wrestling tournament may induce significant physiological demands on wrestlers that may adversely affect their performance and inflammatory status especially during the later stages of the tournament.

Editor's Note: Coaches should take note of the negative responses to competition and how they may be mediated.

Cleary, M. A., K. A. Sadowski, S. Y. Lee, G. L. Miller, and A. W. Nichols. Exertional rhabdomyolysis in an adolescent athlete during preseason conditioning: a perfect storm. *J. Strength. Cond. Res.* 25:3506-3513, 2011.

Keywords: /Creatine/Creatine Kinase/Dehydration/Pain/rehydration/urine

Abstract: The purpose of this brief review is to present a case of a healthy, male adolescent athlete (age = 16 years, body mass = 67.9 kg, height = 165.5 cm) who participated in a 3-day preseason wrestling camp which resulted in hospitalization for exertional rhabdomyolysis. As part of the preseason conditioning program directed by the coaches, the athlete completed 60 minutes of short, intense intervals of wall-sits, squats, sit-ups, push-ups, lunges, and plyometric jumps. The following day, the athlete continued his vigorous training consisting of running drills. That night he noticed voiding dark brown urine the color of cola. The day after the camp ended, the athlete reported to his Athletic Trainers with the chief complaint of severe bilateral leg pain in his quadriceps. Two days after the initial assessment, he was admitted to the hospital where he was diagnosed with exertional rhabdomyolysis based on creatine kinase (CK) levels that peaked at 146,000 IU.L, elevated far beyond normal (normal range = 58-280 IU.L). The athlete was hospitalized for 6 days where he received intravenous normal saline for rehydration, and his CK levels were assessed daily. Athletic Trainers, personal trainers, physical

education teachers, and coaches should be aware that exertional rhabdomyolysis is the most common form of rhabdomyolysis and affects individuals who participate in novel and intense exercise to which they are unaccustomed. Stressful ambient conditions may lead to dehydration and exacerbation of the condition, particularly when the individual is not accustomed to the exercise intensity.

Editor's Note: Coaches must be made aware of the possible serious consequences of extreme programs of muscular endurance to which the athletes are not accustomed.

Cotugna, N., O. S. Snider, and J. Windish. Nutrition assessment of horse-racing athletes. *J. Community Health* 36:261-264, 2011.

Keywords: Body Mass Index/Body Weight/Jockeys/Nutrition/Nutritional Status/weight/Weight Loss/

Abstract: Athletes involved in horse racing face weight restrictions like wrestlers and dancers; however, the literature is sparse pertaining to nutritional habits of jockeys. The practice of "making weight" causes these athletes to engage in potentially unhealthy practices. A gap in nutritionally sound practices and methods used by jockeys was identified and a desire for nutrition education was expressed to Cooperative Extension of Delaware by representatives of the riders at Delaware Park Race Track. Nutrition assessment was done using the Nutrition Care Process. Twenty jockeys were interviewed using an assessment form developed to target areas of disordered eating. Body mass index (BMI), mean weight loss on race day, methods of weight loss and ease of weight maintenance were examined. The jockeys were also asked for areas they wished to receive nutrition education on in the future. The BMI of the 20 jockeys ranged from 17.0 to 21.4 during racing season, with only one jockey in the "underweight" category. This range increased to 19.1-24.0 when the riders were not riding. The most common method of weight loss was the use of steam rooms, to lose an average 2.5 lb in 1 day. Eight of 20, the most common response, reported it very easy to maintain their racing weight. The jockeys reported interest in future education sessions on meal planning and healthy food ideas. The assessment was used as the basis to develop nutrition education materials and presentations for the riders at the race track

del Vecchio, F. B., S. M. Hirata, and E. Franchini. A review of time-motion analysis and combat development in mixed martial arts matches at regional level tournaments. *Percept. Mot. Skills* 112:639-648, 2011.

Keywords: Athletic Performance/competition/Competitive Behavior/judo/Martial Arts/Physical Exertion/psychology/skill/strategy/technique/Time and Motion Studies

Abstract: Mixed martial arts (MMA) have become a fast-growing worldwide expansion of martial arts competition, requiring high level of skill, physical conditioning, and strategy, and involving a synthesis of combat while standing or on the ground. This study quantified the effort-pause ratio (EP), and classified effort segments of stand-up or groundwork development to identify the number of actions performed per round in MMA matches. 52 MMA athletes participated in the study (M age = 24 yr., SD = 5; average experience in MMA = 5 yr., SD = 3). A one-way analysis of variance with repeated measurements was conducted to compare the type of action across the rounds. A chi-squared test was applied across the percentages to compare proportions of different events. Only one significant difference ($p < .05$) was observed among rounds: time in groundwork of low intensity was longer in the second compared to the third round. When the interval between rounds was not considered, the EP ratio (between high-intensity effort to low-intensity effort plus pauses) was 1:2 to 1:4. This ratio is between ratios typical for judo, wrestling, karate, and taekwondo and reflects the combination of ground and standup techniques. Most of the matches ended in the third round, involving high-intensity actions, predominantly executed during groundwork combat.

Eckner, J. T., J. S. Kutcher, and J. K. Richardson. Effect of concussion on clinically measured reaction time in 9 NCAA division I collegiate athletes: a preliminary study. *PM. R.* 3:212-218, 2011.

Keywords: Concussion/Female/Football/injuries/preparticipation physical/Reaction Time

Abstract: OBJECTIVES: To evaluate the effect of concussion on clinically measured reaction time (RT(clin)) and in comparison to a computerized reaction time measure (RT(comp)). DESIGN: Prospective, repeated measures observational study. SETTING: Athletic training clinic at a National Collegiate Athletic Association (NCAA) Division I university. PARTICIPANTS: Data are reported for 9 collegiate athletes with acute concussion who were part of a larger cohort of 209 athletes recruited from the university's football, women's soccer, and wrestling teams before the start of their respective athletic seasons. METHODS: Baseline RT(clin) and RT(comp) were measured during preparticipation physical examinations. RT(clin) measured the time required to catch a suspended vertical shaft by hand closure after its release by the examiner. RT(comp) was derived from the simple RT component of

the CogState-Sport computerized neurocognitive test battery. Athletes who subsequently sustained a physician-diagnosed concussion underwent repeated RT(clin) and RT(comp) testing within 72 hours of injury. A Wilcoxon signed rank test was used to compare baseline and after-injury RTs. **MAIN OUTCOME MEASUREMENTS:** After-injury changes in RT(clin) and RT(comp) were calculated with respect to each athlete's own preseason baseline value. **RESULTS:** After-injury RT(clin) was prolonged in 8 of the 9 athletes with concussions, whereas RT(comp) was prolonged in 5 of the 9 athletes with concussions. The mean (standard deviation) RT(clin) increased from 193 +/- 21 ms to 219 +/- 31 ms ($P = .050$), and mean RT(comp) increased from 247 +/- 75 to 462 +/- 120 ms ($P = .214$). **CONCLUSIONS:** We concluded that RT(clin) appears to be sensitive to the known prolongation of RT after concussion and compares favorably with an accepted computerized RT measure. This study supports the potential utility of RT(clin) as part of a multifaceted concussion assessment battery.

Eckner, J. T., J. S. Kutcher, and J. K. Richardson. Between-seasons test-retest reliability of clinically measured reaction time in national collegiate athletic association division I athletes. *J. Athl. Train.* 46:409-414, 2011.

Keywords: Concussion/diagnosis/Football/Physical Examination/preparticipation physical/Reaction Time/rehabilitation/season/team/Universities

Abstract: **CONTEXT:** Reaction time is typically impaired after concussion. A clinical test of reaction time (RT(clin)) that does not require a computer to administer may be a valuable tool to assist in concussion diagnosis and management. **OBJECTIVE:** To determine the test-retest reliability of RTclin measured over successive seasons in competitive collegiate athletes and to compare these results with a computerized measure of reaction time (RT(comp)). **DESIGN:** Case series with repeated measures. **SETTING:** Preparticipation physical examinations for the football, women's soccer, and wrestling teams at a single university. **Patients or Other Participants:** 102 National Collegiate Athletic Association Division I athletes. **Intervention(s):** The RT(clin) was measured using a measuring stick embedded in a weighted rubber disk that was released and caught as quickly as possible. The RT(comp) was measured using the simple reaction time component of CogState Sport. **Main Outcome Measure(s):** Data were collected at 2 time points, 1 season apart, during preparticipation physical examinations. Outcomes were mean simple RT(clin) and RT(comp). **RESULTS:** The intraclass correlation coefficient estimates from season 1 to season 2 were 0.645 for RT(clin) ($n = 102$, entire sample) and 0.512 for RT(comp) ($n = 62$ athletes who had 2 consecutive valid baseline CogState Sport test sessions). **CONCLUSIONS:** The test-retest reliability of RT(clin) over consecutive seasons compared favorably with that of a concurrently tested computerized measure of reaction time and with literature-based estimates of computerized reaction time measures. This finding supports the potential use of RT(clin) as part of a multifaceted concussion assessment battery. Further prospective study is warranted.

Farzad, B., R. Gharakhanlou, H. Agha-Alinejad, D. G. Curby, M. Bayati, M. Bahraminejad, and J. Maestu. Physiological and performance changes from the addition of a sprint interval program to wrestling training. *J. Strength. Cond. Res.* 25:2392-2399, 2011.

Keywords: adaptation/blood/competition/conditioning/cortisol/ExerciseTest/periodization/testing/Testosterone/training cycle

Abstract: Increasing the level of physical fitness for competition is the primary goal of any conditioning program for wrestlers. Wrestlers often need to peak for competitions several times over an annual training cycle. Additionally, the scheduling of these competitions does not always match an ideal periodization plan and may require a modified training program to achieve a high level of competitive fitness in a short-time frame. The purpose of this study was to examine the effects of 4 weeks of sprint-interval training (SIT) program, on selected aerobic and anaerobic performance indices, and hormonal and hematological adaptations, when added to the traditional Iranian training of wrestlers in their preseason phase. Fifteen trained wrestlers were assigned to either an experimental (EXP) or a control (CON) group. Both groups followed a traditional preparation phase consisting of learning and drilling technique, live wrestling and weight training for 4 weeks. In addition, the EXP group performed a running-based SIT protocol. The SIT consisted of 6 35-m sprints at maximum effort with a 10-second recovery between each sprint. The SIT protocol was performed in 2 sessions per week, for the 4 weeks of the study. Before and after the 4-week training program, pre and posttesting was performed on each subject on the following: a graded exercise test (GXT) to determine $\text{VO}(2)\text{max}$, the velocity associated with $\text{V}(2)\text{max}$ ($\text{nuVO}(2)\text{max}$), maximal ventilation, and peak oxygen pulse; a time to exhaustion test ($\text{T}(\text{max})$) at their $\text{nuVO}(2)\text{max}$; and 4 successive Wingate tests with a 4-minute recovery between each trial for the determination of peak and mean power output (PPO, MPO). Resting blood samples were also collected at the beginning of each pre and posttesting period, before and after the 4-week training program. The EXP group showed significant improvements in $\text{VO}(2)\text{max}$ (+5.4%), peak oxygen pulse (+7.7%) and $\text{T}(\text{max})$ (+32.2%) compared with pretesting. The EXP group produced significant increases in PPO and MPO during the Wingate testing compared with pretesting ($p < 0.05$). After the 4-week training program, total testosterone and the total testosterone/cortisol ratio

increased significantly in the EXP group, whereas cortisol tended to decrease ($p = 0.06$). The current findings indicate that the addition of an SIT program with short recovery can improve both aerobic and anaerobic performances in trained wrestlers during the preseason phase. The hormonal changes seen suggest training-induced anabolic adaptations

Fortes, M. B., B. C. Diment, F. U. Di, A. E. Gunn, J. L. Kendall, M. Esmaeelpour, and N. P. Walsh. Tear fluid osmolality as a potential marker of hydration status. *Med. Sci. Sports Exerc.* 43:1590-1597, 2011.

Keywords: Dehydration/diagnosis/Female/Fluid Therapy/hydration/hydration assessment/hydration status/Hypovolemia//Osmolar Concentration/rehydration/Sports Medicine/Tears/urine/urine specific gravity

Abstract: It has been suggested that tear fluid is isotonic with plasma, and plasma osmolality ($P(\text{osm})$) is an accepted, albeit invasive, hydration marker. Our aim was to determine whether tear fluid osmolality ($T(\text{osm})$) assessed using a new, portable, noninvasive, rapid collection and measurement device tracks hydration.

PURPOSE: This study aimed to compare changes in $T(\text{osm})$ and another widely used noninvasive marker, urine specific gravity (USG), with changes in $P(\text{osm})$ during hypertonic-hypovolemia. **METHODS:** In a randomized order, 14 healthy volunteers exercised in the heat on one occasion with fluid restriction (FR) until 1%, 2%, and 3% body mass loss (BML) and with overnight fluid restriction until 08:00 h the following day, and on another occasion with fluid intake (FI). Volunteers were rehydrated between 08:00 and 11:00 h. $T(\text{osm})$ was assessed using the TearLab osmolality system. **RESULTS:** $P(\text{osm})$ and USG increased with progressive dehydration on FR ($P < 0.001$). $T(\text{osm})$ increased significantly on FR from 293 ± 9 to 305 ± 13 mOsm.L(-1) at 3% BML and remained elevated overnight (304 ± 14 mOsm.L(-1); $P < 0.001$). $P(\text{osm})$ and $T(\text{osm})$ decreased during exercise on FI and returned to preexercise values the following morning. Rehydration restored $P(\text{osm})$, USG, and $T(\text{osm})$ to within preexercise values. The mean correlation between $T(\text{osm})$ and $P(\text{osm})$ was $r = 0.93$ and that between USG and $P(\text{osm})$ was $r = 0.72$. **CONCLUSIONS:** $T(\text{osm})$ increased with dehydration and tracked alterations in $P(\text{osm})$ with comparable utility to USG. Measuring $T(\text{osm})$ using the TearLab osmolality system may offer sports medicine practitioners, clinicians, and research investigators a practical and rapid hydration assessment technique

Editor's Note: *The assessment of hydration status is a critical element in most minimal wrestling weight programs. Many have flaws!*

Frommer, L. J., K. K. Gurka, K. M. Cross, C. D. Ingersoll, R. D. Comstock, and S. A. Saliba. Sex differences in concussion symptoms of high school athletes. *J. Athl. Train.* 46:76-84, 2011.

Keywords: Athletic Injuries/Brain Concussion/Concussion/epidemiology/females/Sex Characteristics

Abstract: **CONTEXT:** More than 1.6 million sport-related concussions occur every year in the United States, affecting greater than 5% of all high school athletes who participate in contact sports. As more females participate in sports, understanding possible differences in concussion symptoms between sexes becomes more important. **OBJECTIVE:** To compare symptoms, symptom resolution time, and time to return to sport between males and females with sport-related concussions. **DESIGN:** Descriptive epidemiology study. **SETTING:** Data were collected from 100 high schools via High School RIO (Reporting Information Online). **PATIENTS OR OTHER PARTICIPANTS:** Athletes from participating schools who sustained concussions while involved in interscholastic sports practice or competition in 9 sports (boys' football, soccer, basketball, wrestling, and baseball and girls' soccer, volleyball, basketball, and softball) during the 2005-2006 and 2006-2007 school years. A total of 812 sport concussions were reported (610 males, 202 females). **MAIN OUTCOME MEASURE(S):** Reported symptoms, symptom resolution time, and return-to-play time. **RESULTS:** No difference was found between the number of symptoms reported ($P = .30$). However, a difference was seen in the types of symptoms reported. In year 1, males reported amnesia (exact $P = .03$) and confusion/disorientation (exact $P = .04$) more frequently than did females. In year 2, males reported more amnesia (exact $P = .002$) and confusion/disorientation (exact $P = .002$) than did females, whereas females reported more drowsiness (exact $P = .02$) and sensitivity to noise (exact $P = .002$) than did males. No differences were observed for symptom resolution time ($P = .40$) or return-to-play time ($P = .43$) between sexes. **CONCLUSIONS:** The types of symptoms reported differed between sexes after sport-related concussion, but symptom resolution time and return-to-play timelines were similar.

Editor's Note: *Guidelines for concussion management are rapidly changing and evolving.*

Fry, A. C., B. K. Schilling, S. J. Fleck, and W. J. Kraemer. Relationships between competitive wrestling success and neuroendocrine responses. *J. Strength. Cond. Res.* 25:40-45, 2011.

Keywords: Athletic Performanc/Competitive Behavior/cortisol/Epinephrine/Hydrocortisone/Nervous System/Neurosecretory Systems/physiology/research/success/Sympathetic Nervous System/Testosterone

Abstract: Previous research on wrestling suggests winning wrestlers will have a greater increase in testosterone

(Tes) than losing wrestlers, although the physiological mechanism is unknown. To determine the role of the sympathetic nervous system in this phenomenon, 12 male wrestlers from an National Collegiate Athletic Association Division I program wrestled 5 matches over a 2-day period. Serum samples were collected pre (Pre) and immediately postmatch (Post) for the determination of Tes, cortisol (Cort), Tes/Cort, and epinephrine (Epi). The subjects had a combined record of 34 wins, 31 losses, and 4 ties. Testosterone increased ($p < 0.05$) for both winners and losers, but the increase was greater for winners ($X \pm SE$; nmol . L⁻¹); winners, pre = 16.4 \pm 1.2, post = 23.2 \pm 1.5; losers, pre = 14.8 \pm 1.0, post = 19.4 \pm 1.2). Cortisol and Epi increased similarly for both winners and losers, whereas the Tes/Cort ratio was unaltered at any time. Relative changes in the Epi response (%Delta) for losers were correlated to %DeltaTes ($r = 0.91$), whereas winners did not exhibit similar relationships ($r = 0.09$). These data suggest that winning wrestlers may use a different regulatory mechanism for their acute Tes responses than losers who appear to depend on sympathetic regulation. Additionally, these data from humans support the biosocial theory of status and the challenge hypothesis developed for competing males in other species

Gademan, M. G., A. Uberoi, V. V. Le, S. Mandic, E. R. van Oort, J. Myers, and V. F. Froelicher. The effect of sport on computerized electrocardiogram measurements in college athletes. *Eur. J. Cardiovasc. Prev. Rehabil.*, 2011.

Keywords: Age/analysis/Athletes/Female/females/Football/gender/Gymnastics/Heart/Heart Rate/Male/methods/Sports/testing/Universities/Water/Wrestling

Abstract: Background: Broad criteria for abnormal electrocardiogram (ECG) findings, requiring additional testing, have been recommended for preparticipation exams (PPE) of athletes. As these criteria have not considered the sport in which athletes participate, we examined the effect of sports on the computerized ECG measurements obtained in college athletes. Methods: During the Stanford 2007 PPE, computerized 12-lead ECGs (Schiller AG) were obtained in 641 athletes (350 male/291 female, age 19.5 \pm 2 years). Athletes were engaged in 22 different sports and were grouped into 16 categories: baseball/softball, basketball, crew, crosscountry, fencing, field events, football linemen, football other positions, golf, gymnastics, racquet sports, sailing, track/field, volleyball, water sports, and wrestling. The analysis focused on ECG leads V2, aVF and V5 which provide a three-dimensional representation of the heart's electrical activity. As marked ECG differences exist between males and females, the data are presented by gender. Results: In males, ANOVA analysis yielded significant ECG differences between sports for heart rate, QRS duration, QTc, J-amplitude in V2 and V5, spatial vector length (SVL) of the P wave, SVL R wave, and SVL T wave, and RS(sum) ($p < 0.05$). In females ECG differences between sports were found for heart rate, QRS duration, QRS axis and SVL T wave ($p < 0.05$). Poor correlations were found between body dimensions and ECG measurements ($r < 0.50$). Conclusions: Significant ECG changes exist between college athletes participating in different sports, and these differences were more apparent in males than females. Therefore, sport-specific ECG criteria for abnormal ECG findings should be developed to obtain a more useful approach to ECG screening in athletes.

Garcia-Pallares, J., J. M. Lopez-Gullon, X. Muriel, A. Diaz, and M. Izquierdo. Physical fitness factors to predict male Olympic wrestling performance. *Eur. J. Appl. Physiol* 111:1747-1758, 2011.

Keywords: body fat/Exercise/experience/fat-free mass/grip/jumping/metabolism/peak power/power/Running speed/strength/weight classes/Wingate test

Abstract: To determine differences in maximal strength and muscle power output of the arm and leg extensor muscles, peak and mean power during a modified standing crank-arm Wingate test, running speed, muscle extensibility, and anthropometric markers between elite and amateurs wrestlers according to the weight classes system; 92 male wrestlers were assigned into 6 groups according to their body mass (light, middle and heavy weight) and their competitive level (elite and amateur): Light Weight (body mass ranged between 55 and 68 kg) in elite (LW(E), $n = 18$) and amateur (LW(A), $n = 15$) level; Middle Weight (body mass ranged between 68 and 84 kg) in elite (MW(E), $n = 18$) and amateur (MW(A), $n = 19$) level; and Heavy Weight (body mass ranged between 84 and 100 kg) in elite (HW(E), $n = 10$) and amateur (HW(A), $n = 12$) level. Elite wrestlers were older (8-12%), had more training experience (25-37%), fat-free mass (3-5%), maximal strength in absolute and relative terms (8-25%), muscle power (14-30%), mean and peak power during crank-arm Wingate testing in absolute and relative terms (13-22%), jumping height (8-17%) as well as grip (6-19%) and back strength (7-20%) compared to amateur wrestlers. However, no differences were observed between elite and amateur groups in height, body mass index, percentage of body fat, hamstring extensibility and running speed. The present results suggest that the higher absolute and relative values of maximal strength, muscle power, and anaerobic metabolism, explained in part by the differences in lean mass and neural activation patterns, will give elite wrestlers a clear advantage during the most frequently used techniques in Olympic wrestling.

Gavett, B. E., R. A. Stern, and A. C. McKee. Chronic traumatic encephalopathy: a potential late effect of sport-related concussive and subconcussive head trauma. **Clin. Sports Med.** 30:179-88, xi, 2011.

Keywords: Amyloid beta-Peptides/Athletic Injuries/Brain Concussion/Brain Injury, Chronic/Chronic Disease/complications/diagnosis/DNA-Binding Proteins/etiology/Football/Head/head injuries/injuries/Memory/Personality/profile

Abstract: Chronic traumatic encephalopathy (CTE) is a form of neurodegeneration believed to result from repeated head injuries. Originally termed dementia pugilistica because of its association with boxing, the neuropathology of CTE was first described by Corsellis in 1973 in a case series of 15 retired boxers. CTE has recently been found to occur after other causes of repeated head trauma, suggesting that any repeated blows to the head, such as those that occur in American football, hockey, soccer, professional wrestling, and physical abuse, can also lead to neurodegenerative changes. These changes often include cerebral atrophy, cavum septi pellucidi with fenestrations, shrinkage of the mammillary bodies, dense tau immunoreactive inclusions (neurofibrillary tangles, glial tangles, and neuropil neurites), and, in some cases, a TDP-43 proteinopathy. In association with these pathologic changes, disordered memory and executive functioning, behavioral and personality disturbances (eg, apathy, depression, irritability, impulsiveness, suicidality), parkinsonism, and, occasionally, motor neuron disease are seen in affected individuals. No formal clinical or pathologic diagnostic criteria for CTE currently exist, but the distinctive neuropathologic profile of the disorder lends promise for future research into its prevention, diagnosis, and treatment

Ilkit, M., R. Gumral, M. A. Saracli, and R. Burgut. Trichophyton tonsurans scalp carriage among wrestlers in a national competition in Turkey. **Mycopathologia** 172:215-222, 2011.

Keywords: combat sport/competition/feet/Forearm/Infection/mats/Tinea/Trichophyton/trunk

Abstract: Trichophyton tonsurans tinea gladiatorum is an emerging epidemic among combat-sport athletes across the globe. In the present study, we investigated the prevalence of symptomatic and asymptomatic dermatophytic infections among wrestlers in the National Greco-Roman Championship in Turkey. In total, 194 wrestlers from 32 provinces and 72 clubs were examined for scalp, trunk, groin, and toe web dermatophytic infections. We also administered a questionnaire to obtain information on the participants' lifestyles, wrestling characteristics, and risk factors for dermatophytic infections. The hairbrush method was used for scalp and trunk sampling, whereas a cotton swab was used for groin, toe web, and mat sampling. Three wrestling mats in the gymnasium were surveyed for dermatophytes using the touch preparation method. A total of 17 (8.8%) wrestlers harbored dermatophytes, and 22 strains were isolated: 13 (59.1%) T. tonsurans and 9 (40.9%) T. rubrum. These isolates were found on the scalp (8), trunk (2), forearm (1), hand (1), groin (3), and feet (7). In addition, we recovered 8 dermatophyte strains from the 150 mat samples (5.3%): T. rubrum in 6 samples (75%) and T. tonsurans in two samples (25%). T. tonsurans was only recovered from 11 out of 194 (5.7%) wrestlers. Scalp carriage represents the predominant (72.7%) clinical picture of a T. tonsurans infection in these Greco-Roman wrestlers in Turkey.

Jang, T. R., C. L. Wu, C. M. Chang, W. Hung, S. H. Fang, and C. K. Chang. Effects of carbohydrate, branched-chain amino acids, and arginine in recovery period on the subsequent performance in wrestlers. **J. Int. Soc. Sports Nutr.** 8:21, 2011.

Keywords: Amino Acids/Glucose/Glycogen/Insulin/power/recovery/Water

Abstract: **ABSTRACT:** Many athletes need to participate in multiple events in a single day. The efficient post-exercise glycogen recovery may be critical for the performance in subsequent exercise. This study examined whether post-exercise carbohydrate supplementation could restore the performance in the subsequent simulated wrestling match. The effect of branched-chain amino acids and arginine on glucose disposal and performance was also investigated. Nine well-trained male wrestlers participated in 3 trials in a random order. Each trial contained 3 matches with a 1-hr rest between match 1 and 2, and a 2-hr rest between match 2 and 3. Each match contained 3 exercise periods interspersed with 1-min rests. The subjects alternated 10-s all-out sprints and 20-s rests in each exercise period. At the end of match 2, 3 different supplementations were consumed: 1.2 g/kg glucose (CHO trial), 1 g/kg glucose + 0.1 g/kg Arg + 0.1 g/kg BCAA (CHO+AA trial), or water (placebo trial). The peak and average power in the 3 matches was similar in the 3 trials. After the supplementation, CHO and CHO+AA trial showed significantly higher glucose and insulin, and lower glycerol and non-esterified fatty acid concentrations than the placebo trial. There was no significant difference in these biochemical parameters between the CHO and CHO+AA trials. Supplementation of carbohydrate with or without BCAA and arginine during the post-match period had no effect on the performance in the following simulated match in wrestlers. In addition, BCAA and arginine did not provide additional insulinemic effect

Jang, T. R., M. F. Kao, C. H. Chen, K. C. Hsieh, W. Y. Lai, and Y. Y. Chen. Alleviating effects of dehydration under no hyperthermia on the immunomodulatory response to the polysaccharide fraction from fu-ling (*Poria cocos*) in male collegiate wrestlers. *Chin Med. J. (Engl)* 124:530-536, 2011.

Keywords: Body Weight/chemistry/China/Dehydration/Diet/drug effects/Drugs,Chinese Herbs/Fever/Growth/hydration/hydration status/immune system/Immunologic Factors/immunology/Interferon-gamma/Interleukin-1beta/Leukocytes/Mononuclear/metabolism/Polysaccharides/Tumor Necrosis Factor-alpha/U937 Cells

Abstract: BACKGROUND: It is well known that dehydration can impair bodily functions. To evaluate the impact of hydration status under ambient environmental temperature on the immune system, 25 male collegiate wrestlers were recruited to undergo an experimental dehydration program. METHODS: Thirteen subjects had controlled diets with individual energy requirements to prevent body mass loss and restricted water intake to cause 4.52% dehydration; they formed the dehydrated group (DE). These subjects developed a urine specific gravity of about 1.030 in 84 hours. Twelve other subjects had no water restriction and maintained their total body weight comprised the euhydrated group (EU). Peripheral blood monocytes (PBMNC) were isolated after dehydration to perform immune response testing by being incubated with a polysaccharide fraction from fu-ling, *Poria cocos* (polysaccharide fraction from *Poria cocos*, PCPS, 1 - 30 poundg/L), to prepare a conditioned medium termed conditioned medium of PBMNC stimulated by PCPS (PCPS-MNC-CM). More PCPS (25 microg/L) was needed in the DE group to prepare the PCPS-MNC-CM, which was assayed with a growth inhibitory curve for treated U937 cells. RESULTS: The treated U937 cells, incubated together with PCPS-MNC-CM from the DE group, exhibited a much lower nitroblue tetrazolium (NBT) positive value of (63.7 +/- 4.7)%. The concentration of interferon-gamma (IFN-gamma), interleukin (IL)-1beta and tumor necrosis factor (TNF)-alpha in PCPS-MNC-CM from subjects after dehydration was much lower than in the CM from the EU group. CONCLUSION: The immune response to PCPS in the DE group was lower than in normally hydrated subjects

Jonasson, P., K. Halldin, J. Karlsson, O. Thoreson, J. Hvannberg, L. Sward, and A. Baranto. Prevalence of joint-related pain in the extremities and spine in five groups of top athletes. *Knee. Surg. Sports Traumatol. Arthrosc.* 19:1540-1546, 2011.

Keywords: Back/Back Pain/Cervical spine/Elbow/Extremities/hip/Joints/Knee/Low Back Pain/Neck/Pain/Shoulder/Spine

Abstract: PURPOSE: Joint-related pain conditions from the spine and extremities are common among top athletes. The frequency of back pain has, however, been studied in more detail, and the frequency of low-back pain in top athletes in different high-load sports has been reported to be as high as 85%. Sport-related pain from different joints in the extremities is, however, infrequently reported on in the literature. METHODS: Seventy-five male athletes, i.e. divers, weight-lifters, wrestlers, orienteers and ice-hockey players and 12 non-athletes (control group) were included in the study. A specific self-assessed pain-oriented questionnaire related to the cervical, thoracic and lumbar spine, as well as the various joints, i.e. shoulders, elbows, wrists, hips, knees and ankles, was filled out by the athletes and the non-athletes. RESULTS: The overall frequency of pain reported by the athletes during the last week/last year was as follows; cervical spine 35/55%; thoracic spine 22/33%; lumbar spine 50/68%; shoulder 10/21%; elbow 7/7%; wrist 7/8%; hip 15/23%; knee 22/44%; and ankle 11/25%. The corresponding values for non-athletes were cervical spine 9/36%; thoracic spine 17/33%; lumbar spine 36/50%; shoulder 0/9%; elbow 9/0%; wrist 0/0%; hip 9/16%; knee 10/9%; and ankle 0/0%. A higher percentage of athletes reported pain in almost all joint regions, but there were no statistically significant differences (n.s.), with the exception of the knees ($P = 0.05$). Over the last year, athletes reporting the highest pain frequency in the lumbar spine were ice-hockey players and, in the cervical spine, wrestlers and ice-hockey players. The highest levels of knee pain were found among wrestlers and ice-hockey players, whereas the highest levels for wrist pain were found among divers, hip pain among weight-lifters, orienteers and divers and ankle pain among orienteers. For the thoracic spine, shoulder and elbow regions, only minor differences were found. CONCLUSION: There was no statistically significant difference in prevalence of pain in the neck, spine and joints between top athletes in different sports or between athletes and non-athletes. However, pain in one spinal region was correlated to reported pain in other regions of the spine. Moreover, pain in the spine was also correlated to pain in the shoulders, hips and knees.

Kara, E., M. Ozal, M. Gunay, M. Kilic, A. K. Baltaci, and R. Mogulkoc. Effects of Exercise and Zinc Supplementation on Cytokine Release in Young Wrestlers. *Biol. Trace Elem. Res.*, 2011.

Keywords: Tumor Necrosis Factor-alpha/zinc

Abstract: The present study aims to examine the effect of zinc supplementation on the release of some cytokines in young wrestlers actively involved in wrestling. A total of 40 male subjects of the same age group were included

in the study: half were wrestlers and the other half were not involved in sports. The subjects were equally divided into four groups and treated during an 8-week period as follows: group 1, zinc-supplemented athletes; group 2, non-supplemented athletes; group 3, zinc-supplemented sedentary subjects, and group 4, non-supplemented sedentary group. Blood samples were taken from each subject at the beginning and at the end of the study period. The serum tumor necrosis factor-alpha (TNF-alpha), interleukin-2 (IL-2), and interferon-gamma levels (IFN-gamma) were determined using the enzyme-linked immunosorbent assay method. At the beginning of the study, there were no significant differences of the measured parameters between the four study groups. At the end of the study, the levels of TNF-alpha, IL-2, and IFN-gamma were significantly higher in the two zinc-supplemented groups compared to those that did not receive supplementation, regardless of the activity status ($p < 0.01$).

Kern, B. D. and T. L. Robinson. Effects of beta-alanine supplementation on performance and body composition in collegiate wrestlers and football players. **J. Strength. Cond. Res.** 25:1804-1815, 2011.

Keywords: anaerobic power/Body Composition/Football/Human/lactate/power/tests

Abstract: The purpose of this study was to examine the effectiveness of beta-alanine as an ergogenic aid in tests of anaerobic power output after 8 weeks of high-intensity interval, repeated sprint, and resistance training in previously trained collegiate wrestlers (WR) and football (FB) players. Twenty-two college WRs (19.9 +/- 1.9 years, age +/- SD) and 15 college FB players (18.6 +/- 1.5 years) participated in this double-blind, placebo-controlled study. Each subject ingested either 4 g.d beta-alanine or placebo in powdered capsule form. Subjects were tested pre and posttreatment in timed 300-yd shuttle, 90 degrees flexed-arm hang (FAH), body composition, and blood lactate after 300-yd shuttle. Although not statistically significant ($p > 0.05$) subjects taking beta-alanine achieved more desirable results on all tests compared to those on placebo. Performance improvements were greatest in the FB supplement group, decreasing 300 shuttle time by 1.1 seconds (vs. 0.4-second placebo) and increasing FAH (3.0 vs. 0.39 seconds). The wrestlers, both placebo and supplement, lost weight (as was the goal, i.e., weight bracket allowance); however, the supplement group increased lean mass by 1.1 lb, whereas the placebo group lost lean mass (-0.98 lb). Both FB groups gained weight; however, the supplement group gained an average 2.1-lb lean mass compared to 1.1 lb for placebo. Beta-Alanine appears to have the ability to augment performance and stimulate lean mass accrual in a short amount of time (8 weeks) in previously trained athletes. Training regimen may have an effect on the degree of benefit from beta-alanine supplementation.

Editor's Note: A new supplement for power athletes that needs investigation!

Kerr, Z. Y., C. L. Collins, T. L. Pommering, S. K. Fields, and R. D. Comstock. Dislocation/separation injuries among US high school athletes in 9 selected sports: 2005-2009. **Clin. J. Sport Med.** 21:101-108, 2011.

Keywords: Athletic Injuries/Dislocations//epidemiology/gender/injuries/injury prevention/Population Surveillance/Risk Factors/Sex Distribution/Shoulder

Abstract: **OBJECTIVE:** To investigate the epidemiology of dislocations/separations in a nationally representative sample of high school student-athletes participating in 9 sports. **DESIGN:** Descriptive epidemiologic study. **SETTING:** Sports injury data for the 2005-2009 academic years were collected using an Internet-based injury surveillance system, Reporting Information Online (RIO). **PARTICIPANTS:** A nationally representative sample of 100 US high schools. **ASSESSMENT OF RISK FACTORS:** Injuries sustained as a function of sport and gender. **MAIN OUTCOME MEASURES:** Dislocation/separation rates, body site, outcome, surgery, and mechanism. **RESULTS:** Dislocations/separations represented 3.6% ($n = 755$) of all injuries. The most commonly injured body sites were the shoulder (54.9%), wrist/hand (16.5%), and knee (16.0%); 18.4% of dislocations/separations were recurrences of previous injuries at the same body site; 32.3% of injuries were severe (ie, student-athletes unable to return to play within 3 weeks of the injury date), and 11.8% required surgical repair. The most common mechanisms of injury were contact with another player (52.4%) and contact with the playing surface (26.4%). Injury rates varied by sport. In gender-comparable sports, few variations in patterns of injury existed. **Rates were highest in football (2.10 per 10 000 athletic exposures) and wrestling (1.99) and lowest in baseball (0.24) and girls' soccer (0.27).** **CONCLUSIONS:** Although dislocation/separation injuries represent a relatively small proportion of all injuries sustained by high school student-athletes, the severity of these injuries indicates a need for enhanced injury prevention efforts. Developing effective targeted preventive measures depends on increasing our knowledge of dislocation/separation rates, patterns, and risk factors among high school athletes.

Kerr, Z. Y., C. L. Collins, S. K. Fields, and R. D. Comstock. Epidemiology of player--player contact injuries among US high school athletes, 2005-2009. **Clin. Pediatr. (Phila)** 50:594-603, 2011.

Keywords: epidemiology/gender/injuries/Knee/Risk Factors/

Abstract: OBJECTIVE: To investigate the epidemiology of player-player contact injuries in a nationally representative sample of US high school student-athletes. METHODS: Data from the National High School Sports-Related Injury Surveillance Study were analyzed to calculate rates, describe patterns, and evaluate potential risk factors for player-player contact injuries. RESULTS: Player-player contact injuries represented 46.4% of all high school sports injuries and occurred at a rate of 11.6 per 10,000 athlete exposures (AEs). **Player-player contact injury rates (per 10 000 AEs) were highest in football (26.0), wrestling (10.8), and girls' soccer (9.8).** Body sites most commonly injured were the ankle/foot (21.9%), head/face (18.9%), and knee (16.9%). Most common diagnoses were ligament sprains (32.5%). CONCLUSIONS: Player-player contact is the most common mechanism of injury among high school athletes. The epidemiology of such injuries varies by gender and sport. Developing effective preventive measures depends on increasing our knowledge of player-player contact injury rates, patterns, and risk factors

Khlevner, J., C. Beneri, and J. A. Morganstern. Wrestling and herpetic esophagitis. *Pediatr. Infect. Dis. J.* 30:911-912, 2011.

Keywords: Fever/herpes/Herpes Simplex/team/transmission

Abstract: Herpes simplex virus esophagitis has rarely been reported in immunocompetent children. We describe 2 immunocompetent wrestlers on the same team who presented with fever, odynophagia, and dysphagia. Histologic examination of the esophagus showed ulceration and exudate, herpes simplex virus was detected by polymerase chain reaction. We propose that wrestling may be a mode of transmission for this disease.

Editor's Note: *This is another example of why herpes gladiatorum must be taken seriously.*

Kikuchi N, Inkwan Hwang, Ryutaro Matsumoto, Dai Ueda, Seok-ki Min, Koichi Nakazato, Syouji Igawa, Is The Distribution Of Actn3 And Ace Polymorphism Associated With Athletic Performance In Japanese Wrestlers? *Medicine & Science in Sports & Exercise:* Volume 43:5 p51

Keywords: ACTN3, ACE

Abstract: α -actinin-3 (ACTN3) and angiotensin-converting enzyme (ACE) gene are two of the most studied "performance genes" and both have been associated with muscle composition, muscle strength and athletic performance. **PURPOSE:** To examine the distribution of ACTN3 and ACE genotype in 135 Japanese wrestlers. **METHODS:** We divided 135 wrestlers into international wrestler group (I-W; n=52) and college wrestler group (C-W; n=83) based on their competition results. ACTN3 and ACE genotype of wrestlers were compared with controls from Japanese college students majoring in physical education (n=368). **RESULTS:** The distribution of ACTN3 XX genotype was significantly lower in I-W compared with C-W and controls. There was no significant difference in distribution of ACTN3 genotype and allele frequency between C-W and controls. Furthermore, we proved that ACE DD genotype and D allele were significantly over-represented in wrestlers (I-W and C-W) compared with controls. **CONCLUSIONS:** The above data suggested that the distribution of ACTN3 R577X and ACE I/D genotype would be associated with Japanese elite wrestlers.
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Kordi, R., K. Neal, A. A. Pourfathollah, M. A. Mansournia, and W. A. Wallace. Risk of hepatitis B and C infections in tehranian wrestlers. *J. Athl. Train.* 46:445-450, 2011.

Keywords: bleeding/Hepatitis B/Infection/injuries/Risk/viruses

Abstract: CONTEXT: Although bloodborne infections are among the most important global health issues, limited data are available on bloodborne infections in athletes. OBJECTIVE: To determine and compare the prevalence of markers of hepatitis B (HBV) and hepatitis C (HCV) viruses and the risk factors for these infections among wrestlers in Tehran and among a control group of athletes in the same geographic area who took part in low- to moderate-contact sports (ie, volleyball and soccer). DESIGN: Case-control study. SETTING: Laboratory. Patients or Other Participants: A total of 420 male wrestlers were randomly selected from 28 wrestling clubs in Tehran using a cluster-sample-setting method. The control group (205 volleyball players from 21 clubs and 205 soccer players from 16 clubs) was selected from the same geographic area. Main Outcome Measure(s): The risk factors for HBV and HCV and serum levels of anti-HBcAg (antibodies to the HBV core antigen), HBsAg (HBV surface antigen), and anti-HCV (antibodies to HCV) in both groups. RESULTS: The prevalence of anti-HBcAg was 13.4% (95% confidence interval [CI] = 10.2%, 16.7%) in wrestlers and 10.9% (95% CI = 7.9%, 14.0%) in the control group. The prevalence of HBsAg was 1.2% (95% CI = 0.2%, 2.2%) in wrestlers and 0.5% (95% CI = -0.2%, 1.2%) in the control group. The prevalence of anti-HCV was 0.5% (95% CI = -0.2%, 1.1%) in wrestlers and 0 in the control group. Some risk factors for bloodborne infections were more common in the wrestlers than in the control

group. **CONCLUSIONS:** Within the limits of our study, we found no evidence that participation in Tehranian wrestling increased HBV or HCV transmission when compared with transmission in athletes participating in low- to moderate-contact sports. Prevention of bloodborne infections in Tehranian wrestlers should be focused not only on appropriate care for bleeding injuries but also on general risk factors for these conditions

Kordi, R., V. Ziaee, M. Rostami, and W. A. Wallace. Patterns of weight loss and supplement consumption of male wrestlers in Tehran. *Sports Med. Arthrosc. Rehabil. Ther. Technol.* 3:4, 2011.

Keywords: behavior/body fat/Dehydration/Fasting/rules/Skin/Sports/Sports Medicine/supplements/weight/Weight Loss/weight loss methods

Abstract: **BACKGROUND:** To evaluate the weight loss behavior of male wrestlers in Tehran **METHODS:** This study was a population-based cross sectional survey. Subjects were 436 wrestlers randomly selected from the wrestling clubs in Tehran employing cluster sample setting method. Subjects were interviewed based on a designed questionnaire. Body fat levels were measured based on skin fold measurements. **RESULTS:** Weight loss methods practiced by 62% of all subjects during the previous year employing rapid (≤ 7 days before the matches) and gradual (> 7 days before the matches) weight reduction methods (73% and 34% of wrestlers who reduced their weight respectively). In addition, opinions on weight reduction, the methods of weight loss used, and the side effects of the weight loss practices as well as consumption of supplements among the subjects were reported in this study. The mean percentage of body fat of subjects was 15.9%. **CONCLUSIONS:** Rapid weight loss for matches and the use of unsafe methods of weight reduction such as fasting, and fluid reduction methods as well as acute side effects of weight loss were prevalent among wrestlers in Tehran. Some preventive measures including education and new rules such as scheduling weigh-ins immediately prior to the competitions and mat-side weigh-in are needed to prevent these unhealthy practices. The weight loss behaviors of these wrestlers should be changed from using dehydration methods to using gradual methods of weight loss

Korobeynikov, G., K. Mazmanian, L. Korobeynikova, and W. Jagiello. Diagnostics of psychophysiological states and motivation in elite athletes. *Bratisl. Lek. Listy* 112:637-643, 2011.

Keywords: Female/Heart Rate/Humans/judo/Male/Martial Arts/Motivation/Personality/physiology/psychology /Psychomotor Performance/Reaction Time/success/tests

Abstract: **OBJECTIVES:** Concepts explored in our study concerned identification of various types of motivation and their connection to psychophysiological states in elite judo and Greco-Roman wrestlers. We tried to figure out how do these different types of motivation interact to describe psychophysiological state in qualified wrestlers. **METHODS:** Neuropsychological evaluation methods as simple (SRT) and choice reaction-time (CRT) tests, HRV measurements, psychological questionnaires. To explore obtained data methods of statistical analysis were used **RESULTS AND CONCLUSION:** Obtained data show that different combinations of levels of motivation to achieve success and motivation to avoid failure provoke different psychophysiological states. Conducted experiment revealed that combination of high levels of both motivation to achievement of success and motivation to avoid failure provides better psychophysiological state in elite wrestlers compared to other groups with different combinations of motivational variables. Conducted experiment revealed that motivation to avoid failures had been formed as a personality formation, which compensates excessive tension, caused by high level of motivation to achieve and regulate the psychophysiological state. This can be viewed as an effect of training in athletes (Tab. 3, Fig. 1, Ref. 38)

Lin, Z. P., Y. H. Chen, F. Chia, H. J. Wu, L. W. Lan, and J. G. Lin. Episodes of injuries and frequent usage of traditional Chinese medicine for Taiwanese elite wrestling athletes. *Am. J. Chin Med.* 39:233-241, 2011.

Keywords: Acupuncture Therapy/Medicine, Chinese Traditional/safety

Abstract: Wrestling normally places extreme demands on the body and thus may cause various kinds of injuries. An in-depth understanding of the episodes of injured sites, types, timings, and treatment modalities would help participants be aware of wrestling-related injury occurrences so as to develop effective preventive measures. Therefore, this study aims to investigate the gender-specific injuries among elite wrestling athletes. Subjects were selected from the 2009 Taiwanese National Wrestling Sport Championship. Participants were adolescent wrestling athletes, ages 16-18, who must have received at least one bronze medal at national level tournaments in 2008. A total of 118 respondents, 96 males and 22 females, completed and returned the questionnaire in which demographic data and information about the types, sites, and timings of injuries suffered and treatment modalities adopted were elicited. The data were analyzed with independent t-tests. The questionnaire results revealed a significantly higher injury rate for males than for females. The top three injured sites for males were waist (11.1%), ankle joint (10.1%) and finger (9.6%); while for females were ankle joint (13.6%), knee (12.5%) and waist (11.3%).

Contusions were the most frequent type of injury: for males (73.5%) and for females (70.6%); followed by tendon inflammation for males (10.7%) and accumulated injuries for females (15.2%). During training and matching periods, the frequency of injuries for males (69.0%) is lower than that for females (81.8%). Traditional Chinese medicine (TCM) with acupuncture and moxibustion was the most common treatment modalities used for males (51.8%) and for females (68.0%); followed by orthopedics: for males (29.5%) and for females (18.0%). The present study contributed as the first effort to reveal the potency of using TCM with acupuncture and moxibustion in wrestling competitions. To prevent possible brain and body injuries in wrestling, safety education, skills and rules, and scoring systems may require further revision. Increased training of wrestling health professionals and advanced research and development of auxiliary training devices and protective equipment for wrestling athletes are also recommended

Loenneke, J. P., J. M. Wilson, J. T. Barnes, and T. J. Pujol. Validity of the current NCAA minimum weight protocol: a brief review. *Ann. Nutr. Metab* 58:245-249, 2011.

Keywords: body fat/ Weight Loss/weight loss methods

Abstract: Historically, collegiate wrestlers have been associated with utilizing rapid weight loss methods to reach a desired weight class. Following three deaths in 1997, the National Collegiate Athletic Association (NCAA) implemented a program which prevents wrestlers from wrestling below a minimum weight (MW) of 5% body fat. Although numerous studies have investigated adolescent wrestlers, few have investigated collegiate wrestlers using the methods outlined by the NCAA. The purpose of this review paper is to outline potential problems with the current NCAA protocol as well as critique studies investigating the validity of methods to assess MW.

Editor's Note: *These programs must be evaluated and adjusted as research indicates.*

Maffulli, N., U. G. Longo, N. Gougoulis, D. Caine, and V. Denaro. Sport injuries: a review of outcomes. *Br. Med. Bull.* 97:47-80, 2011.

Keywords: Athletic Injuries/Growth Disorders/injuries

Abstract: Injuries can counter the beneficial aspects related to sports activities if an athlete is unable to continue to participate because of residual effects of injury. We provide an updated synthesis of existing clinical evidence of long-term follow-up outcome of sports injuries. A systematic computerized literature search was conducted on following databases were accessed: PubMed, Medline, Cochrane, CINAHL and Embase databases. At a young age, injury to the physis can result in limb deformities and leg-length discrepancy. Weight-bearing joints including the hip, knee and ankle are at risk of developing osteoarthritis (OA) in former athletes, after injury or in the presence of malalignment, especially in association with high impact sport. Knee injury is a risk factor for OA. Ankle ligament injuries in athletes result in incomplete recovery (up to 40% at 6 months), and OA in the long term (latency period more than 25 years). Spine pathologies are associated more commonly with certain sports (e.g. wrestling, heavy-weight lifting, gymnastics, tennis, soccer). Evolution in arthroscopy allows more accurate assessment of hip, ankle, shoulder, elbow and wrist intra-articular post-traumatic pathologies, and possibly more successful management. Few well-conducted studies are available to establish the long-term follow-up of former athletes. To assess whether benefits from sports participation outweigh the risks, future research should involve questionnaires regarding the health-related quality of life in former athletes, to be compared with the general population.

Marclay, F., E. Grata, L. Perrenoud, and M. Saugy. A one-year monitoring of nicotine use in sport: Frontier between potential performance enhancement and addiction issues. *Forensic Sci. Int.*, 2011.

Keywords: analysis/doping/Football/Gymnastics/Health/Hockey/legal/practice/Skiing/Sports/Universities/urine

Abstract: Tobacco consumption is a global epidemic responsible for a vast burden of disease. With pharmacological properties sought-after by consumers and responsible for addiction issues, nicotine is the main reason of this phenomenon. Accordingly, smokeless tobacco products are of growing popularity in sport owing to potential performance enhancing properties and absence of adverse effects on the respiratory system. Nevertheless, nicotine does not appear on the 2011 World Anti-Doping Agency (WADA) Prohibited List or Monitoring Program by lack of a comprehensive large-scale prevalence survey. Thus, this work describes a one-year monitoring study on urine specimens from professional athletes of different disciplines covering 2010 and 2011. A method for the detection and quantification of nicotine, its major metabolites (cotinine, trans-3-hydroxycotinine, nicotine-N'-oxide and cotinine-N-oxide) and minor tobacco alkaloids (anabasine, anatabine and nornicotine) was developed, relying on ultra-high pressure liquid chromatography coupled to triple quadrupole mass spectrometry (UHPLC-TQ-MS/MS). A simple and fast dilute-and-shoot sample treatment was performed,

followed by hydrophilic interaction chromatography-tandem mass spectrometry (HILIC-MS/MS) operated in positive electrospray ionization (ESI) mode with multiple reaction monitoring (MRM) data acquisition. After method validation, assessing the prevalence of nicotine consumption in sport involved analysis of 2185 urine samples, accounting for 43 different sports. Concentrations distribution of major nicotine metabolites, minor nicotine metabolites and tobacco alkaloids ranged from 10 (LLOQ) to 32,223, 6670 and 538ng/mL, respectively. Compounds of interest were detected in trace levels in 23.0% of urine specimens, with concentration levels corresponding to an exposure within the last three days for 18.3% of samples. Likewise, hypothesizing conservative concentration limits for active nicotine consumption prior and/or during sport practice (50ng/mL for nicotine, cotinine and trans-3-hydroxycotinine and 25ng/mL for nicotine-N'-oxide, cotinine-N'-oxide, anabasine, anatabine and nor nicotine) revealed a prevalence of 15.3% amongst athletes. While this number may appear lower than the worldwide smoking prevalence of around 25%, focusing the study on selected sports highlighted more alarming findings. Indeed, active nicotine consumption in ice hockey, skiing, biathlon, bobsleigh, skating, football, basketball, volleyball, rugby, American football, wrestling and gymnastics was found to range between 19.0 and 55.6%. Therefore, considering the adverse effects of smoking on the respiratory tract and numerous health threats detrimental to sport practice at top level, likelihood of smokeless tobacco consumption for performance enhancement is greatly supported.

Marttinen, R. H., D. A. Judelson, L. D. Wiersma, and J. W. Coburn. Effects of self-selected mass loss on performance and mood in collegiate wrestlers. *J. Strength. Cond. Res.* 25:1010-1015, 2011.

Keywords: Weight Loss

Abstract: Wrestlers abruptly lose body mass before competition; however, the effects of "weight cutting" are poorly understood because of conflicting evidence. This study aimed to determine the effects of self-selected mass loss on precompetition mood, grip strength, and lower body power in collegiate wrestlers. Sixteen male collegiate wrestlers (age = 20 +/- 2 years, height = 177.5 +/- 7.2 cm) were weighed 10 days before (D-10) a competitive meet. Euhydrated subjects were administered the Brunel Mood Scale (BRUMS), tested on grip strength, and given a 30-second Wingate Anaerobic Power test to determine lower body power. Additional weigh-ins were conducted 6 (D-6) and 2 (D-2) days before competition. Subjects repeated the testing battery the day of competition (D-0). During the study, wrestlers self-selected the method and timing of mass loss. Wrestlers lost 0.0-8.1% of their body mass using exercise, caloric restriction, or fluid deprivation. Most mass loss occurred between D-2 and D-0 (mean +/- SD, D-10 = 81.7 +/- 18.2 kg, D-6 = 81.2 +/- 17.8 kg, D-2 = 81.1 +/- 18.5 kg, D-0 = 79.0 +/- 19.2 kg). Wrestlers losing >= 4% body mass became significantly more confused (D-10 = 0 +/- 0, D-0 = 3 +/- 3); subjects losing less mass showed no difference in confusion. No significant differences existed across time for remaining BRUMS variables, grip strength, and Wingate variables. These results suggest that wrestlers self-select large, rapid mass loss that impairs aspects of psychological functioning without affecting grip strength or lower-body power.

Mirzaei B, Curby DG, Barbas I, Lotfi N. Anthropometric and physical fitness traits of four-time World Greco-Roman wrestling champion in relation to national norms: A case study. *J. Hum. Sport Exerc.* Vol. 6, No. 2, pp. 406-413, 2011.

Key words: ANTHROPOMETRIC CHARACTERISTICS, FITNESS, GRECO-ROMAN WRESTLING, NATIONAL NORMS.

ABSTRACT The purpose of the present investigation was to describe the anthropometric and physical fitness traits of a four-time World senior Greco-Roman wrestling champion (age: 24 years, height: 167 cm, weight: 61 kg) in relation to national norms. The anthropometric traits included body weight, height, sitting height, arm-span, and the physical fitness traits included flexibility (sit-and-reach, trunk-and-neck extension and shoulder-and-wrist elevation tests), maximal oxygen uptake (Gas analysis method), muscular endurance (pull-ups and bent-knee sit-ups), muscular strength (bench press, squat), agility (4x9 m shuttle run), speed (40-yd sprint), bilateral visual reaction time and body composition. The major results are as follows: body fat (%): 8.4; body weight (kg): 61; height (cm): 167; sitting height (cm): 89; arm-span (cm): 174; sit-and-reach (cm): 45; trunk-and-neck extension (cm/cm): 0.64; shoulder-and-wrist elevation (cm/cm): 0.54; maximal oxygen uptake (ml·kg⁻¹·min⁻¹): 56; pull-ups (reps): 50; bent-knee sit-ups (reps/min): 77; agility (s): 7.6; speed (s): 4.57; bilateral visual reaction time (ms): 229; 1RM weight lifted in the bench press relative to body weight (kg·kg⁻¹): 1.39 and 1 RM weight lifted in the squat relative to body weight (kg·kg⁻¹): 1.83. The present study indicated that measures of the squat, speed and agility tests of the subject were higher than Iranian national norms for 55 kg senior Greco-Roman style wrestling. The measures of bench press and trunk and shoulder flexibility tests were lower than the national norms. In other tests, no major difference was observed between the results of the subject's tests and national norms.
bmirzaei2000@yahoo.com

Montgomery, J. R., R. B. Carroll, and A. M. McCollum. Ocular vaccinia: a consequence of unrecognized contact transmission. *Mil. Med.* 176:699-701, 2011.

Keywords: Antiviral Agents/EyeInfections,Viral/Infection/Orthopoxvirus/SmallpoxVaccine/transmission/Trifluridine/Vaccination/vaccine/Vaccinia

Abstract: A patient developed severe ocular vaccinia via autoinoculation after acquiring unrecognized contact-transmitted vaccinia from wrestling with vaccinated members of his unit. This case highlights both the need to reinforce infection-control measures among vaccinees and the need for providers to be familiar with the identification and treatment of cutaneous and ocular vaccinia infection.

Editor's Note: *a rather obscure situation, but one that should be recognized as a possibility in wrestling circles.*

Szabolcs Lajos Molnar, Peter Lang, János Skapinyecz, Babak Shadgan, Dislocation of the ulnar nerve at the elbow in an elite wrestler, *BMJ Case Reports* 2011; doi:10.1136/bcr.02.2011.3806

Summary: Dislocation of the ulnar nerve is uncommon among the general population, but it has been reported more frequently in athletes who use their upper limbs to make forceful and resisted flexion of elbow joint. The authors report a unique case of ulnar nerve dislocation in an elite wrestler treated by partial epicondylectomy and subcutaneous transposition of the ulnar nerve. Following the surgery, a supervised and well-designed sport-specific rehabilitation program is a necessary requirement for a rapid return to sport. Such a program requires a bilateral consultation and collaboration between treating physician and trainer of the wrestler. The athlete regained his full function and returned to wrestling after a 3-month sport-specific functional rehabilitation program. szabolcsmolnandr@gmail.com

Moreno, E. The society of our "out of Africa" ancestors (I): The migrant warriors that colonized the world. *Commun. Integr. Biol.* 4:163-170, 2011.

Abstract: The "out of Africa" hypothesis proposes that a small group of Homo sapiens left Africa 80,000 years ago, spreading the mitochondrial haplotype L3 throughout the Earth. Little effort has been made to try to reconstruct the society and culture of the tribe that left Africa to populate the rest of the world. I find that hunter-gatherers that belong to mitochondrial haplotypes L0, L1 and L2 do not have a culture of ritualized fights. In contrast to this, almost all L3 derived hunter-gatherers have a more belligerent culture that includes ritualized fights such as wrestling, stick fights or headhunting expeditions. This appears to be independent of their environment because ritualized fights occur in all climates, from the tropics to the arctic. There is also a correlation between mitochondrial haplotypes and warfare propensity or the use of murder and suicide to resolve conflicts. The data implicate that the original human population outside Africa is descended from only two closely related sub-branches that practiced ritual fighting and had a higher propensity towards warfare and the use of murder for conflict resolution. This warfare culture may have given the out of Africa migrants a competitive advantage to colonize the world. But it could also have crucially influenced the subsequent history of The Earth. In the future, it would be interesting to see how we could further reconstruct the society and culture of the "Out of Africa Tribe."

Omalu, B., J. Bailes, R. L. Hamilton, M. I. Kamboh, J. Hammers, M. Case, and R. Fitzsimmons. Emerging histomorphologic phenotypes of chronic traumatic encephalopathy in American athletes. *Neurosurgery* 69:173-183, 2011.

Keywords: Brain Cortex/Football/Genotype /Neurofibrillary Tangles

Abstract: **BACKGROUND:** We define chronic traumatic encephalopathy (CTE) as a progressive neurodegenerative syndrome caused by single, episodic, or repetitive blunt force impacts to the head and transfer of acceleration-deceleration forces to the brain. **OBJECTIVE:** We present emerging histomorphologic phenotypes of CTE that we identified in our cohort of CTE cases with apolipoprotein E genotyping and causes and manners of death. **METHODS:** Autopsy brain tissue of 14 professional athletes and 3 high school football players was examined after unexpected deaths. Histochemical and immunohistochemical tissue staining was performed with apolipoprotein E genotyping. **RESULTS:** Ten of 14 professional athletes (71%) were positive for CTE: 7 of 8 football players, 2 of 4 wrestlers, and 1 boxer. One of 3 high school players manifested incipient CTE. The age range of those with CTE was 18 to 52 years; they were all male athletes. In all cases of CTE, Alzheimer-type cerebral cortical atrophy was absent; negligible to mild neocortical neuronal dropout was present. The

fundamental neuropathologic feature of CTE was the topographic distribution of sparse, moderate, and frequent band-shaped, flame-shaped, small and large globose neurofibrillary tangles and neuritic threads in the cerebral cortex, subcortical nuclei/basal ganglia, hippocampus, and brainstem nuclei. Sparse to frequent diffuse amyloid plaques may accompany tauopathy and was seen in only 2 CTE cases. No alpha-synucleinopathy was present. All 7 CTE-positive professional athletes with known apolipoprotein E genotypes had at least 1 E3 allele comprising 5 E3/E3 (71%) and 2 E3/E4 (29%). Alcohol- and drug-related deaths, suicides, and accidental deaths were overrepresented in our CTE cohort. **CONCLUSION:** The emerging histomorphologic features of our CTE cohort may specify histologic criteria for CTE diagnosis, may identify emerging histologic variants of CTE and may facilitate more objective surveillance and accurate identification of sentinel CTE cases

Pallares, J. G., J. M. Lopez-Gullon, M. D. Torres-Bonete, and M. Izquierdo. Physical fitness factors to predict female Olympic wrestling performance and gender differences. *J. Strength. Cond. Res.*, 2011.

Keywords: analysis/Back/Body

Composition/experience/Female/females/gender/grip/Health/jumping/Male/metabolism/methods/muscle/neuromuscular/peak power/Physical Fitness/physiology/power/research/sport science/strength/success

Abstract: To determine differences in anthropometric, body composition, physiological and neuromuscular markers between elite and amateur female wrestlers; 35 female wrestlers were assigned into 4 groups according to their body mass (light and middle weight) and their competitive level (elite and amateur): Light Weight (between 49-58 kg) in elite (LWE, n=6) and amateur (LWA, n=12) level; and Middle Weight (between 58-67 kg) in elite (MWE, n=7) and amateur (MWA, n=10) level. A binary logistic regression analysis was performed to identify which variables better predict female wrestling successes. Elite female wrestlers were older (8%-10%), had more training experience (27%-29%), fat free mass (FFM) (3%), maximum strength in absolute and allometrically scaled values (13%-33%), maximal muscle power (16%-34%), mean and peak power during an arm-crank Wingate testing in absolute and allometrically scaled values (17%-23%), jumping height (2%-9%) as well as grip (5%-13%) and back isometric strength (10%-13%) compared to amateur wrestlers ($p < 0.05$). When the results of the present research and those of a recent study performed in our laboratory with elite male wrestlers were compared, elite females presented lower ($p < 0.05$) maximum isometric and dynamic strength, muscle power output as well as anaerobic metabolism values even when these data were normalized using allometric methods

Panov, S. F. and A. A. Pleshakov. [Effect of steam bath on gastric secretion and some endocrine changes of athlete-fighters]. *Fiziol. Cheloveka* 37:92-99, 2011.

Keywords: cortisol/Endocrine System/Gastric Juice/Gastric Mucosa /Steam Bath

Abstract: The issues of adaptation of the gastric glands to thermal load (steam bath) of athlete-fighters. The differences in adaptation to thermal load of gastric glands in connection with a weight category, seniority and age of athletes. Discovered the relationship in reaction to thermal load of gastric and endocrine glands. The stability of steam bath of gastric glands in the middle weight class athlete-fighters combined with the preservation of endocrine homeostasis. The high sensitivity of athlete-fighters of light and middleweight category combined with an authentic increase in serum of blood the concentrations of gastric and aldosterone, and with decrease the concentrations of cortisol.

Passelergue, P. A. and G. Lac. "SALIVARY HORMONAL RESPONSES AND PERFORMANCE CHANGES DURING 15 WEEKS OF MIXED AEROBIC AND WEIGHT TRAINING IN ELITE JUNIOR WRESTLERS". *J. Strength. Cond. Res.*, 2011.

Keywords: Saliva/Testosterone

Abstract: In order to prepare efficiently for competition, wrestlers usually train physically for a period of approximately 12 to 20 weeks. Numerous physical qualities must be developed during this period of preparation: aerobic fitness, maximal strength, muscular endurance, power and speed. However, numerous studies have concluded that it is difficult to concurrently develop strength and aerobic fitness for several reasons, in particular antagonistic endocrine variations. The study involved 15 elite junior wrestlers who trained at a sports training school for 15 weeks. To investigate the effects of long-term training and to assess the relationships between hormonal concentrations (salivary testosterone and cortisol) and performance changes during simultaneous strength and aerobic fitness training, six saliva samples and three physical tests and two measures of body composition were made during the training period. Wrestlers had a significant increase (+1.5 kg) in body weight without changes in percentage body fat. Apart from the 20-m Maximal Shuttle Speed, all performances increased significantly during the 15 weeks training: maximum mechanical power output (Pmax: + 12.8%), mean power during 30 seconds (Pmean: + 10.8%), bench press (+5.7%), squat (+ 23.1%), power clean (+6.1%), time to 3000-

m and 30-m sprint (-3.6%, -1.3% respectively). During the period that the cortisol increased, there was no significant variation for the testosterone. The testosterone/cortisol ratio (T/C) followed a variation pattern contrary to that of the cortisol. We found strong correlations between salivary testosterone, cortisol and T/C and the variation in explosive strength. Our results suggest that data about subjects' salivary cortisol, testosterone and T/C may be employed to optimize the training process for sports people who need to develop strength and aerobic fitness simultaneously

Popovic, D., S. Damjanovic, V. Markovic, B. Vujisic-Tesic, M. Petrovic, I. Nedeljkovic, A. Arandjelovic, B. Popovic, B. Jakovljevic, S. Stojilkovic, and S. M. Ostojic. Systolic right ventricular adaptive changes in athletes as predictors of the maximal functional capacity: a pulsed tissue Doppler study. *J. Sports Med. Phys. Fitness* 51:452-461, 2011.

Keywords: adaptation/cardiology

Abstract: AIM: The aim of this study was to extend the analysis of the systolic right ventricular (RV) adaptation to combined endurance and strength training, to assess the utility of tissue Doppler imaging in detecting the degree of these changes and to find independent RV predictors of the maximal functional capacity. METHODS: Standard Doppler and TDI were used to assess cardiac parameters at rest in 37 elite male athletes (16 wrestlers, 21 water polo players) and 20 sedentary subjects of similar age. Progressive maximal test on treadmill was used to assess VO₂max. The obtained parameters were adjusted for HR, FFM, and BSA. RESULTS: Wrestlers showed higher VO₂max than controls, but lesser than water polo players. RV diameter was larger in athletes. Right atrial pressure (RVE/e) was higher in water polo players than in other groups. Systolic function assessed by tricuspid annular plane systolic excursion (TAPSE) and RVs' was the highest in wrestlers. Global RV systolic parameters myocardial performance index (MPI) and preejection time/ejection time index (PET/ET) were similar. On multivariate analysis systolic parameters were independent predictors of VO₂max only in wrestlers: RVs' (beta=3.18, P=0.001) and RV ET (beta=2.32, P=0.001). RVE/e' correlated with RVs' (r=-0.57, P=0.000). TAPSE correlated with RV ET (r=0.32, P=0.015) and RVs' (beta=0.28, P=0.033). CONCLUSION: Systolic function assessed by TAPSE and RVs' has more improved in less endurance athletes. RVs' and TDI ejection time predict VO₂max in wrestlers, and possibly in other athletes with lesser right atrial pressure. TDI enables quantifying RV adaptation degree in athletes, but complementary to M-mode technique

Popovic, D., M. C. Ostojic, M. Petrovic, B. Vujisic-Tesic, B. Popovic, I. Nedeljkovic, A. Arandjelovic, B. Jakovljevic, V. Stojanov, and S. Damjanovic. Assessment of the left ventricular chamber stiffness in athletes. *Echocardiography*. 28:276-287, 2011.

Keywords: cardiology/Echocardiography/Elasticity Imaging Techniques/Left ventricular hypertrophy/ultrasonography/Ventricular Function

Abstract: Since diastolic dysfunction is an early sign of the heart disease, detecting diastolic disturbances is predicted to be the way for early recognizing underlying heart disease in athletes. So-called chamber stiffness index (E/e')/LVDD was predicted to be useful in distinguishing physiological from pathological left ventricular hypertrophy, because it was shown to be reduced in athletes. It remains unknown whether it is reduced in all athletic population. Standard and tissue Doppler were used to assess cardiac parameters at rest in 16 elite male wrestlers, 21 water polo player, and 20 sedentary subjects of similar age. In addition to (E/e')/LVDD index, a novel (E/e')/LVV, (E/e')/RVE'lat indices were determined. Progressive continuous maximal test on treadmill was used to assess the functional capacity. VO(2) max was the highest in water polo players, and higher in wrestlers than in controls. LVDD, LVV, LVM/BH(2.7) were higher in athletes. Left ventricular early diastolic filling velocity, deceleration and isovolumetric relaxation time did not differ. End-systolic wall stress was significantly higher in water polo players. RV e' was lower in water polo athletes. Right atrial pressure (RVE/e') was the highest in water polo athletes. (E/e'lat)/LVDD was not reduced in athletes comparing to controls (water polo players 0.83 +/- 0.39, wrestlers 0.73 +/- 0.29, controls 0.70 +/- 0.28; P = 0.52), but (E/e's)/RVE'lat better distinguished examined groups (water polo players 0.48 +/- 0.37, wrestlers 0.28 +/- 0.15, controls 0.25 +/- 0.16, P = 0.015) and it was the only index which predicted VO(2) max. In conclusion, intensive training does not necessarily reduce (E/e'lat)/LVDD index. A novel index (E/e's)/RVE'lat should be investigated furthermore in detecting diastolic adaptive changes

Thiel, A., K. Diehl, K. E. Giel, A. Schnell, A. M. Schubring, J. Mayer, S. Zipfel, and S. Schneider. The German Young Olympic Athletes' Lifestyle and Health Management Study (GOAL Study): design of a mixed-method study. *BMC. Public Health* 11:410, 2011.

Keywords: behavior/coaching/competition/culture/Germany/Gymnastics/Health/Nutrition/promotion/research/Risk/sport

science/Sports/strategy/team/training

Abstract: BACKGROUND: In order to perform at top levels, elite athletes have to both protect and risk their health at the same time. Adolescent elite athletes have the additional challenge of coping with substantial physical, psychological and social transformations. The contradictory phenomenon of protecting and risking the adolescent athletes' health in sports challenges the development of health promotion and protection strategies. The GOAL Study (German Young Olympic Athletes' Lifestyle and Health Management Study) analyzes the individual and organizational management of health in adolescent elite sports. METHODS/DESIGN: We combine quantitative and qualitative approaches in a mixed-method study. This allows us to gather a broad range of representative information on squad athletes from all Olympic disciplines as well as in-depth information on four selected Olympic disciplines (artistic gymnastics, biathlon, handball and wrestling). Within the quantitative section we attempt to identify the young athletes' health and nutrition behavior, their subjective health state and their lay health representations, health-related social networks, and structures of medical attendance. 1138 national team level athletes born between 1992 and 1995 from 51 Olympic disciplines responded to the questionnaire (response rate: 61,75%). The qualitative section investigates the meaning and relevance of health and nutrition within the athletes' sports specific surroundings, the impact of biographic backgrounds on individual health behavior, and sports specific cultures of health, nutrition and risk. We interviewed 24 athletes and 28 coaching and medical experts, and carried out 14 multi-day participant observations at training sessions and competitions. CONCLUSIONS: The studies' results will serve as the basis for developing tailored health promotion strategies to be in cooperation with German elite sports associations.

Utter, A. C., S. R. McAnulty, B. F. Riha, B. A. Pratt, and J. M. Grose. The validity of multi-frequency bioelectrical impedance measures to detect changes in the hydration status of wrestlers during acute dehydration and rehydration. *J. Strength. Cond. Res.*, 2011.

Keywords: Age/analysis/Body Water/Body Weight/Dehydration/hydration/hydration status/NCAA/rehydration/season/total body water/urine/urine specific gravity/Water/weight

Abstract: The objective of this study was to examine the validity of multi-frequency direct segmental bioelectrical impedance analysis (DSM-BIA) measures to detect changes in the hydration status of wrestlers after undergoing 3% acute dehydration and a 2-h rehydration period. 56 NCAA wrestlers: (mean +/- SEM); age 19.5 +/- 0.2 years, height 1.73 +/- 0.01 m, body mass (BM) 82.5 +/- 2.3 kg were tested in euhydrated, dehydrated (-3.5%), and a 2-h rehydration conditions using DSM-BIA to detect changes in hydration status. Hydration status was quantified by measuring changes in plasma osmolality (Posm), urine osmolality (Uosm), urine specific gravity (Usg), BM and weighted segmental impedance at frequencies of 5, 20, 50, 100, and 500 KHz. Weighted segmental impedance significantly increased after a 3.5% reduction in body weight for all five frequencies evaluated, but did not return to baseline at 2-h rehydration. Posm (303 +/- 0.6 mOsm.L), Uosm (617 +/- 47 mOsm.L) and Usg (1.017 +/- 0.001) all significantly increased at post-dehydration and returned to baseline at 2-h rehydration. Estimations of extracellular water (ECW) were significantly different throughout the trial, but there were no significant changes in estimations of total body water (TBW) or intracellular water (ICW). Results of the present study demonstrate the potential use of DSM-BIA as a field measure to assess the hydration status of wrestlers for the purpose of minimal weight certification prior to the competitive season. When employing DSM-BIA to assess hydration status, results indicated that changes in weighted segmental impedance at the frequencies evaluated (5, 20, 50, 100, and 500 KHz) are sensitive to acute changes in dehydration, but lag behind changes in the standard physiological (plasma and urinary) markers of hydration status after a 2-h rehydration period.

Editor's Note: *The search for valid, reliable and practical methods to assess hydration continues!*

Ziyagil, M. A. Handedness and footedness: relations to differences in sprinting speed and multiple sprints performance in prepubertal boys. *Percept. Mot. Skills* 112:440-450, 2011.

Keywords: Acceleration/Age/Anthropometry/Aptitude/Arm/Athletic Performance/Brain/Child/Education/experience/Functional Laterality/Humans/Leg/Male/physical education/psychology/Running/skill/speed/Sports/strength/training/Universities/Wrestling

Abstract: Physical performance and movement skills are differentiated by brain hemispheric dominance. Relations of handedness and footedness to differences in sprint speed and multiple sprints performances were investigated in 362 prepubertal, male, novice wrestlers. Participants with two months of irregular training experience were grouped by hand and foot preferences and matched on age and anthropometry. Mean running speed was associated with the number of sprints and handedness, but not with footedness. The decrease in sprint speed was less for right-handed subjects, who also had better sprinting speed and multiple sprint performance. Symmetrical arm and leg strength development for left-handers should be emphasized.

SCORING ANALYSIS OF THE 2011 WORLD CHAMPIONSHIPS IN FREESTYLE WRESTLING

Professor Dr. Harold Tünnemann

1. Current tendencies in combat behaviour of the Senior- Junior- and Cadet World Championships 2011 one year before the Olympic Games in London

The Turkish Wrestling Federation organized very successful this very important Senior World Championships and gave 900 competitors from 104 countries excellent possibilities for winning the first quota places for the Olympic Games in London. Also the Wrestling Federations of Rumania and Hungary organized perfect World Championships in 2011 for the Olympic hopes within the three Olympic Wrestling styles.

Therefore we move into the centre of our analysis the following two aspects:

- The quality of wrestling of the promising young athletes in Freestyle wrestling
- The quality of wrestling of the qualified athletes for the Olympic Games

1.1. Analysis of the Cadet World Championships 2011 in Szombathely

The young athletes showed already a very good and spectacular technical tactical combat behaviour. As an example we can see the attractive offensive strategies, brilliant techniques and the fighting spirit up to the end of the situation and up to the end of the bout (clip 1). The leading nations of senior Freestyle wrestling are dominating already the Cadet World Championships (Fig.1).

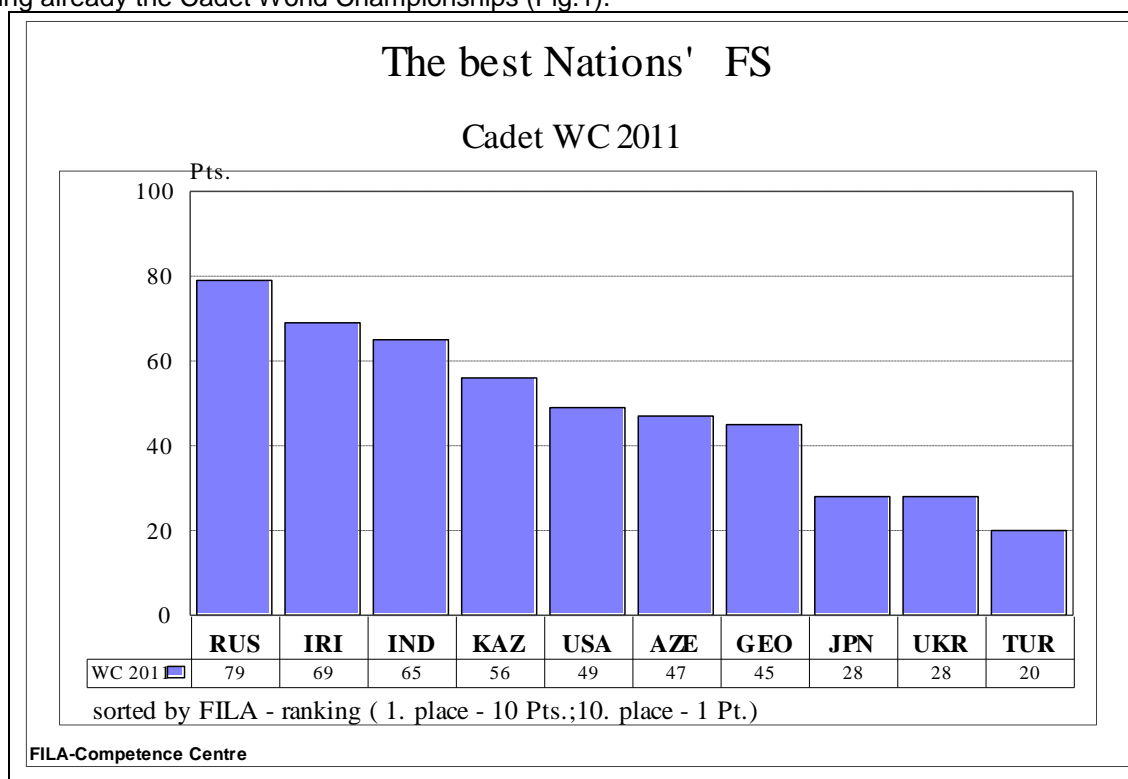


Fig.1 Best nations Cadet WC Freestyle

This is the proof of dedicated and successful work with the young wrestling generation of these nations. It is of course no surprise that in this age group the portion of the shoulder victories are higher than in the other age groups (Cadet WC 35 that means 14%, Junior WC 29 that means 12% and Senior WC 28 that means 8%) (clip2).

Particularly noteworthy is the successful work of the coaches from Russia, Iran, and India which together with the established countries, Kazakhstan, USA, Azerbaijan and Georgia belonging to the top seven nations.

Another proof of the technical tactical attractiveness at the Cadet World Championships is the realized number of technical points per minute. This is true both for the most successful nations as well as for the world champions.

By far the best quality reaches the team of Russia (1.75 points per minute), followed by Iran (1.67), Japan (1.49), Azerbaijan (1.27), Ukraine (1.24) and Georgia with 1.23 points/ minutes (Fig. 2).

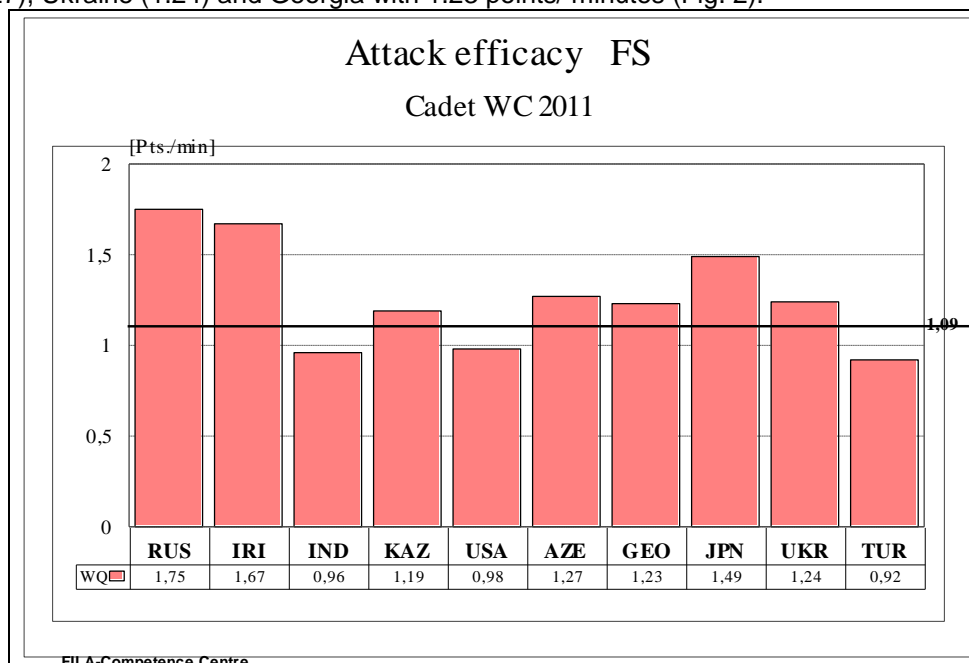


Fig. 2 Attack efficacy of the best countries Cadet WC Freestyle

The world champions achieve even better results (Fig. 3). Fantastic is the attack efficacy of Zaur Uguev RUS (42kg) with a WQ of 3.72 points per minute and Vladimir Kudin KAZ (46kg) with a value of 3.03 (Fig 3). A closer look at this figure indicates attention to the surprisingly good defense actions of the Cadets World Champions. This is also the reason for the excellent performance index of these two young wrestlers, where the attack and defense skills have to be set in a ratio (3.63 and 2.88).

But the outstanding technical and tactical performances of Adam Coon USA (100kg) with an index from 1.89, Magomedgadzhi Imanshapiev RUS (69kg) with an index from 2.21 (he let his opponents not a single point), Gadshimurad Rashidov (RUS) and Hatam Aliakbarzadeh (IRI) should not go unmentioned in this respect.

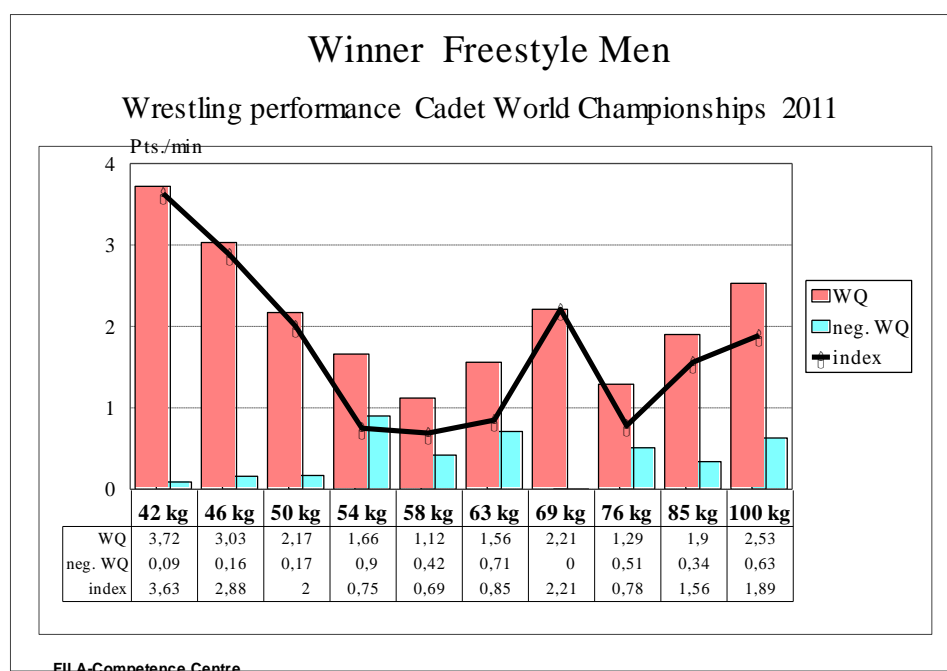


Fig. 3 Quality of wrestling of the Cadet Freestyle World champions

1.2 Analysis of the Junior World Championships 2011 in Bucharest

Already last year we found in the analysis of the Junior World Championships that the best athletes in this age group already have a very high level of the technical and tactical mastery. This observation corresponds also totally with this year's Junior World Championship in Bucharest. And as for the fighting spirit and toughness the juniors are as good as the senior athletes as shown by the following video examples (clip 3, 4 and 5).

As with the cadets, so superior even at the juniors, the Russian boys took first place in the team standing won with 56 points. Congratulation also to the young wrestlers from Georgia, Iran, Turkey, and Azerbaijan, which occupied the farther places (Fig. 4)! A pleasing feature is that the excellent technical school of Moldova was rewarded with 10th place in Bucharest.

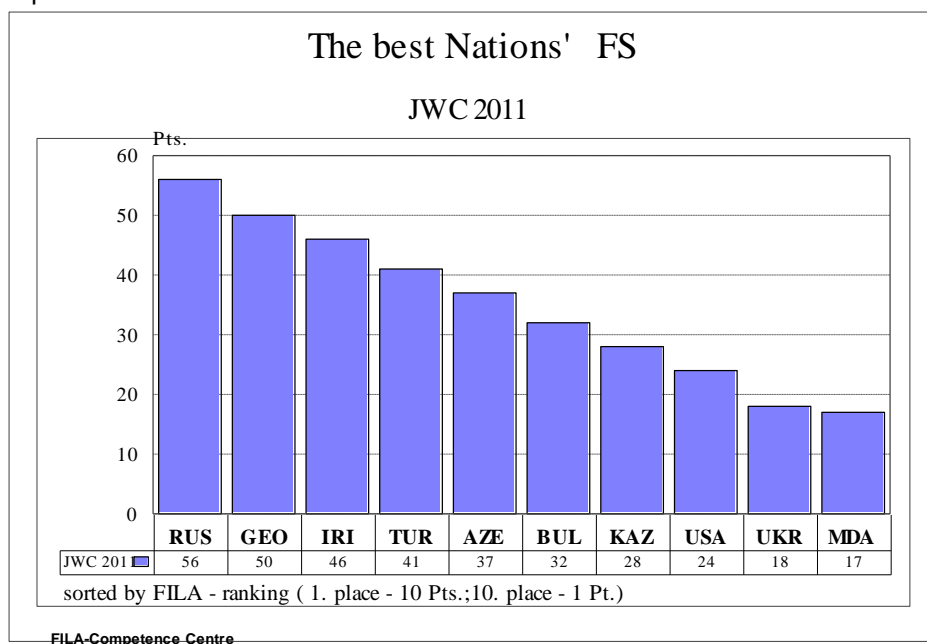


Fig. 4 Best nations of the Junior World Championships 2011 Freestyle

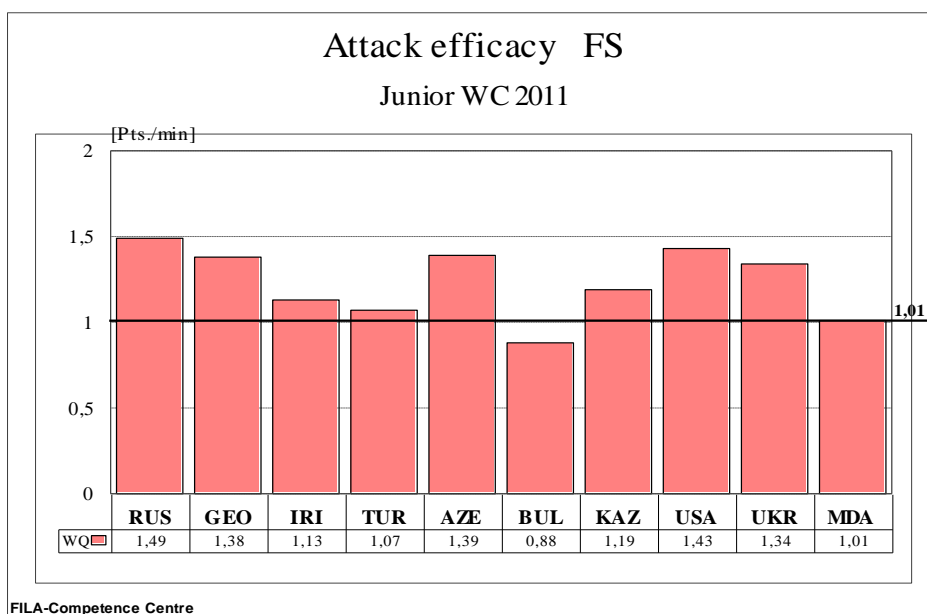


Fig. 5 Attack efficacy of the best countries Junior WC Freestyle

When considering the quality of the attack actions we have the same image as for the team standing. Outstanding is the very good value by Russia (1.49 points per minute) followed by USA (1.43), Azerbaijan (1.39), Georgia

(1.38) and Ukraine (1.34). Interesting that other countries like Kazakhstan, Iran and Turkey reached more than 1.01 point per minute in the attack, the average of all participants in the attack (Fig. 5).

The efficacy of the attack actions awards especially the world champion Dato Marsagishvili 84kg (GEO) with almost 3 points per minute (Fig. 6). Also achieve very good results in this respect, the world champion Magomedaliyev (RUS) 50kg, Vladimr Khinchegashvili (GEO) 55kg, Tamerian Akhmedov (RUS) 74kg and Jaber Sadeghzadehnoukoulai (IRI) 120kg. These world champions already have excellent defensive skills. This is also the reason for their excellent technical and tactical overall results (performance index). Jaber Sadeghzadehnoukoulai (IRI) let his opponents not a single point!

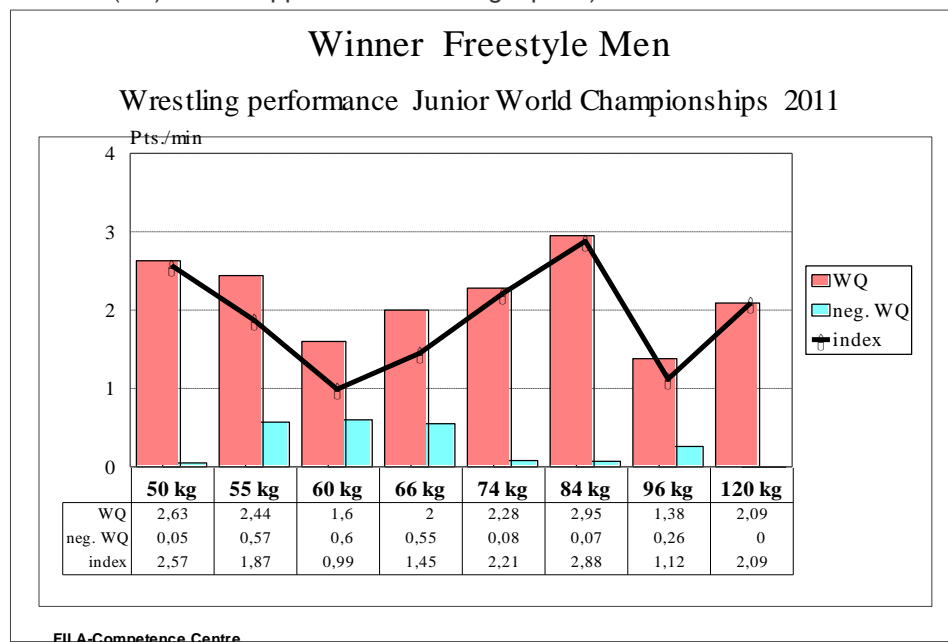


Fig. 6 Quality of wrestling of the winner Junior WC Freestyle

1.3 Qualitative analysis of combat behaviour in comparison between Senior, Junior and Cadet World Championships

A look at the quality of the realized points of all participants of the three world championships once again confirmed previous findings (Fig. 7). The cadets reached 9.1 points per bout, the junior 8.0 and the senior 7.0. The seniors realize fewer 3 - and 2-point scores, and more 1-point scores than the young generation. A similar trend is reflected in the analysis of the attack effectiveness as a measure of technical tactical attractiveness of wrestling.

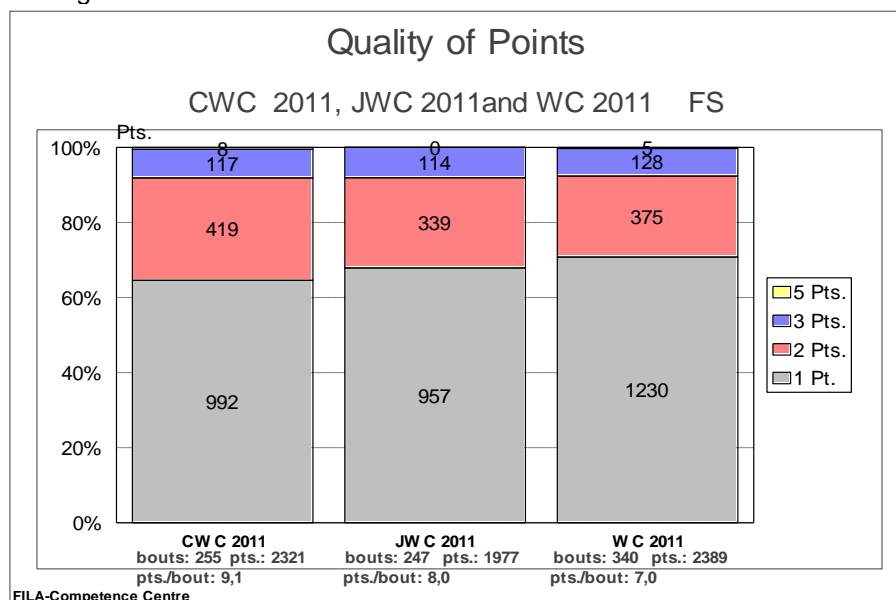


Fig. 7 Quality of points Cadet-, Junior and Senior World Championships 2011

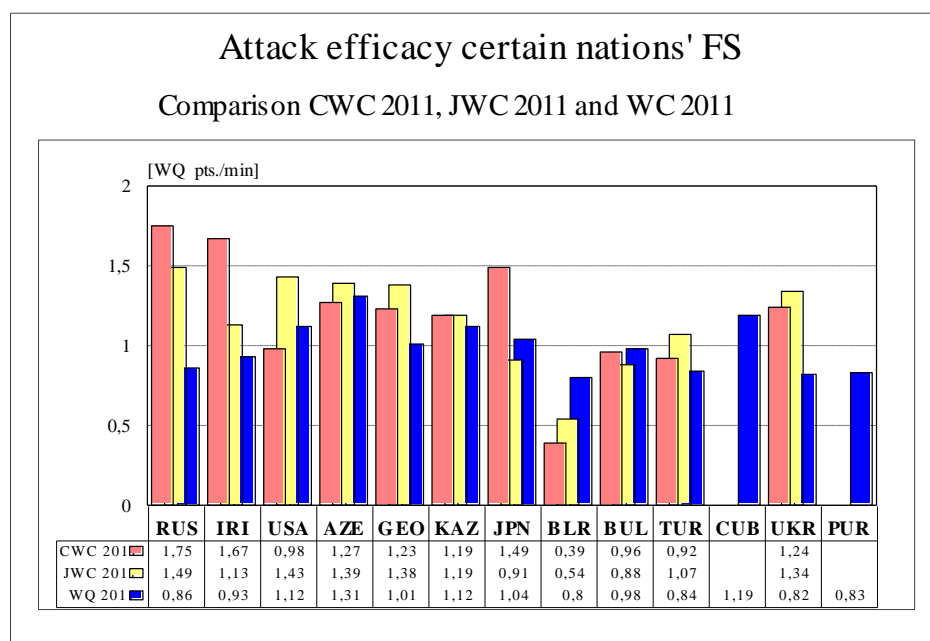


Fig. 8 Country specific attack efficacy Cadet-, Junior and Senior World Championships 2011

Participants in the Cadet World Championships with attack actions achieve average 1.09 points per minute, the junior 1.01 and seniors only 0.84 points per minute. Of course there are differences between the countries. In contrast to the Women's World Championships, reached the one country in all three age groups, the best quality values (Japan), this is achieved in the freestyle men not a single country (Fig.8).

Young talents from Russia, Iran, and Japan achieve top marks in attack by the cadets, there are in the juniors Russia, USA, Azerbaijan, Georgia and Ukraine and among the seniors Azerbaijan, Cuba, USA and Kazakhstan are the best in attack efficacy 2011.

2. Analysis of the Freestyle World Championships in Istanbul from the point of the first Qualification for the Olympic Games in London

2.1 Combat behavior of the nations

Russia, Iran, USA, Azerbaijan, Georgia and Kazakhstan have been the most powerful countries in 2011 (Fig 9).

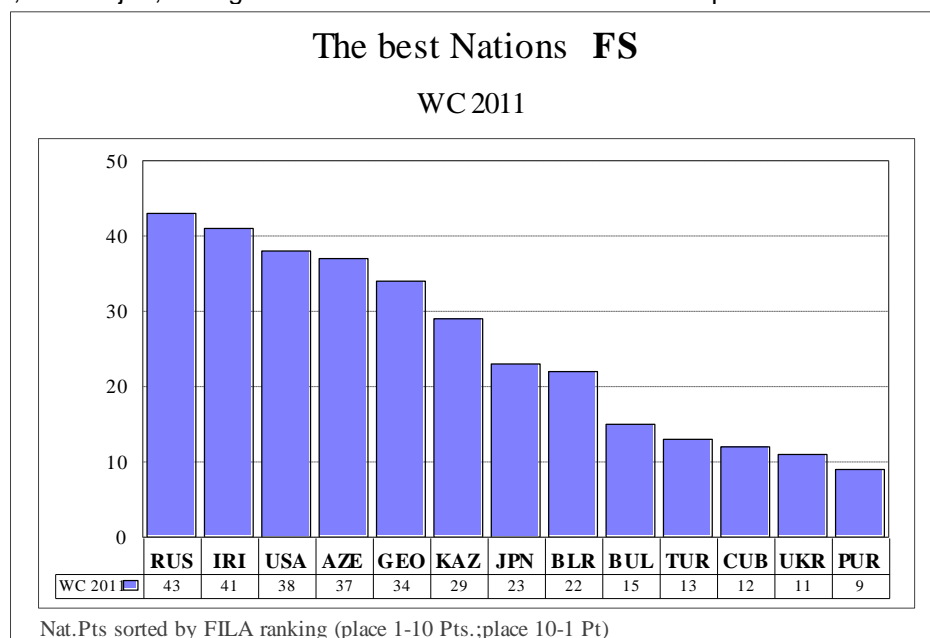


Fig. 9 Best nations of Istanbul

Compared to 2010 were USA, Iran, Georgia, Kazakhstan, Japan and Belarus could improve their results yet, while Russia, Cuba and Azerbaijan had suffered losses (Fig. 10).

But of course, the athletes in the world championships 2011 were under very considerable pressure to succeed at as many qualifications for the Olympic Games in London. Nevertheless, we have seen very exciting bouts (clip 6).

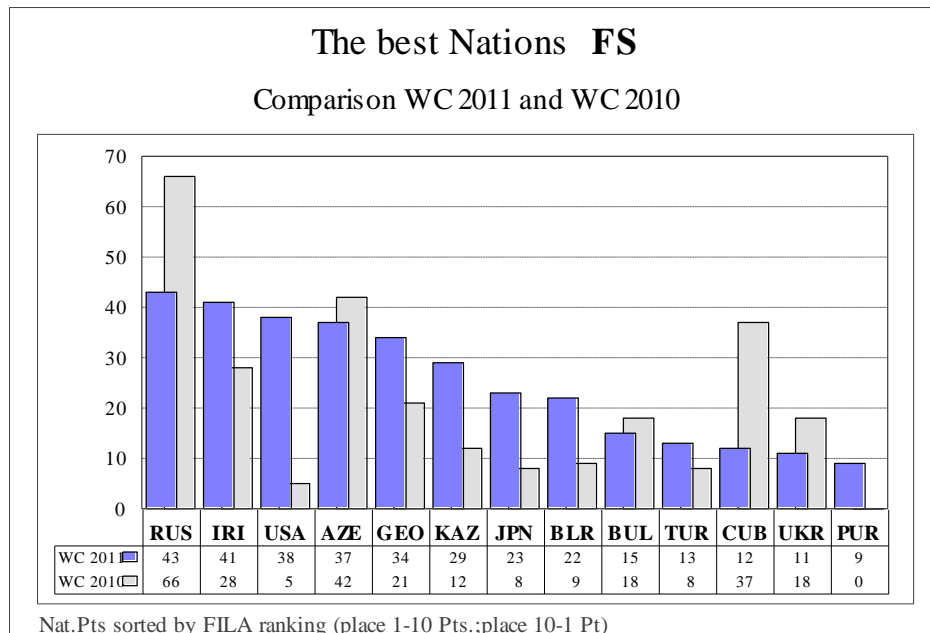


Fig. 10 Best nations of Istanbul 2011 in comparison to 2010

19 countries were able to win the 42 to be allocated quota places (Tab. 1).

Although no country has managed to reach all seven quota places, the strong performance of Russia and the U.S. are particularly appreciated. These two countries met five places, followed by Azerbaijan, Georgia, Iran and Kazakhstan, each with four places, followed by Belarus, Bulgaria and Japan with 2 places. At least one place could get: Armenia, Cuba, France, Latvia, Mongolia, Nigeria, Puerto Rico, Turkey, Ukraine and Venezuela. If one considers the countries who may have hoped for more places are at least two aspects clearly. Some countries may have more promises, which is an indication of the severity of the bouts. On the other hand, the quota places for Puerto Rico, Venezuela and Nigeria are surprisingly and from the perspective of FILA it is a welcome sign for the positive development of our sport in Latin America and Africa.

Table 1 Freestyle Men quota places Istanbul

Reached quota places to NOCs	Freestyle Men							total
WC 2011 Istanbul	55 kg	60 kg	66 kg	74 kg	84 kg	96 kg	120 kg	
RUS	X	X	X		X		X	5
USA	X			X	X	X	X	5
AZE			X	X	X		X	4
GEO		X		X	X		X	4
IRI	X		X	X		X		4
KAZ	X	X		X		X		4
BLR						X	X	2
BUL	X		X					2
JPN		X	X					2
quota pl. awarded	6	6	6	6	6	6	6	42
quota places total	19	19	19	19	19	19	19	133

How were already mentioned in Istanbul the freestyle wrestler from Azerbaijan, Cuba, USA and Kazakhstan had been the best in the quality of the attacks. Looking at the same time at the quality of the defense and thus the quality of overall performance, then we have a different picture and a different order. The success in combat sports, however, depends not only on the effectiveness of the attacks but also of effective defensive actions. This is ultimately a feature of the quality of coaches working in the countries. In this respect, the wrestler from Azerbaijan, Kazakhstan, Russia, Iran and Georgia have achieved the best quality results (Fig. 11). This is also reflected in the order of the countries that have won the most quota places, with the exception of the United States. But it is known that the U. S. wrestlers prefer a physically-based combat strategy.

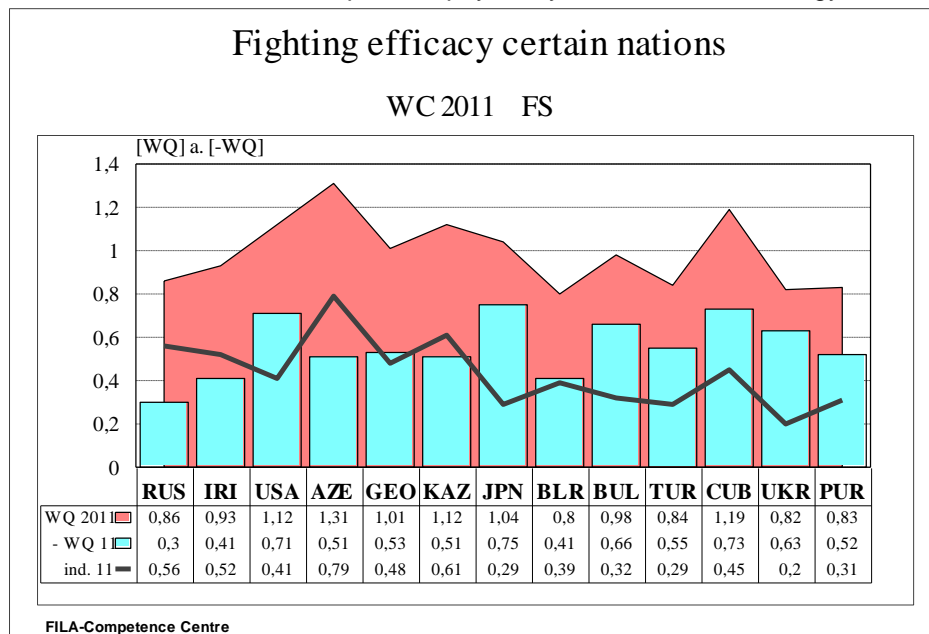


Fig 11 Wrestling efficacy of the best countries in Istanbul Freestyle

2.2 Combat behaviour of the qualified athletes

We had shown in the past, the development of wrestling on the example of the winner at the Olympic Games and World Championships. The winner showed during the World Championships in Istanbul, despite of the qualifying pressure and despite of a slight decline, good attacking performances with 1.2 points per minute (Fig.12).

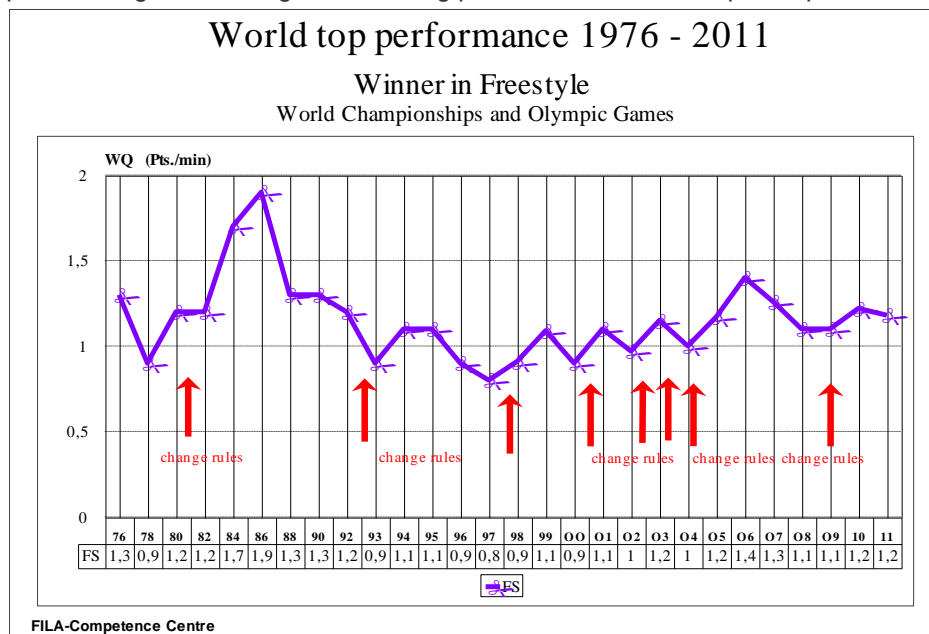


Fig. 12 World top performance since 1976

This trend is also evident when considering the quality of the points scored (Fig. 13). With 5.1 points per bout in Istanbul the winner scored more points than in 2009, and the number of 3 - and 2- points also has been higher than 2009. Accordingly, the proportion of one-point action 2011 has been lower than 2009. The best values of 2010 in Moscow, however, could not be reached.

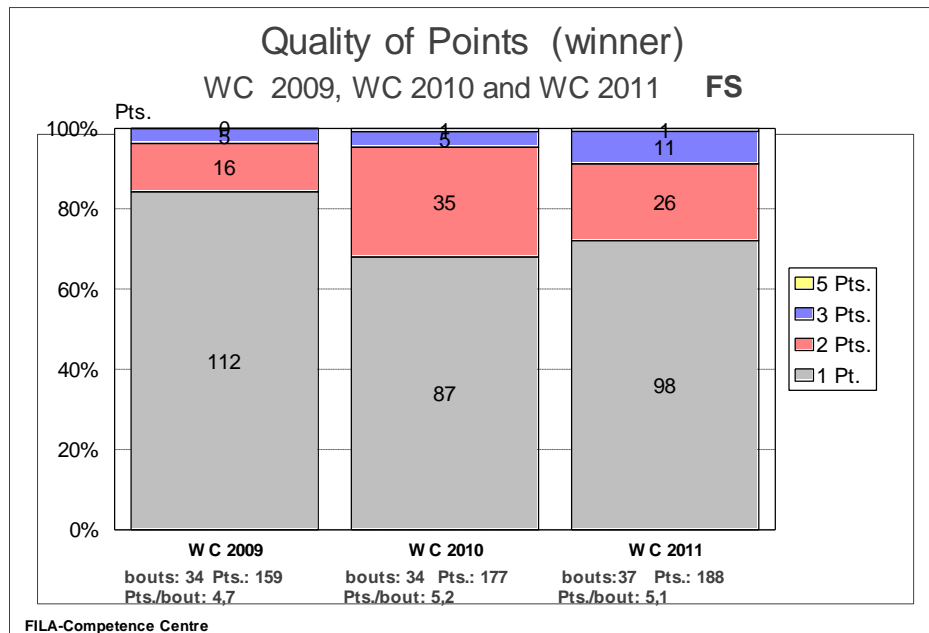


Fig. 13 Quality of points since 2009

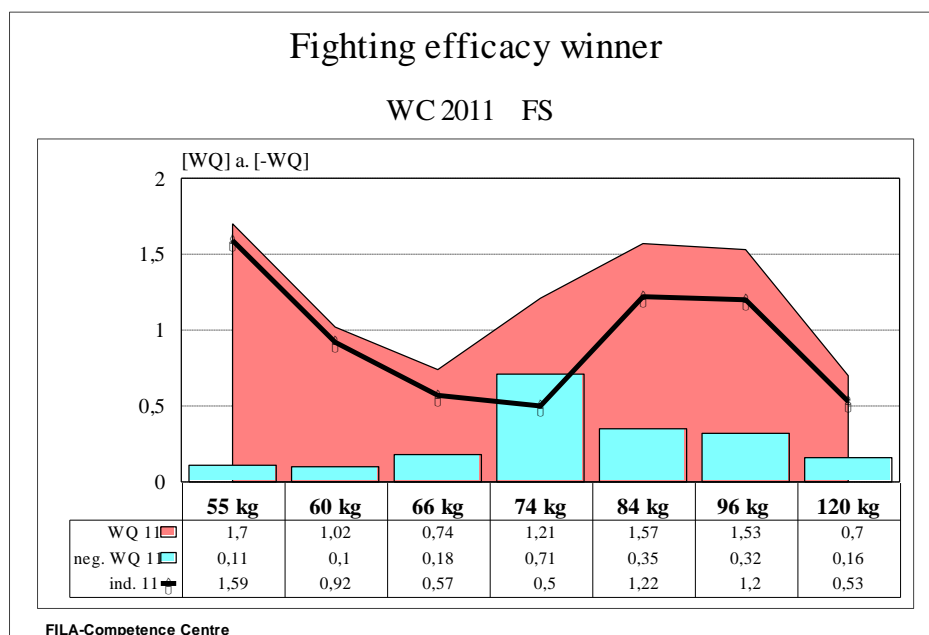


Fig. 14 Wrestling efficacy of the winner

We consider a different picture concerning the attack efficacy especially of the World Champions 2011 in Istanbul (fig. 14). Of course the World Champions are demonstrating the best quality of wrestling. With realizing 1.59 (performance index) was the best wrestler Viktor Lebedev RUS followed by Sharif Sharifov AZE (1.22), Reza Yazdani IRI (1.2) and Besik Sera Kudukhov (0.92). Noteworthy are the excellent defense abilities of the world champions in the weight classes 55, 60, 66 and 120kg. The qualified athletes realized a very high level of the attack efficacy (Fig. 15). On the other hand there are big differences between the qualified wrestlers. In the 55kg weight class Victor Lebedev (RUS) and Daulet Niyazbekov (KAZ) reached better values than the average of the world champions and they are much

better than any other qualified in this weight class. Better quality of the attack actions than the average of the World Champions demonstrated Sharif Sharifov 84kg (AZE), Dato Marsagishvili 84kg (GEO), Jakob Varner 96kg (USA), Reza Yazdany 96kg (IRI) and Jamaladdin Magomedov 120kg (AZE). Some wrestlers like Malkhaz Zarkua 60kg (GEO), Ricardo Antonio Roberthy Moreno 74kg (VEN), or Chuluunbat Jargalsaikhan 120kg (MGL) could reach the qualification with an attack quality under the average of all participants.

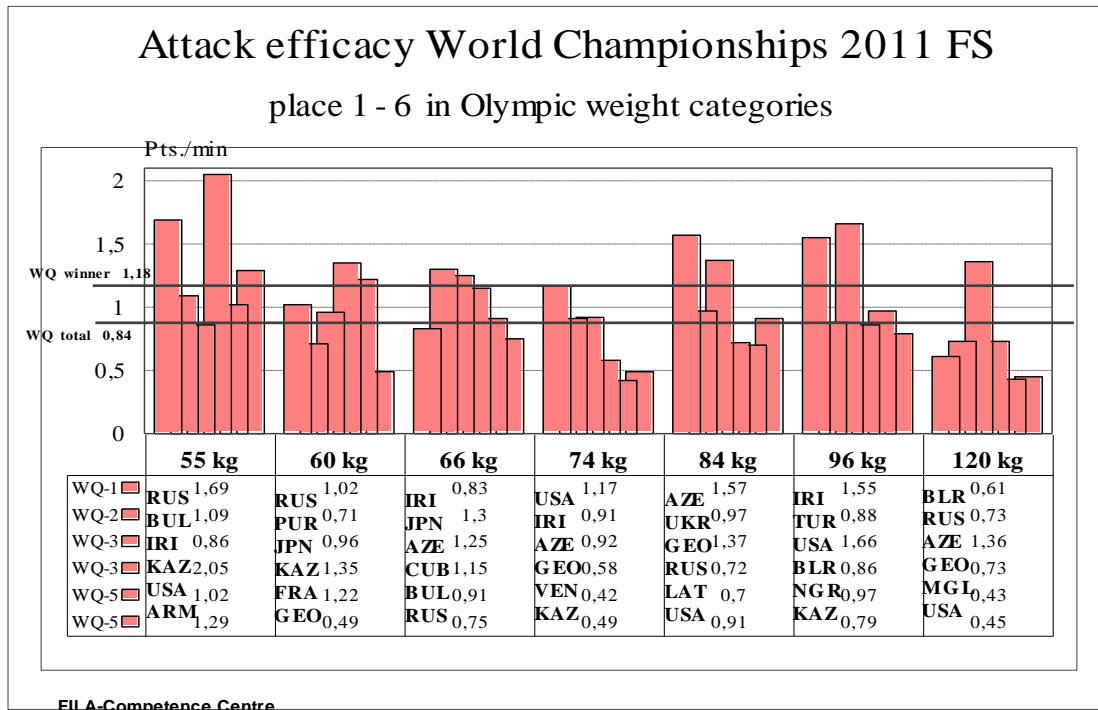


Fig. 15 Attack efficacy of the qualified wrestler

It is for the coaches very important to analyze the technical-tactical structure of the winner. It is important for the analysis of the technical capacity of their athletes to compare this with the top athletes of the weight class. It is also very important for the planning of the technical training process as well as for the training concepts of the promising young talents. We see in Istanbul leg attacks as the absolute dominating techniques followed by clinch! Counter and take downs (Fig 16). Together with the totally decrease of throws this is a sign for the decline of attractive techniques.

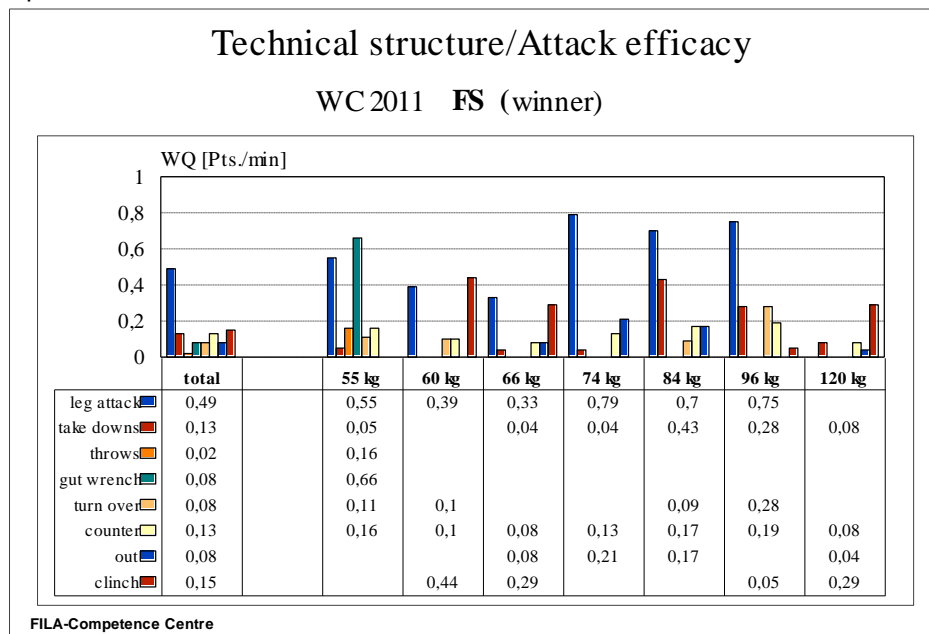


Fig. 16 Technical structure and efficacy of the World Champions 2011

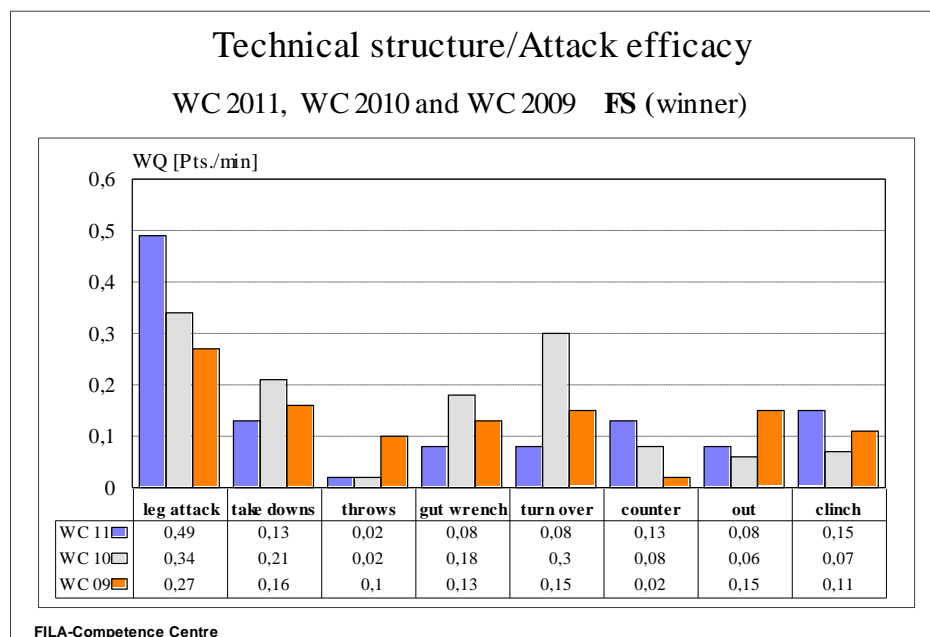


Fig. 17 Comparison of the technical structure in Freestyle wrestling 2009, 2010 and 2011

If we compare the technical structure of 2009 to 2011 we can see some differences (fig. 17). Low-risk techniques dominate and attractive throws are almost gone. The aforementioned pressure to succeed at the world championships 2011 is certainly a cause for the rise in clinching situations.

3. “Challenge” a respectable task also for the coaches

Already last year we stressed out that FILA had increased the fairness in our sport further with its decision to show the video evidence on large screens to the public and to give the coaches the opportunity to demand the Challenge. This year, we could take a further technological progress with the integration of the timeline into the video image. However, one must realize that, unfortunately, coaches use the Challenge more and more for increased tactical purposes (clip 7).

SCORING ANALYSIS OF THE 2011 WORLD CHAMPIONSHIPS IN WOMEN'S FREESTYLE WRESTLING

Professor Dr. Harold Tünnemann
 FILA Coaches Clinic - Antalya
 November 2011

1. Current tendencies in combat behaviour of the Senior-, Junior- and Cadet World Championships 2011 one year before the Olympic Games in London

The Turkish Wrestling Federation organized very successful this very important Senior World Championships and gave 900 competitors from 104 countries excellent possibilities for winning the first quota places for the Olympic Games in London. Also the Wrestling Federations of Rumania and Hungary organized perfect World Championships in 2011 for the Olympic hopes within the three Olympic Wrestling styles.

Therefore we move into the centre of our analysis the following two aspects:

- The quality of wrestling of the promising young athletes in female wrestling
- The quality of wrestling of the qualified athletes for the Olympic Games

1. 1. Analysis of the Cadet World Championships 2011 in Szombathely

After a break the young athletes showed already a very good and spectacular technical tactical combat behaviour. As an example we can see the attractive offensive strategies, brilliant techniques and the fighting spirit up to the end of the situation and up to the end of the bout (clip 1).

The leading nations of senior female wrestling are dominating already the Cadet World Championships (Fig.1).

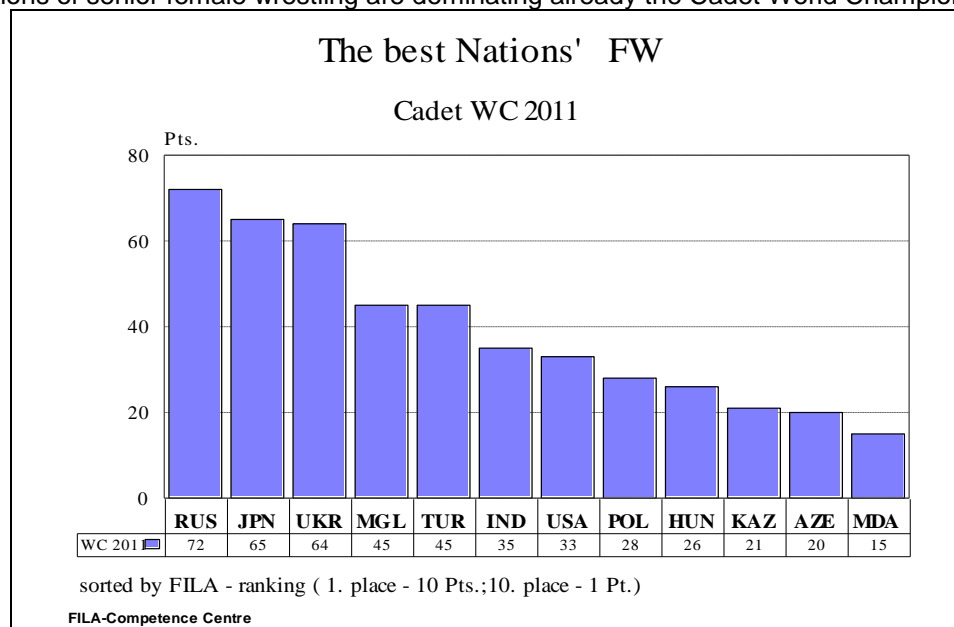


Fig.1 Best nations Cadet WC Female

Particularly noteworthy is the successful work of the coaches from Turkey, Mongolia and India, which together with the established countries, Russia, Japan and the Ukraine belonging to the top six nations.

This is the proof of dedicated and successful work with the young wrestling generation of these nations. It is of course no surprise that in this age range the portion of the shoulder victories are very high (Cadet WC 62 that means 33% of all bouts, Junior WC 60 that means 33% and Senior WC 54 that means 22%). (clip2).

Another proof of the technical tactical attractiveness at the Cadet World Championships is the realized number of technical points per minute. This is true both for the most successful nations as well as for the world champions.

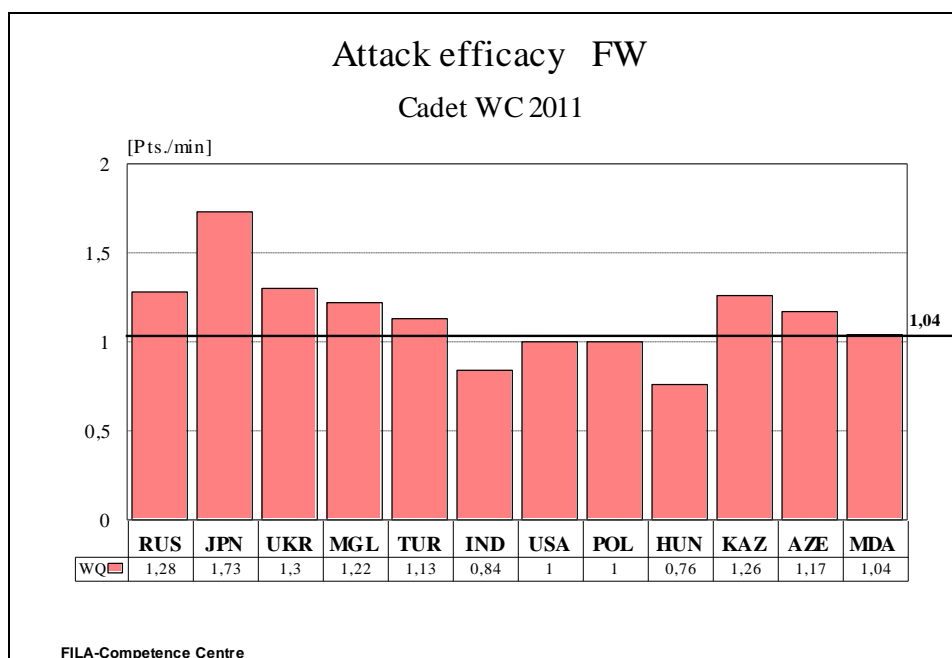


Fig. 2 Attack efficacy of the best countries Cadet WC Female

By far the best quality reaches the team of Japan (1.73 points per minute), followed by Russia (1.28), Ukraine (1.3), Kazakhstan (1.26), Mongolia (1.22), Azerbaijan (1.17) and Turkey with 1.13 points minutes (Fig. 2). The world champions achieve even better results (Fig. 3).

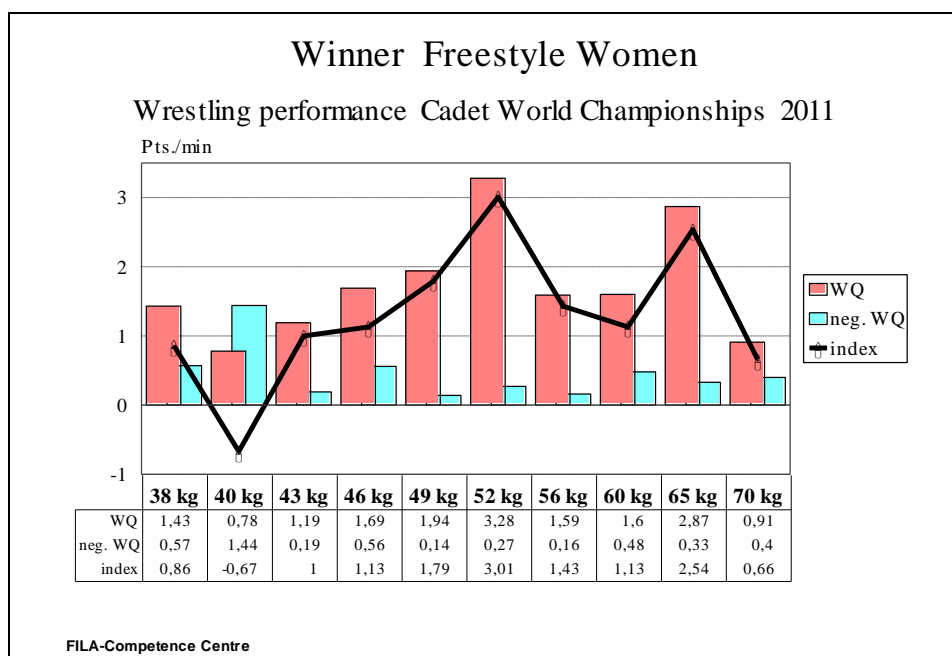


Fig. 3 Quality of wrestling of the Cadet World champions

Fantastic is the attack efficacy of Risako Kawai JPN (52kg) with a WQ of 3.28 points per minute and Masako Furuichi JPN (65kg) with a value of 2.87 (Fig 3). A closer look at this figure indicates attention to the surprisingly good defense actions of the Cadets World Champions. This is also the reason for the excellent performance index of the two Japanese women, where the attack and defense skills have to be set in a ratio (3.01 and 2.54).

1.2 Analysis of the Junior World Championships 2011 in Bucharest

Already last year we found in the analysis of the Junior World Championships that the best athletes in this age group already have a very high level of the technical and tactical mastery. This observation corresponds also totally with this year's Junior World Championship in Bucharest. And as for the fighting spirit and toughness the juniors are as good

as their older athletes as shown by the following video example because both wrestlers demonstrated in a six minute bout almost five minutes effective technical-tactical actions. It is a positive sign for the development of wrestling that athletes from Central and South America come up with more and more world-class performances such as the following bout between Ecuador and Hungary shows. The throw “Backward bending with leg hook” belongs to the most attractive and most technically advanced freestyle techniques. Vorobjeva72kg (RUS) demonstrated this technique in an impressive quality at the Junior World Championships (clip 5). As with the cadets, so superior even at the Junior World Championships, the Japanese girls took first place in the team standing won with a 59 points. Congratulation also to the girls from Russia, USA, China and Germany, which occupied the farther places (Fig. 4)!

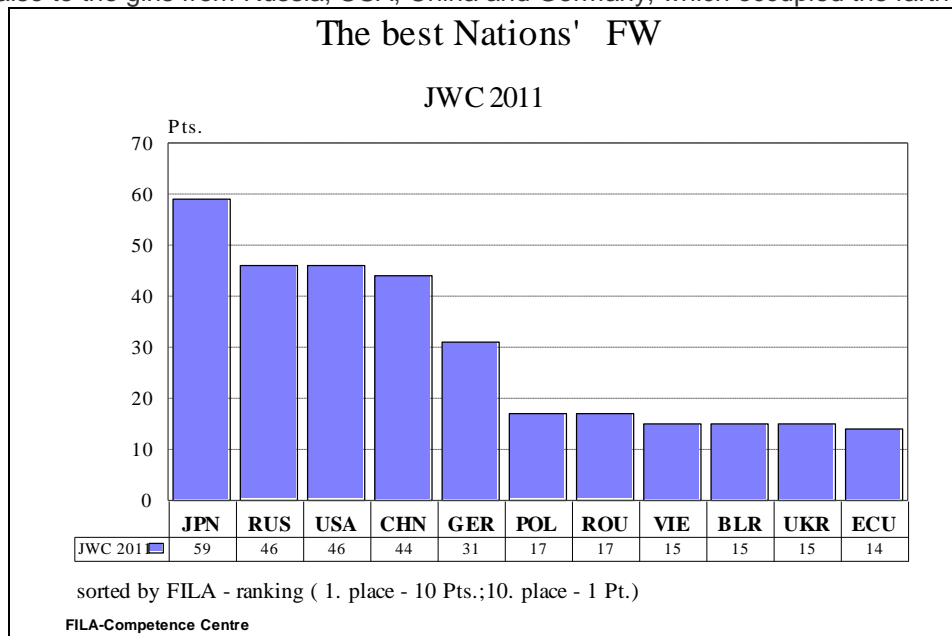


Fig. 4 Best nations of the Junior World Championships 2011

When considering the quality of the attack actions we have the same image as for the team standing. Outstanding is the very good value by Japan (1.84 points per minute) followed by Russia, USA and China. Interesting that Ecuador, Romania and Germany reach about 1 point per minute in the attack, the average of all participants in the attack (Fig. 5).

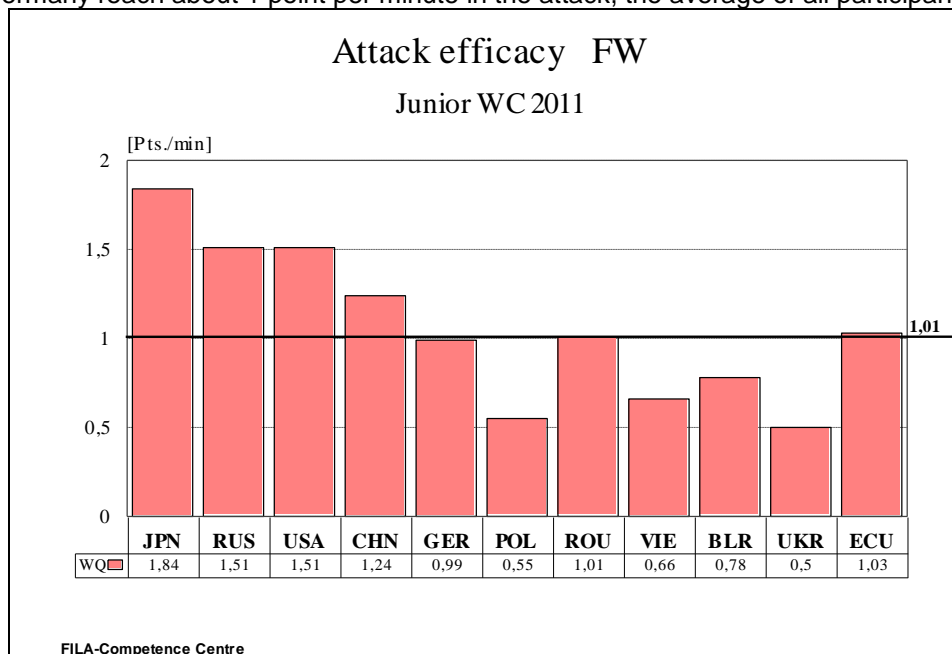


Fig. 5 Attack efficacy of the best countries Junior WC Female

These world champions already have excellent defensive skills. This is also the reason for their excellent technical and tactical overall results (performance index). The efficacy of the attack actions awards especially the

world champion Natalya Vorobeva 72kg (RUS) with almost 4 points per minute (Fig. 6)!

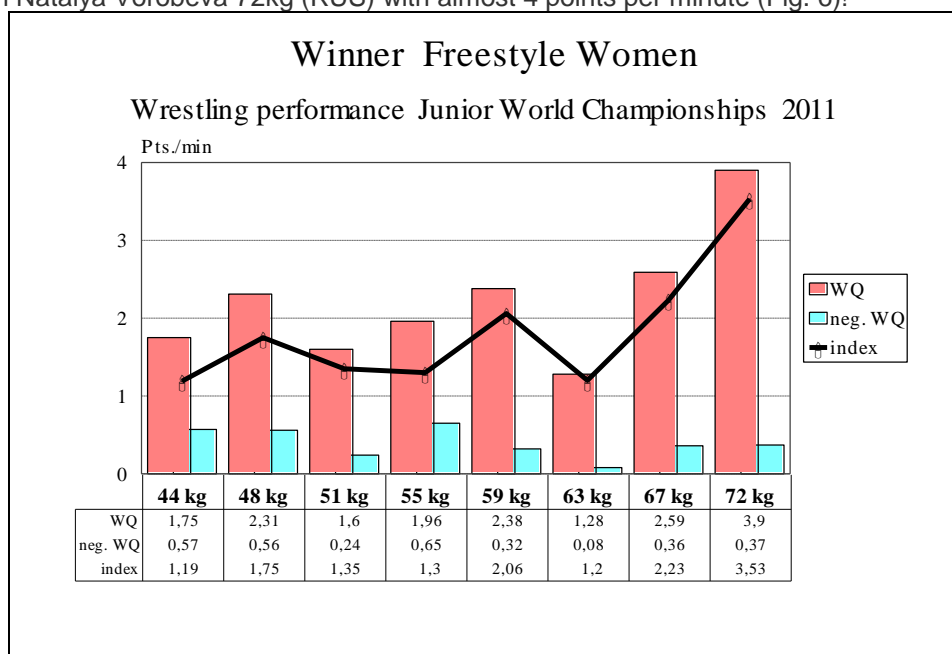


Fig. 6 Quality of wrestling Junior WC Female

Also achieve very good results in this respect, the world champion Sara Dosho JPN 67kg, Yurika Ito JPN 59kg and Mika Naganuma JPN 48kg.

1.3 Qualitative analysis of combat behaviour in comparison between Senior, Junior and Cadet World Championships

A look at the quality of the realized points of all participants of the three world championships once again confirmed previous findings (Fig. 7). The cadets reached 8.1 points per bout, the junior 7.5 and the senior 6.8. The seniors realize fewer 3 - and 2-point scores, and more 1-point scores than the young generation.

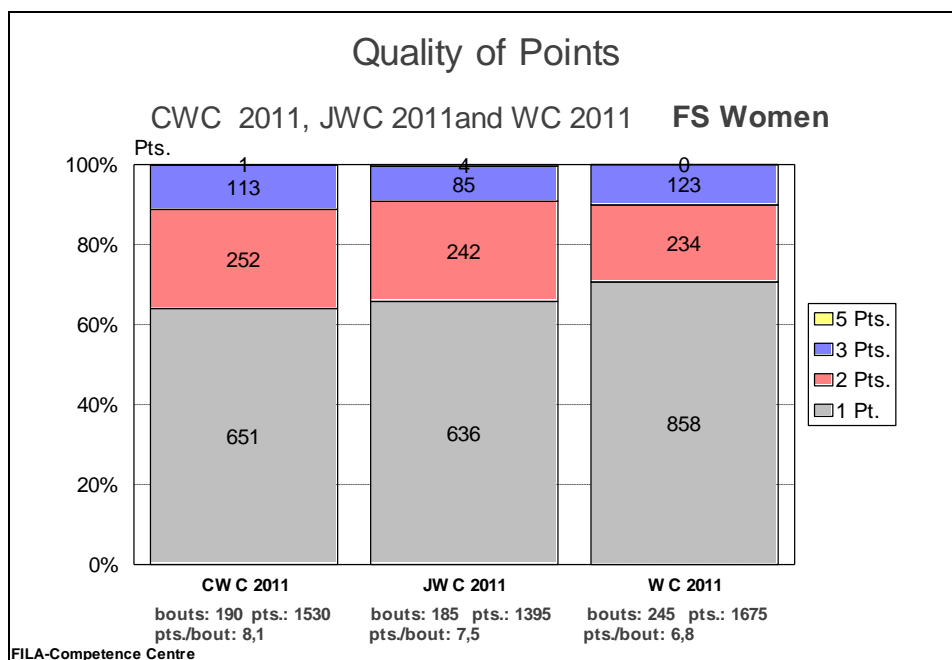


Fig. 7 Quality of points Cadet-, Junior and Senior World Championships 2011

A similar trend is reflected in the analysis of the attack effectiveness as a measure of technical tactical attractiveness of wrestling.

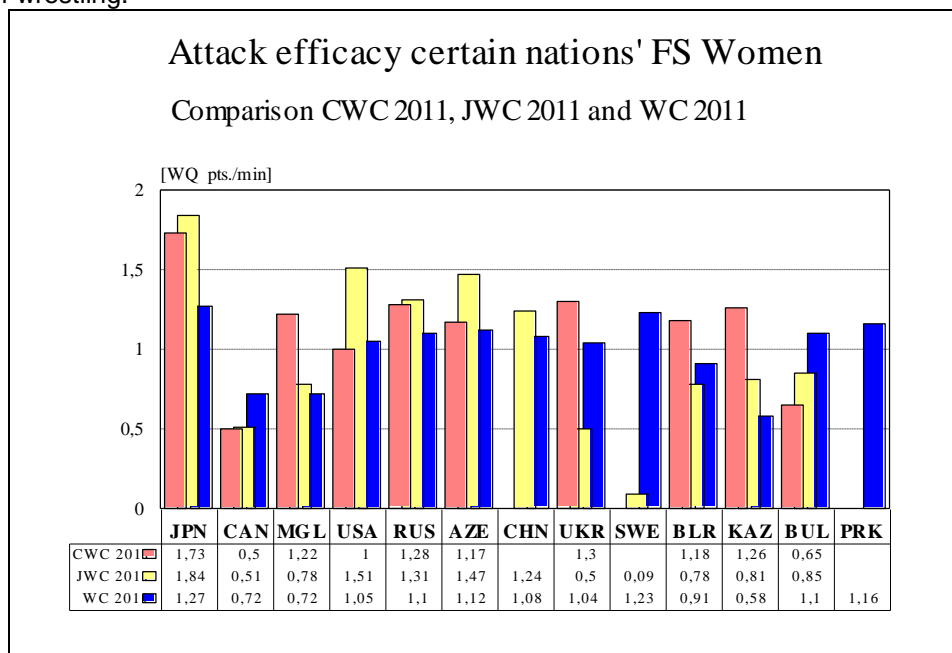


Fig. 8 Country specific attack efficacy Cadet-, Junior and Senior World Championships 2011

Participants in the Cadet World Championships with attack actions achieve average 1.04 points per minute, the junior 1.01 and seniors only 0.86 points per minute. Of course there are differences between countries where the athletes from Japan generally get the best values in all three World Championships (Fig. 8).

In addition to Japan at the Cadet World Championships in the attack, the athletes from Ukraine, Russia, Kazakhstan and Mongolia achieved the best values. At the Junior World Championships are next to Japan the USA, AZE, RUS and CHN while in the seniors along with Japan, Sweden, PRK, AZE, RUS and BUL are the best.

2. Analysis of the Women's World Championships in Istanbul under the aspect of the first Qualification for the Olympic Games in London

2.1 Combat behavior of the nations

The most powerful countries in 2011 Japan, USA, Mongolia, USA, Russia, Azerbaijan, China and Ukraine (Fig. 9).

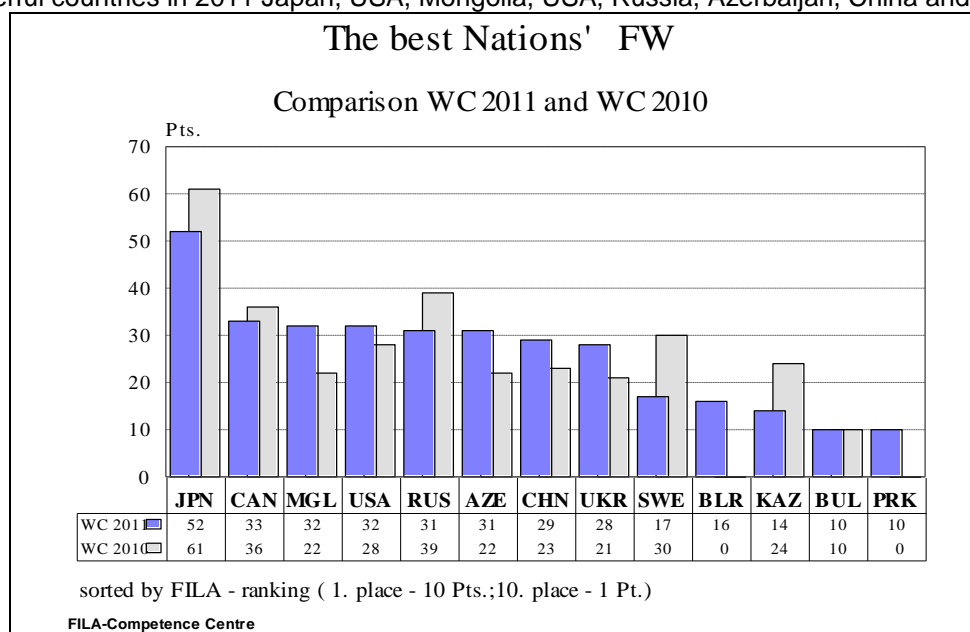


Fig. 9 Best nations of Istanbul

Compared to 2010 were Japan, Russia, Canada, Sweden improve their results yet, while Mongolia, USA, Azerbaijan, China, Ukraine and Belarus had suffered losses. But of course, the athletes in the world championships were under very considerable pressure to succeed at as many qualifications for the Olympic Games in London to achieve. 16 countries were able to win the 24 to be allocated quota places (Table 1).

Table 1 Female quota places Istanbul

Reached quota places to NOCs	Freestyle Women				total
WC 2011 Istanbul	48 kg	55 kg	63 kg	72 kg	
JPN	X	X	X		3
USA		X	X	X	3
CHN	X		X		2
CAN	X	X			2
KAZ	X			X	2
RUS		X		X	2
AZE	X				1
BLR				X	1
BUL				X	1
CMR				X	1
COL	X				1
MGL			X		1
PRK			X		1
SWE		X			1
UKR		X			1
HUN			X		1
quota places awarded	6	6	6	6	24
quota places total	18	18	18	18	72

Although no country has managed to reach all four quota places, the strong performance of Japan and the U.S. are particularly appreciated. These two countries met three places, followed by China, USA, Kazakhstan and Russia, each with two places. If one considers the following countries who may have hoped for more places are at least two aspects clearly. Some countries may have more promises, which is an indication of the severity of the bouts. On the other hand, the quota places for Columbia and Cameroons are surprisingly and from the perspective of FILA it is a welcome sign for the positive development of our sport in Latin America and Africa. If we have a look at a parameter of the quality of wrestling - the average number of scored points per minute – it becomes clear that the women realized - despite a slight drop in 2011 - still more technical points per minute (1.6) as the freestyle men (1.2) and the Greco-Roman wrestler continued with the downward trend from 2011 to a value of 0.7 points Minute (Fig. 10)!

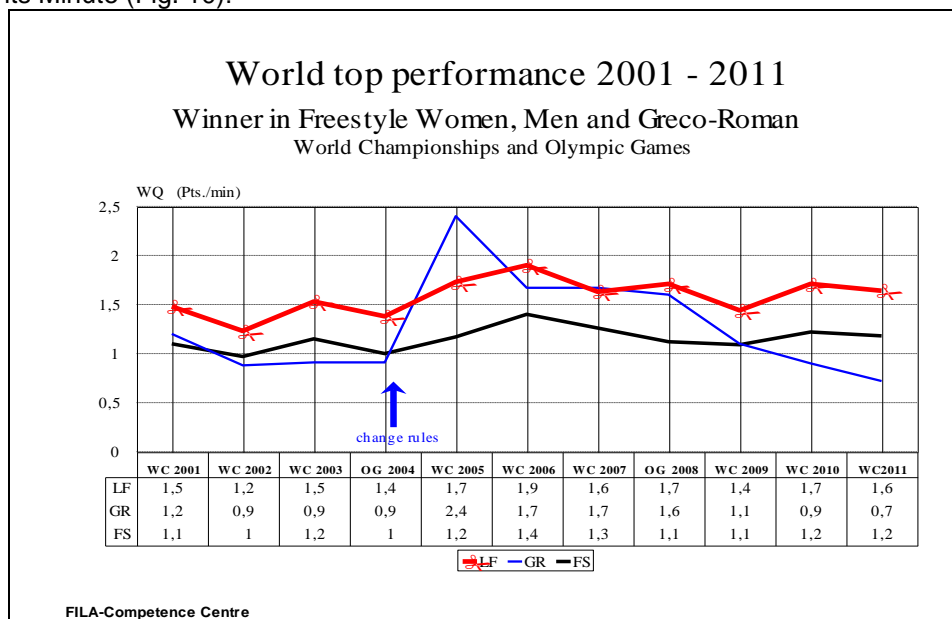


Fig.10 World top performance in wrestling

The excellent quality of the attacks of women is partly due to the still weak developed defense capability of the opponents. On the other hand, they also bear witness to the effective work of the coaches. In this respect, the world class is still dominated by athletes from Japan (Fig.11).

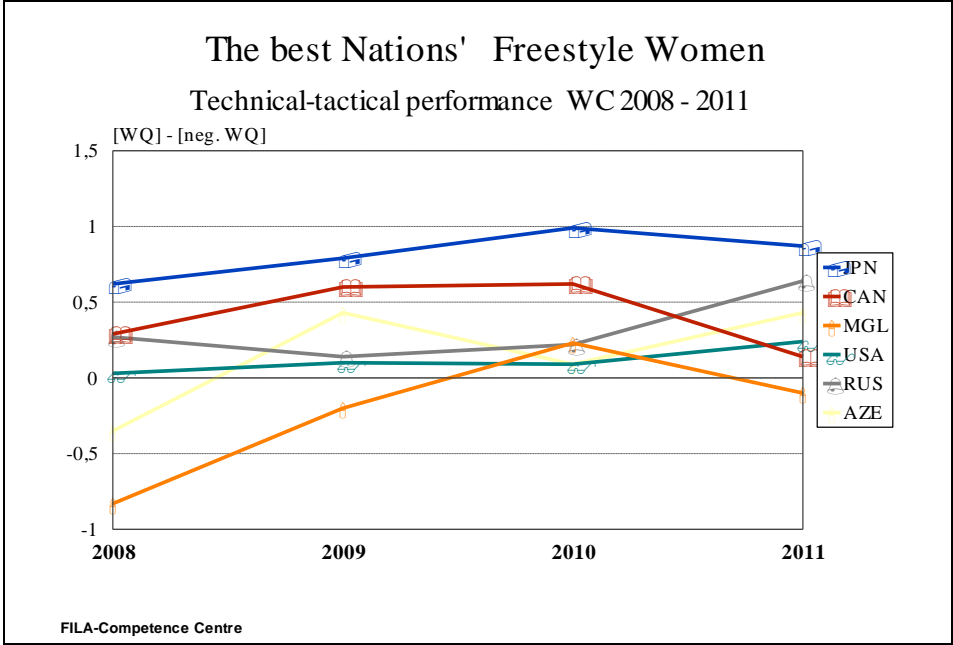


Fig. 11 Quality of country specific attacks Female wrestling

Interesting is the upward trend of the Russian team, the good combat behavior continuously in the U.S. women, the rapid penetration of Mongolia into the world top with a small step backwards since 2010 and the drop in performance of the Canadian women since 2010.

The success in combat sports, however, depends not only on the effectiveness of the attacks but also of effective defensive actions. From Figure 12, the relationship between attack and defense and the resulting overall performance (performance index) is shown.

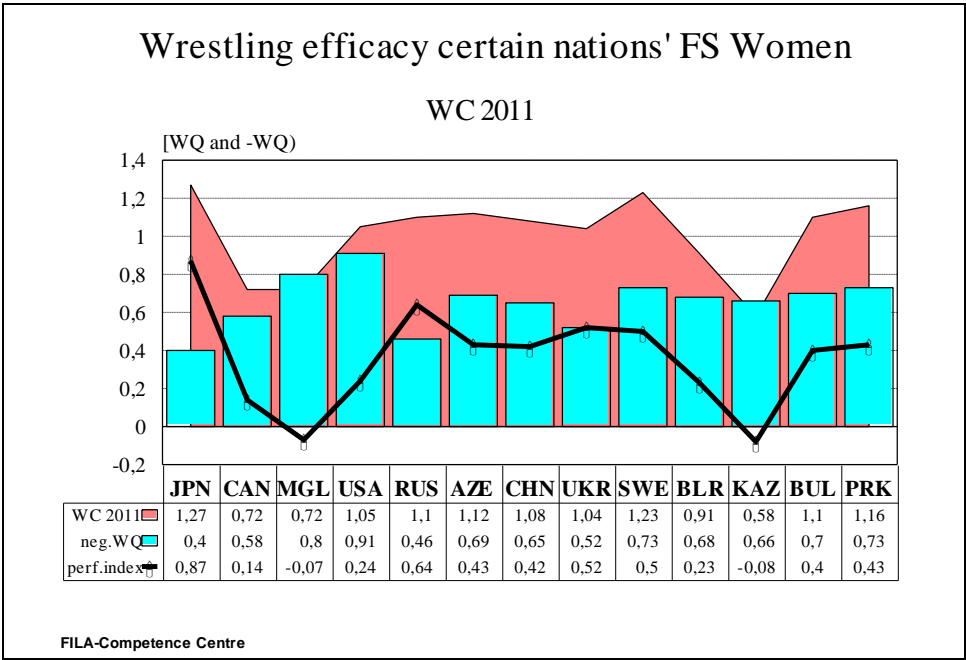


Fig 12 Wrestling efficacy of the best countries in Istanbul

It is obvious that the very good performance index of the Japanese and Russian women resulted from very good attack and defense actions. Even better results could get the Swedish women, Mongolia, the United States, PRK, and more if they would add to their good offensive skills with effective defensive action.

2.2 Combat behaviour of the qualified athletes

We consider a different picture concerning the attack efficacy especially of the World Champions 2011 in Istanbul (fig. 13). Of course the World Champions are demonstrating the best quality of wrestling especially within the Olympic classes even there are differences among them. With realizing 2.34 (performance index) again was the best wrestler Saori Yoshida followed by Hitomi Obara Sakamoto (1.55) and Kaori Icho (1.42).

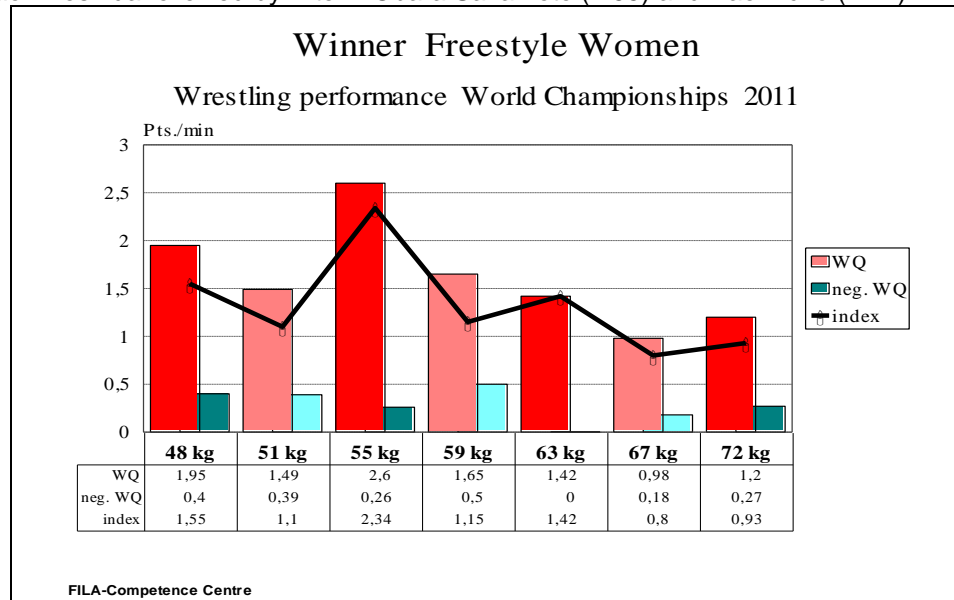


Fig. 13 Wrestling performance of the world champions 2011

The qualified athletes realized a very high level of the attack efficacy (Fig. 14).

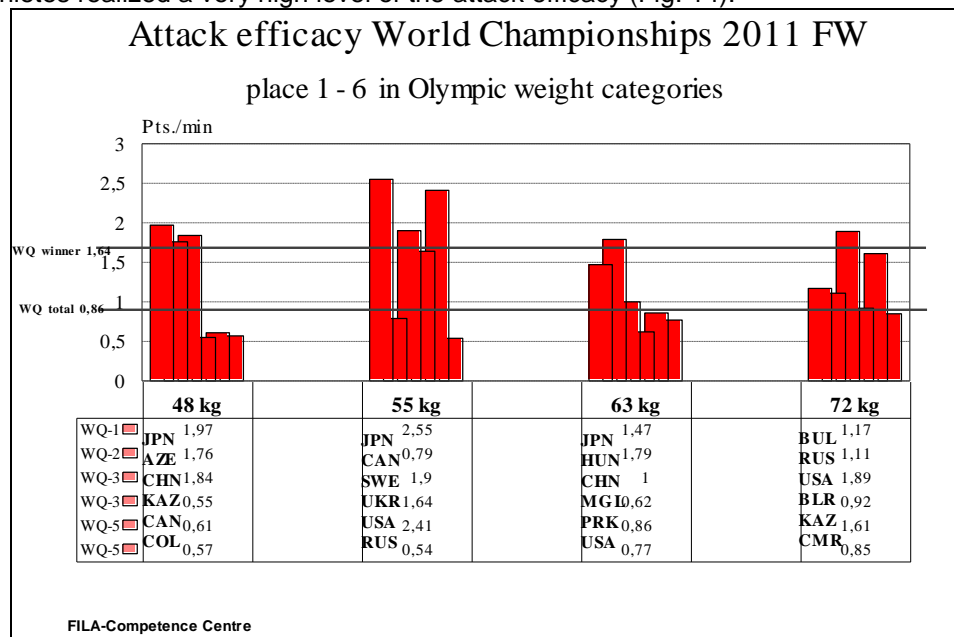


Fig. 14 Attack efficacy of the qualified wrestler

On the other hand there are big differences between the qualified wrestlers. In the 48kg weight class Hitomi Sakamoto (JPN), Maria Stadnik (AZE) and Shaza Zhao (CHN) reached better values than the world champions and they are much better than any other qualified in this weight class. In the 55kg weight class, once again Saori Yoshida showed the best quality of wrestling but it is interesting that others are hot on their heels. This concerns

Helen Maroulis (USA) with 2.41 points per minutes, Ida-Theres Nerell (SWE) and Tatyana Lazareva (UKR). The best value within the 63kg reached Mariana Sastin (HUN) with 1.79 and Kaori Icho (JPN) with 1.47 points per minute. The best values in the 72kg weight class showed Ali Sue Bernard (USA) with 1.89 and Gouzel Manyurova (KAZ) with 1.61 points per minute. Ali Sue Bernard demonstrated not only against Jiao Wang (CHN) a lot of exciting actions. In this bout we have had 30 technical points (clip 6). It is for the coaches very important to analyze the technical-tactical structure of the winner. It is important for the analysis of the technical capacity of their athletes to compare this with the top athletes of the weight class. It is also very important for the planning of the technical training process as well as for the training concepts of the promising young talents. We see in Istanbul leg attacks, turn over and take downs as the dominate techniques (fig. 15). This tendency is obviously in the weight categories 48kg, 55kg and 63kg, where Saori Yoshida showed outstanding leg attacks. The dominating technique Take downs is mainly on account of Stanka Zlateva Hristova 72kg.

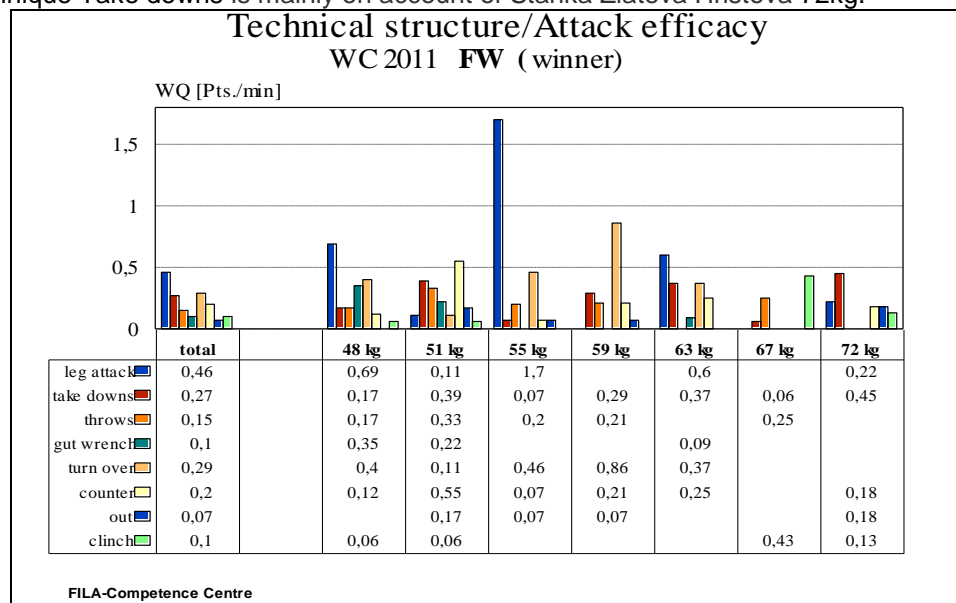


Fig. 15 Technical structure and efficacy of the World Champions 2011

If we compare the technical structure of 2009 to 2011 we can see some differences (fig. 16). We have an increase of the throws, take downs, counter and clinch. The decline of the leg attacks and turn over is essential.

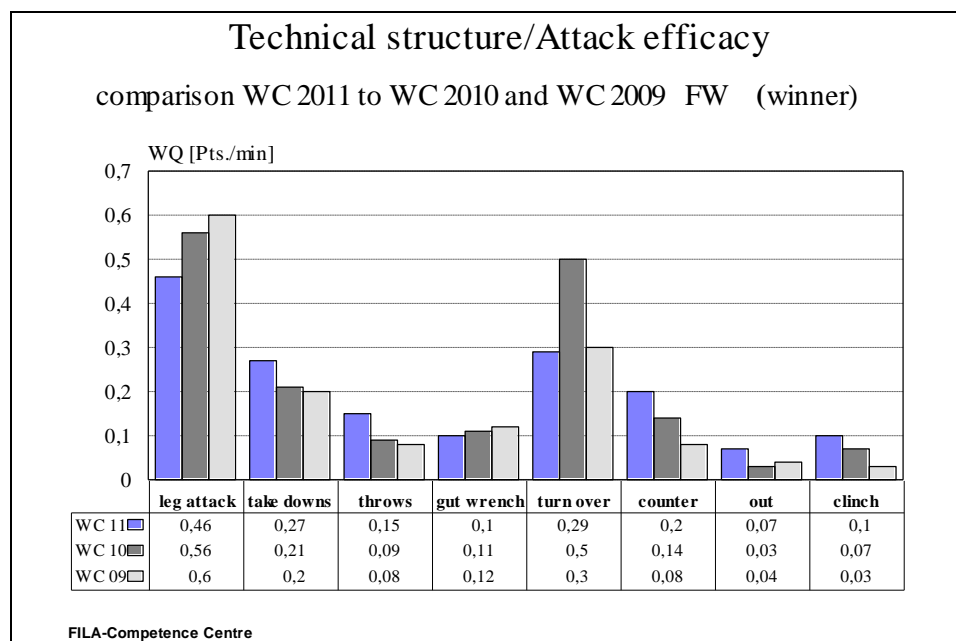


Fig. 16 Comparison of the technical structure in female wrestling 2009, 2010 and 2011

SCORING ANALYSIS OF THE 2011 WORLD CHAMPIONSHIPS IN GRECO-ROMAN WRESTLING

Professor Dr. Harold Tünnemann
FILA Coaches Clinic Rome
December 2011

1. Current tendencies in combat behaviour of the Senior-, Junior- and Cadet World Championships 2011 one year in front of the Olympic Games in London

The Turkish Wrestling Federation organized very successful this very important Senior World Championships and gave 900 competitors from 104 countries excellent possibilities for winning the first quota places for the Olympic Games in London. Also the Wrestling Federations of Rumania and Hungary organized perfect World Championships in 2011 for the Olympic hopes within the three Olympic Wrestling styles.

Therefore we move into the centre of our analysis the following two aspects:

- The quality of wrestling of the promising young athletes in Greco-Roman wrestling
- The quality of wrestling of the qualified athletes for the Olympic Games

1.1. Analysis of the Cadet World Championships 2011 in Szombathely

You could see some spectacular and attractive bouts. As an example we can see the attractive offensive strategies, brilliant techniques and the fighting spirit up to the end of the situation and up to the end of the bout. Furthermore the bout between Kevin Meja Castillo (HON) and Alikhan Getogazov (RUS) is an example for the positive development of Greco-Roman wrestling in Latin America. (clip 1, 2) The leading nations of senior Greco-Roman wrestling are dominating already the Cadet World Championships (Fig.1).

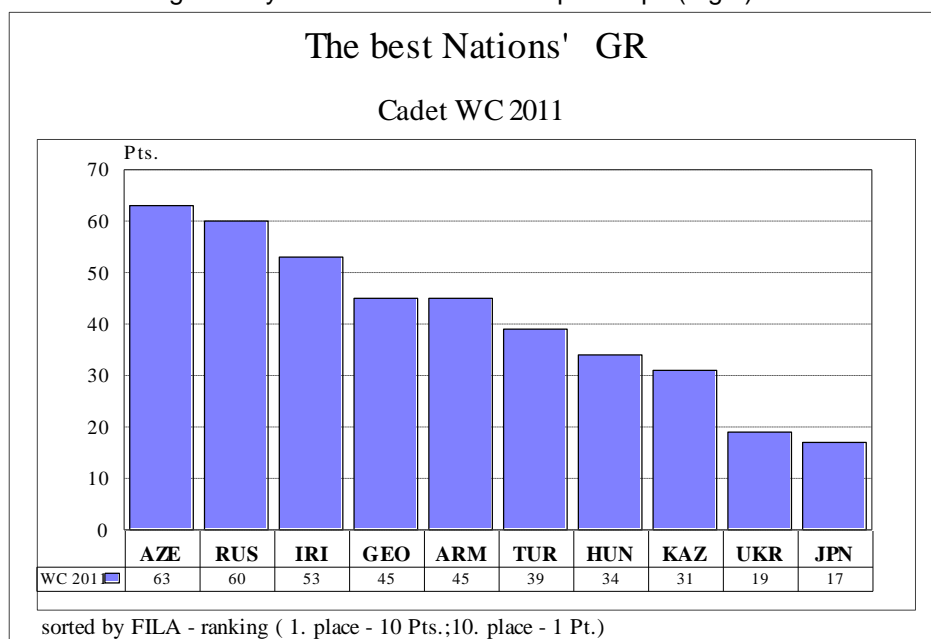


Fig.1 Best nations Cadet WC Greco-Roman wrestling

This is the proof of dedicated and successful work with the young wrestling generation of these nations. It is of course no surprise that in this age group the portion of the shoulder victories are higher than in the other age groups even the result is in comparison with Freestyle rather poor (Cadet WC 28 that means 11%, Junior WC14 that means 8% and Senior WC 8 that means 2%) (clip3). Particularly noteworthy is the successful work of the coaches from Azerbaijan, Russia, Iran, Georgia, Armenia and Turkey belonging to the top six nations. Another proof of the technical tactical attractiveness at the Cadet World Championships is the realized number of technical points per minute. This is true both for the most successful nations as well as for the world champions.

By far the best quality reaches the team of Russia (1.58 points per minute), followed by Kazakhstan (1.33), Georgia (1.26), Armenia (1.21), and Azerbaijan with 1.12 points per minutes (Fig. 2).

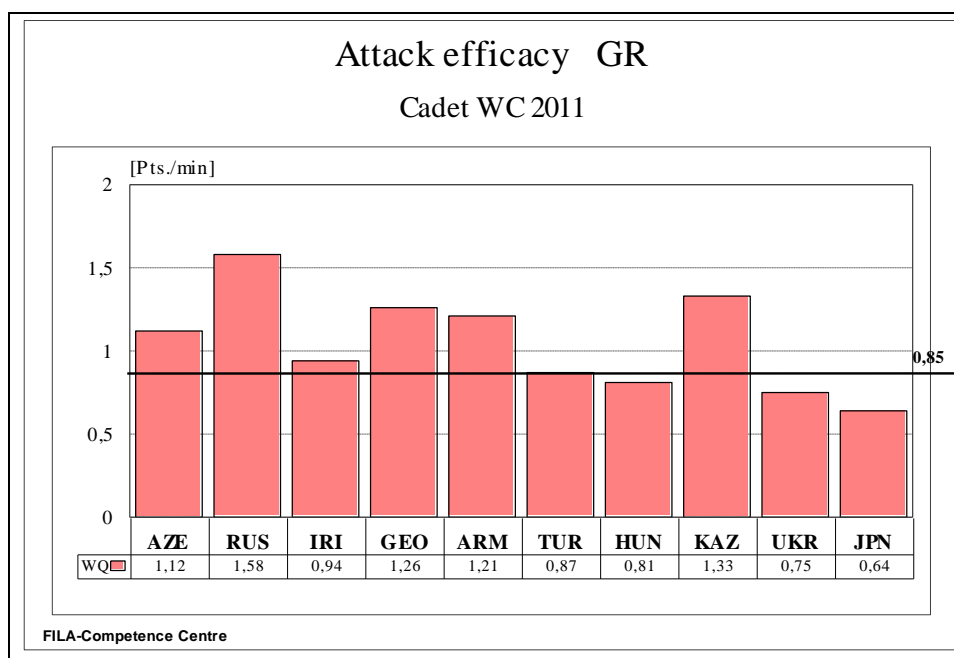


Fig. 2 Attack efficacy of the best countries Cadet WC Greco-Roman

The world champions achieve even better results (Fig. 3). Fantastic is the attack efficacy of Ramaz Zoidse GEO (42kg) with a WQ of 3.07 points per minute, Mirambek Ainagulov KAZ (46kg) with a value of 2.01 and Elman Mukhtarov AZE with a value of 1.87 points per minute (Fig 3). A closer look at this figure indicates attention to the surprisingly good defense actions of the Cadets World Champions. Reza Kedri (IRI) 46kg let his opponents not a single point and the quality of defense of Denis Kudla (GER) 76kg and Mirambek Ainagulov KAZ (46kg) is remarkable. This is also the reason for the excellent performance index of the world champions in 42kg (with 1.92), 50kg (with 1.91), 58kg (with 1.49) and 100kg (with 1.3) where the attack and defense skills have to be set in a ratio.

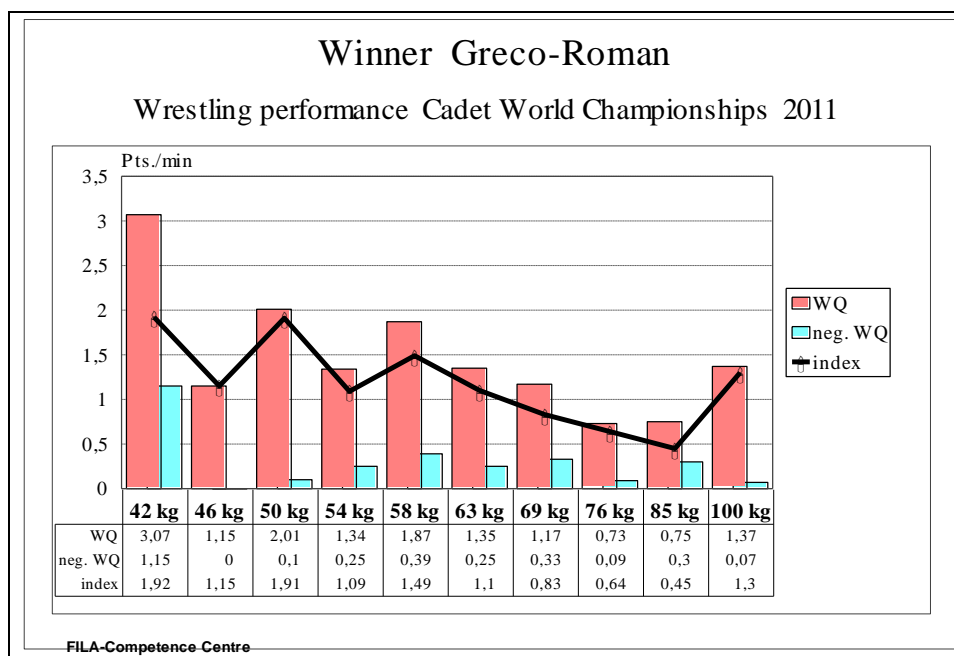


Fig. 3 Quality of wrestling of the Cadet Greco-Roman World champions

1.2 Analysis of the Junior World Championships 2011 in Bucharest

Already at the Junior World Championships, we were able to observe the negative trend of the loss of attractiveness in Greco-Roman wrestling as we shall see later. Nevertheless, there were few exceptions with interesting bouts as for the fighting spirit and toughness as shown by the following video examples (clip 4 and 5). As with the cadets, so superior even at the juniors, the same countries are in front but the order is different. Georgian boys took first place in the team standing won with 49 points. Congratulation also to the young wrestlers from Azerbaijan, Russia, Iran, Armenia and Turkey which occupied the farther places (Fig. 4)!

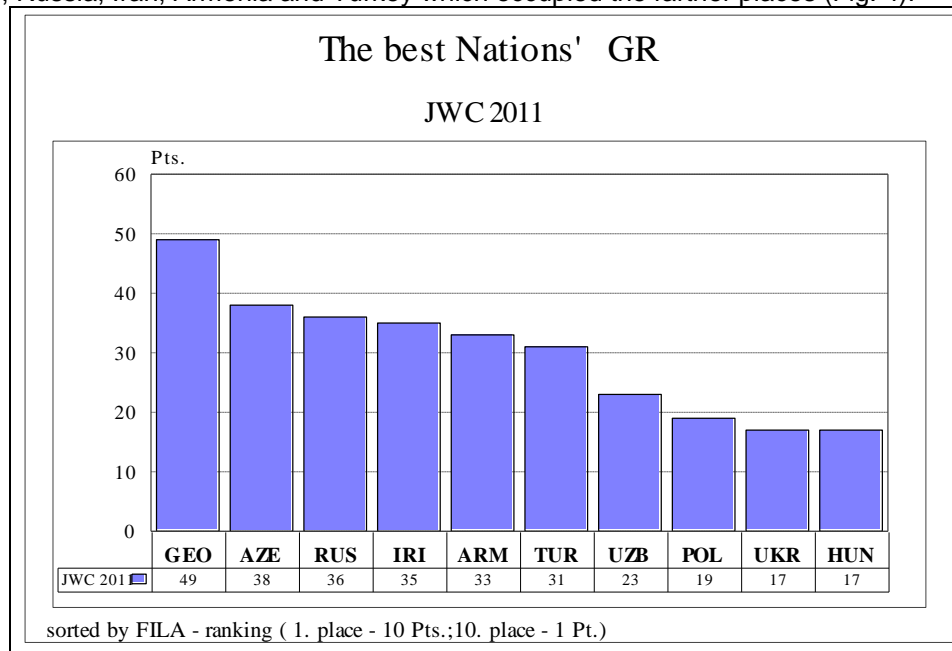


Fig. 4 Best nations of the Junior World Championships 2011 Greco-Roman

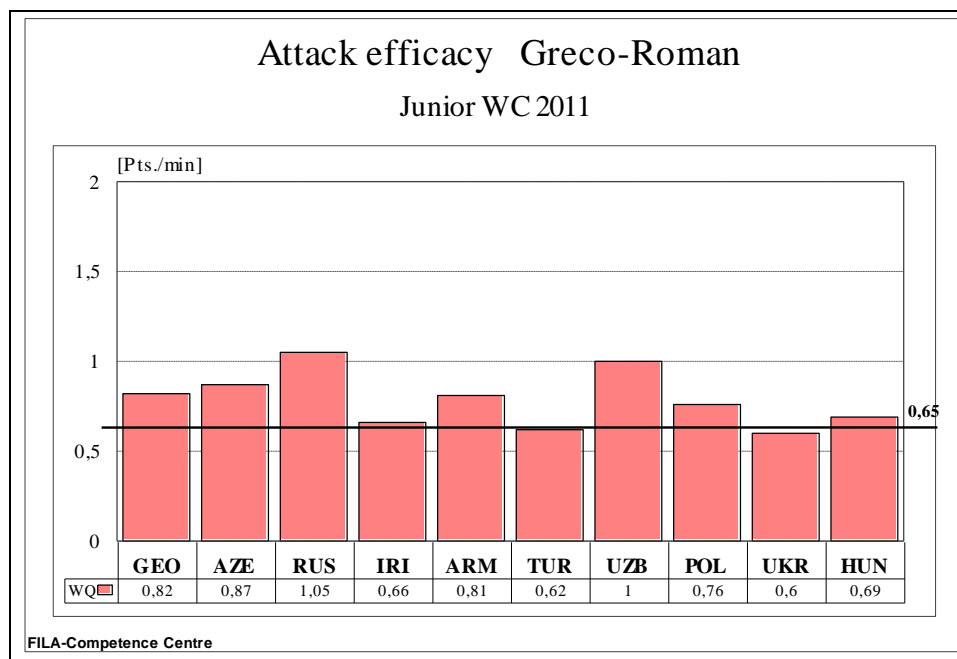


Fig. 5 Attack efficacy of the best countries Junior WC Greco-Roman

When considering the quality of the attack actions we have to accept the negative trend concerning the quality of wrestling (Fig. 5). With an average of 0.65 points per minute of the attacks of all countries we have reached an all-time low. Only Russia (1.05) and Uzbekistan (1.0) are a little bit better followed by Azerbaijan, Georgia, Armenia and Poland. The efficacy of the attack actions awards especially the world champion Vilayuat

Gahramanli 50kg (AZE) with 1.39 points per minute, Chingiz Labazanov 66kg (RUS) with 1.36 and Islam Magomedov 96kg (RUS) with 1.28 points per minute (Fig. 6). Also achieve good results in this respect, the world champion Bobir Zailobidinov (UZB) 60kg and Revaz Nadarelishvili (GEO) 84kg. These world champions already have excellent defensive skills. This is also the reason for their excellent technical and tactical overall results (performance index). Vilayuat Gahramanli (AZE) let his opponents not a single point!

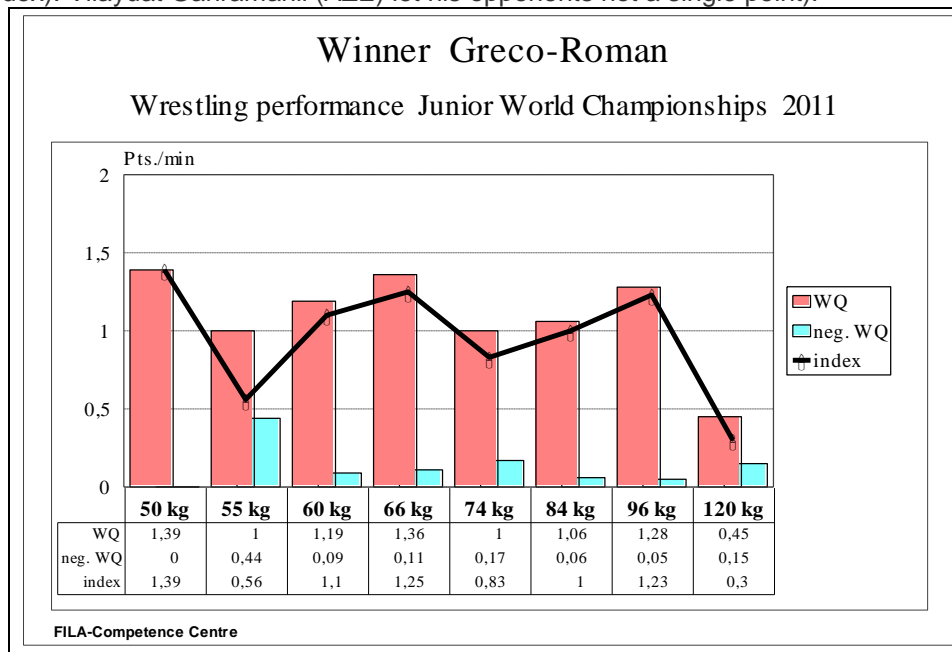


Fig. 6 Wrestling quality of the Junior World Champions Greco-Roman

1.3 Qualitative analysis of combat behaviour in comparison between Senior, Junior and Cadet World Championships

A look at the quality of the realized points of all participants of the three world championships once again confirmed previous findings (Fig. 7). The cadets reached 7.2 points per bout, the junior 5.9 and the senior 5.0. The seniors realize fewer 3- and 2-point scores, and more 1-point scores than the young generation. A similar trend is reflected in the analysis of the attack effectiveness as a measure of technical tactical attractiveness of wrestling.

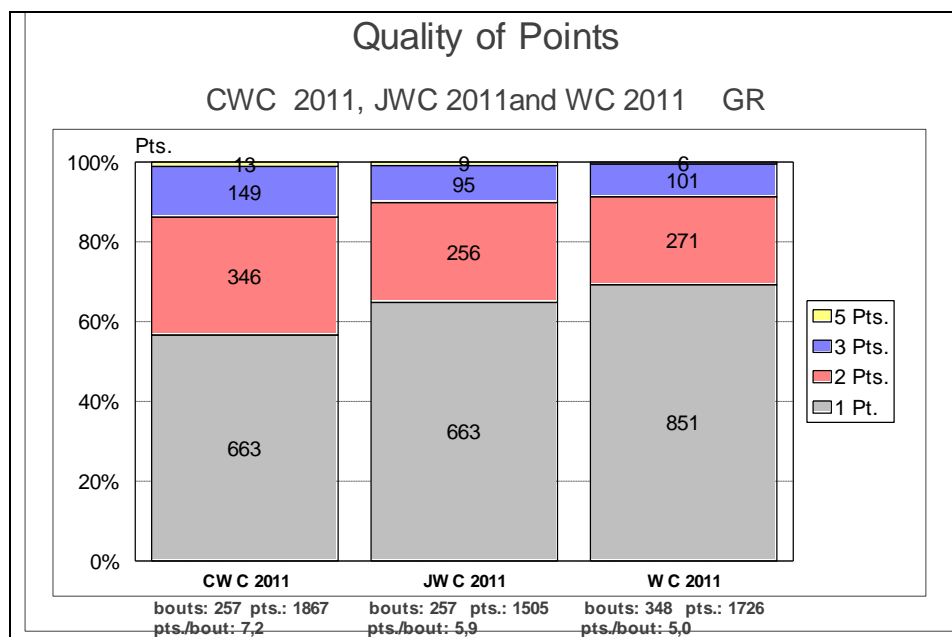


Fig. 7 Quality of points Cadet-, Junior and Senior World Championships 2011

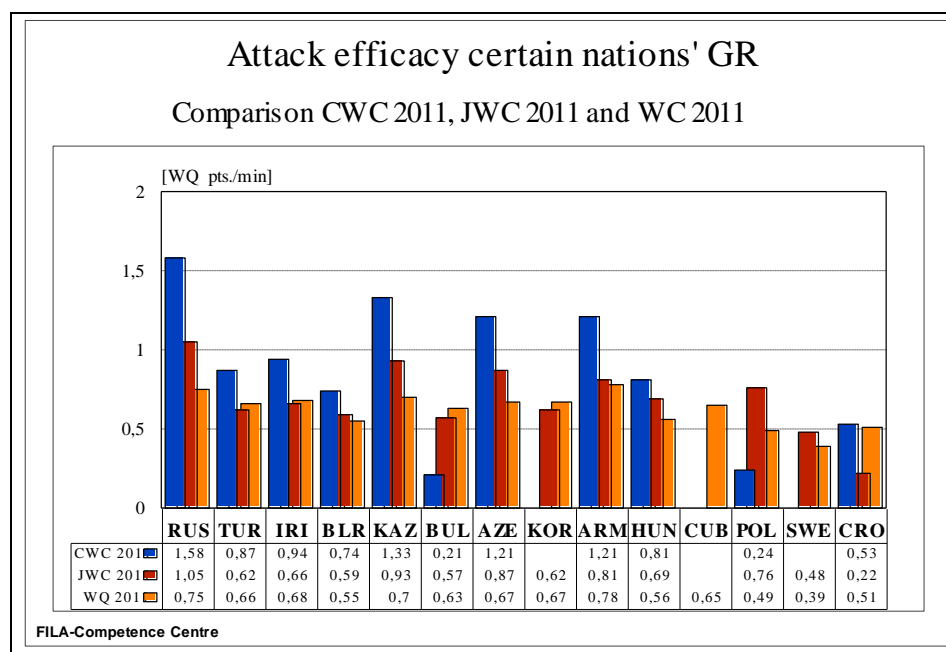


Fig. 8 Country specific attack efficacy Cadet-, Junior and Senior World Championships 2011 Greco-Roman

Participants in the Cadet World Championships with attack actions achieve in average 0.85 points per minute, the junior 0.65 and seniors only 0.54 points per minute. Of course there are differences between the countries. In contrast to the Women's World Championships, reached the one country in all three age groups the best quality values (Japan), this is achieved in Greco-Roman not a single country (Fig.8). Young talents from Russia, Kazakhstan, Azerbaijan and Armenia achieve top marks in attack by the cadets, there are in the juniors Russia, Kazakhstan, Azerbaijan and Armenia (that means totally the same order as at the cadets) and among the seniors Armenia, Russia, Kazakhstan, Iran, Azerbaijan and Korea are the best in attack efficacy 2011.

2. Analysis of the Greco-Roman World Championships in Istanbul from the point of the first Qualification for the Olympic Games in London

2.1 Combat behavior of the nations

Russia, Turkey, Iran, Belarus, Kazakhstan, Bulgaria and Azerbaijan have been the most powerful countries in 2011 (Fig 9).

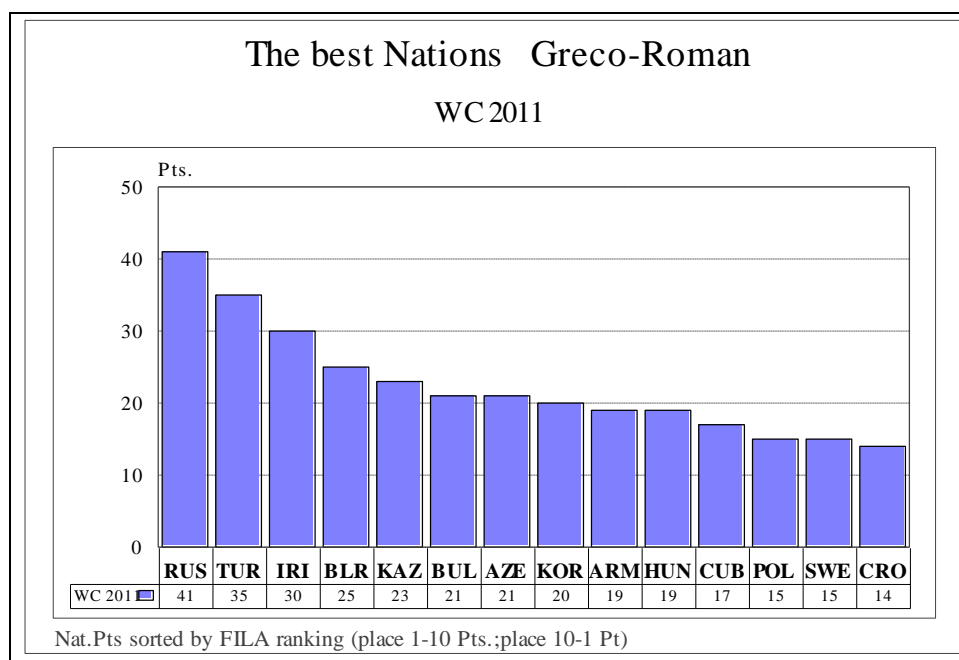


Fig. 9 Best nations of Istanbul

In comparison with 2010 accounts only Belarus and Croatia increase their results a bit, while all other countries had to accept losses (Fig.10).

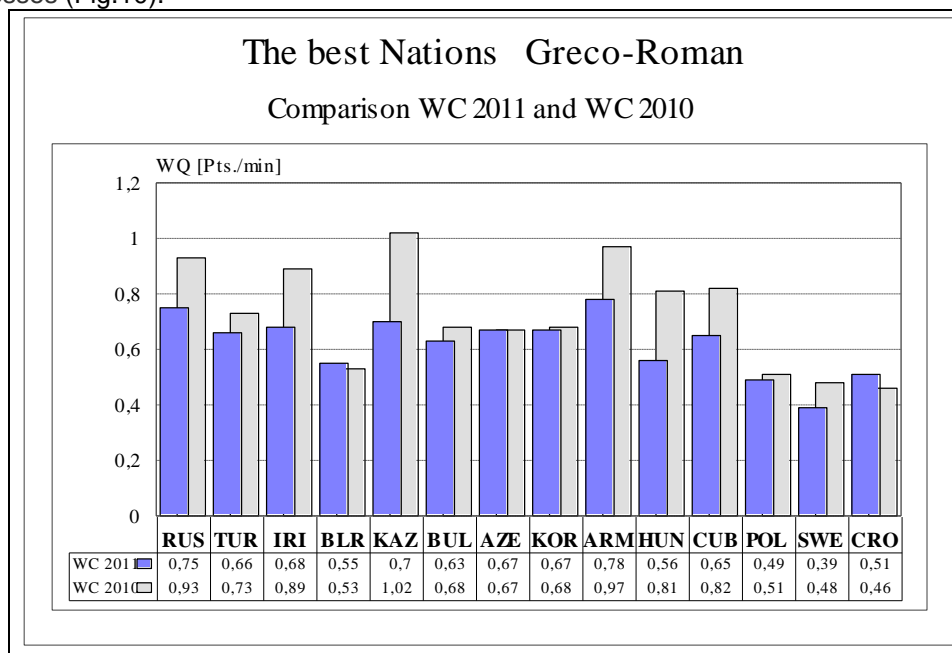


Fig. 10 Best nations of Istanbul 2011 in comparison to 2010

But of course, the athletes in the world championships 2011 were under very considerable pressure to succeed at as many qualifications for the Olympic Games in London and after they had achieved the qualification, the motivation for another tough bout for the medal places may have been limited. Nevertheless, we have seen some very exciting bouts and techniques (clip 6, 7). 22 countries were able to win the 42 to be allocated quota places (Tab. 1). Although no country has managed to reach all seven quota places, the strong performance of Russia with 5 and Turkey with 4 places are particularly appreciated, followed by Belarus, Iran, and Kazakhstan with 3 places. 2 places could reach Azerbaijan, Bulgaria, Cuba, Hungary, Korea, Poland and Sweden. At least one place could get: Armenia, China, Croatia, Egypt, Finland, Georgia, Germany, PRK, USA and Venezuela. If one considers the countries who may have hoped for more places are at least two aspects clearly. Some countries may have more promises, which is an indication of the severity of the bouts. On the other hand, the quota places for Venezuela and Croatia are surprisingly because they do not belong to the “Establishment” and from the perspective of FILA it is a welcome sign for the positive development of our sport in more countries.

Table 1 Greco-Roman quota places Istanbul

Reached quota places to NOCs	Greco-Roman Wrestling							total
WC 2011 Istanbul	55 kg	60 kg	66 kg	74 kg	84 kg	96 kg	120 kg	
RUS	X	X		X	X	X		5
TUR				X	X	X	X	4
BLR	X				X	X		3
IRI		X	X				X	3
KAZ		X		X			X	3
AZE	X				X			2
BUL		X				X		2
CUB			X				X	2
KOR		X	X					2
HUN	X						X	2
POL					X		X	2
SWE				X		X		2
quota pl. awarded	6	6	6	6	6	6	6	42

2.2 Combat behaviour of the qualified athletes

We had shown in the past the development of wrestling on the example of the winner at the Olympic Games and World Championships. With 0.8 points per minute we have to consider the worst level of attack since 1980 (Fig. 11). Even if we take into account the high pressure to succeed on the basis of qualifications this development is not acceptable.

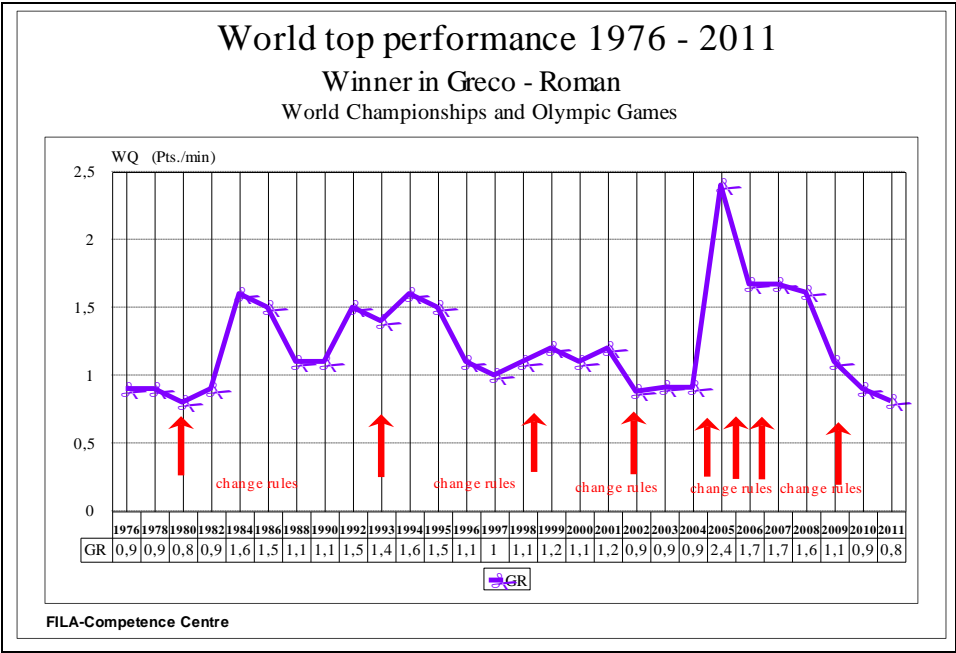


Fig. 11 World top performance since 1976

This trend is also evident when considering the quality of the points scored (Fig. 12). With 3.7 points per bout in Istanbul the winner scored less points than in 2010 and the number of 2- points also has been lower than 2010. Accordingly, the proportion of 3- and one-point action 2011 has been higher than 2010.

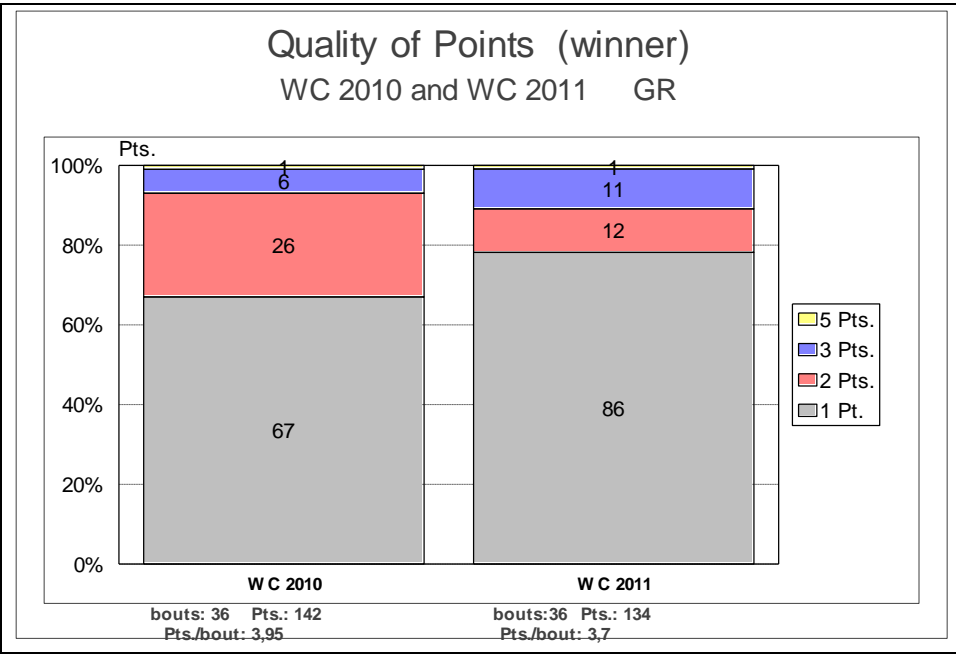


Fig. 12 Quality of points 2010 and 2011

We consider a different picture concerning the attack efficacy especially of the World Champions 2011 in Istanbul (Fig. 13).

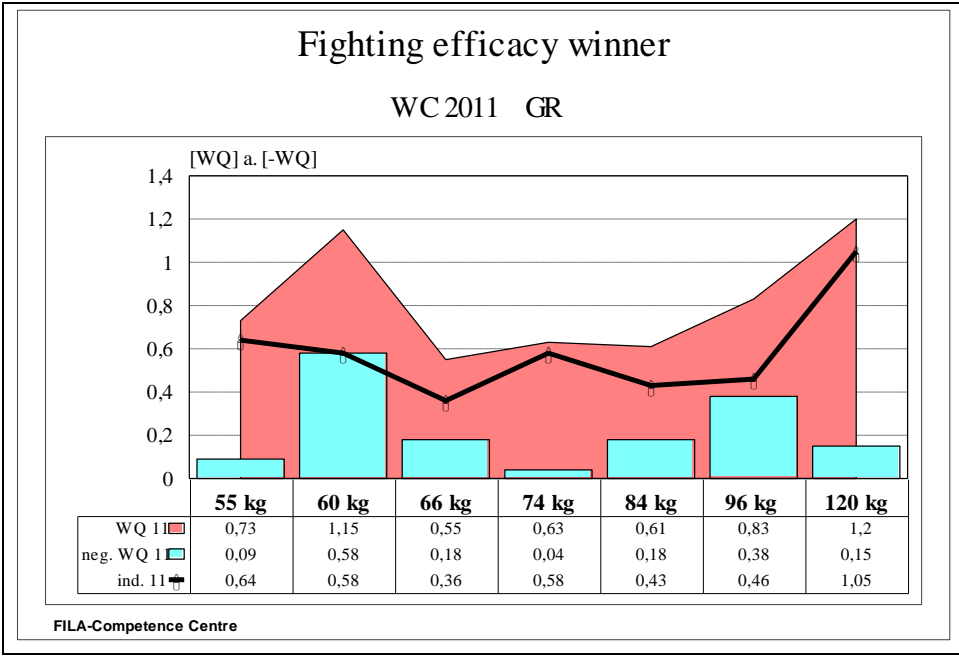


Fig. 13 Wrestling efficacy of the winner

Of course the World Champions are demonstrating the best quality of all participants but overall on a shockingly low level. With realizing 1.05 and 0.64 (performance index) still had been the best wrestler Riza Kayaalp TUR and Rovshan Bayramov AZE. Noteworthy are the excellent defense abilities of the world champion in the weight classes 74kg, Roman Vlasov RUS.

There are big differences between the qualified wrestlers (Fig. 14).

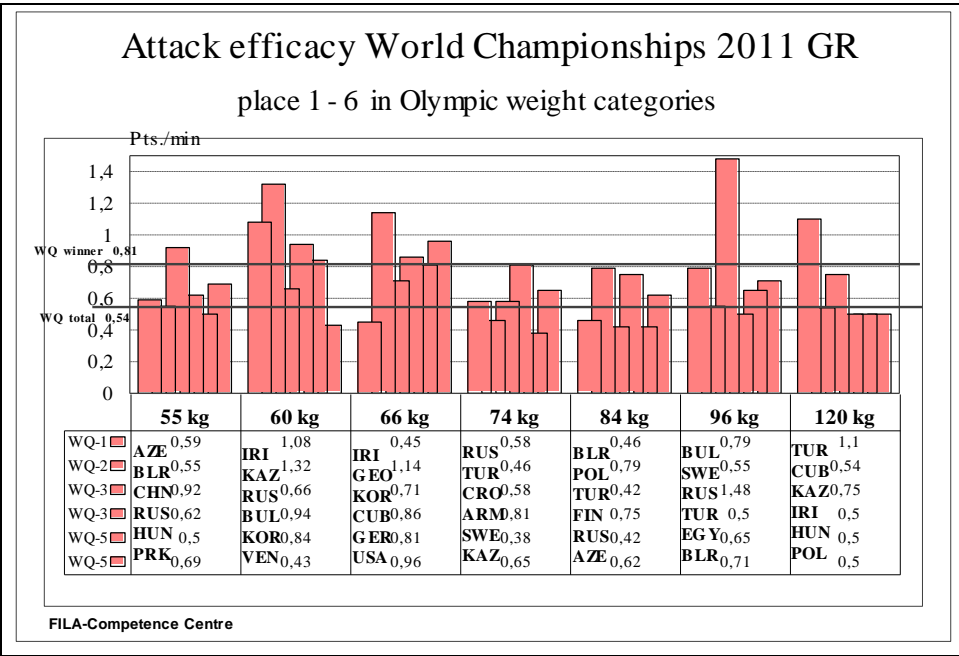


Fig. 14 Attack efficacy of the qualified wrestler

In the 96kg weight class Rustam Totrov (RUS) 1.48 points per minute, Almat Kebispayev (KAZ) 60kg with 1.32, Manukhar Tskhdala (GEO) 66kg with 1.14 and Shujin Li (CHN) 55kg with 0.92 reached better values than the

world champions and they are much better than any other qualified in these weight classes. Some wrestlers (12 from 42) could reach the qualification with an attack quality under the average of all participants.

3. Technical-tactical developments and technical structure of the winner

Following the demands of coaches for prolongation the time of bout at the beginning of the period FILA extended the time by 30 seconds. But the wrestlers did not use this prolongation for making more points. The winner realized 2009 total 171 points, 2010 - 142 and 2011 only 134 technical points . (fig. 15)

They also realized already 2010 less points during the first minute and 30 seconds than 2009 and 2011 this downward trend is going on. That means they are concentrating themselves upon the last 30 seconds of the period and hoping for clinch and challenge.

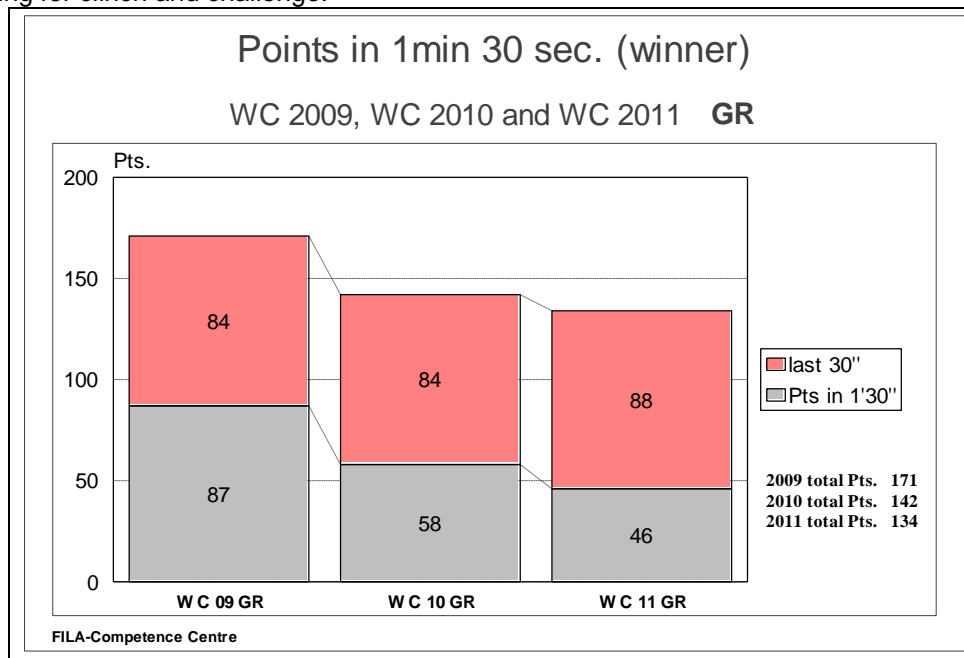


Fig. 15 Points of the winner during the first minute and 30 seconds 2010 in comparison to 2009 and 2010

The reduction of the points during 2010 und 2011 takes its toll on the standing wrestling as we can see in fig. 16. Technical actions in parterre wrestling will be further upgraded and downgraded in the standing wrestling.

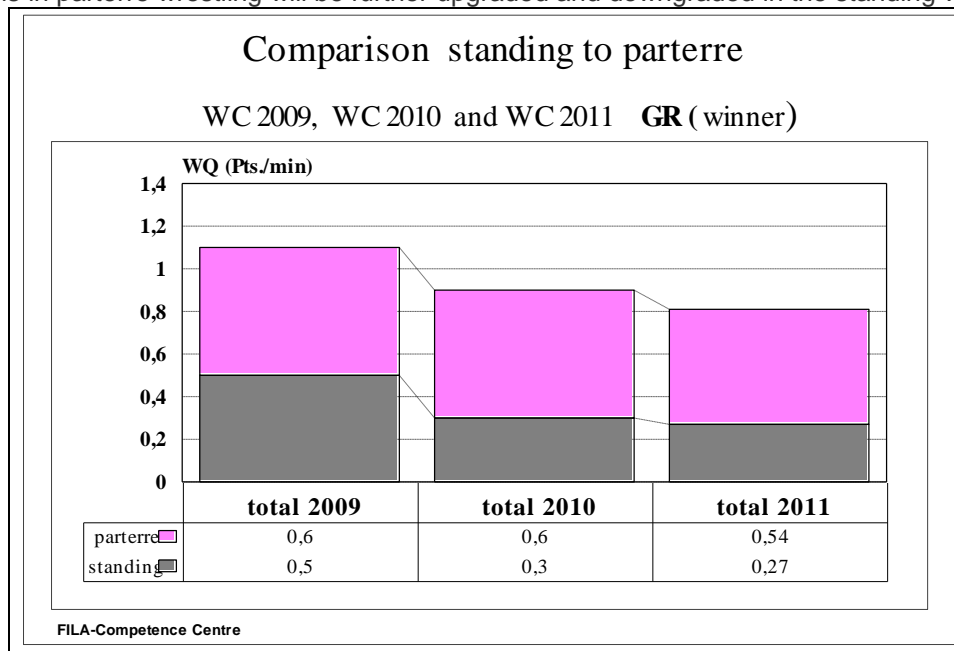


Fig. 16 Comparison between standing to parterre wrestling 2009, 2010, 2011

We have an interesting development concerning the clinch points. In comparison to 2009 and 2010, the ratio of “normal” technical points to clinch points has changed (Fig. 17). The ratio is 2011 about 50 to 50. This means a relatively decline in the clinching points. The number of Clinch actions without technical points is also decreased (defense on the ground in the beneath position).

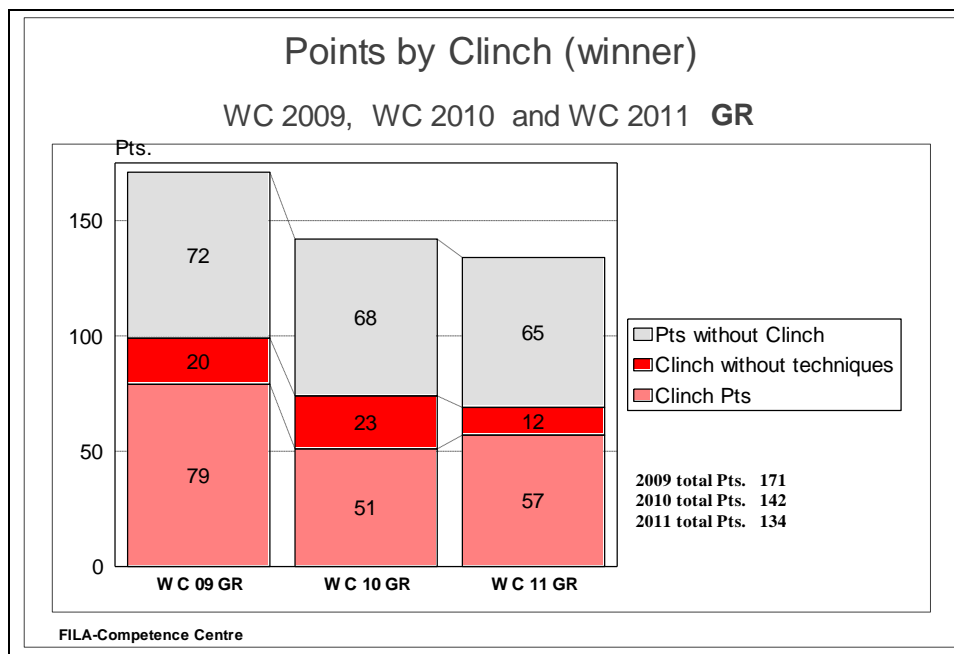


Fig. 17 Points with and without clinch of the winner 2009, 2010 and 2011

It is for the coaches very important to analyze the technical-tactical structure of the winner. It is important for the analysis of the technical capacity of their athletes to compare this with the top athletes of the weight class. It is also very important for the planning of the technical training process as well as for the training concepts of the promising young talents. The modifications of the strategy in Greco-Roman wrestling during the last years we can see by analyzing the technical structure of the winner. 2006, after the rule changes, the dominating technique had been lifts and we have had a poor technical variety. The situation changed 2009. The technical variety improved and the main techniques in Herning had been the throws followed by the gut wrench and take downs (fig. 18).

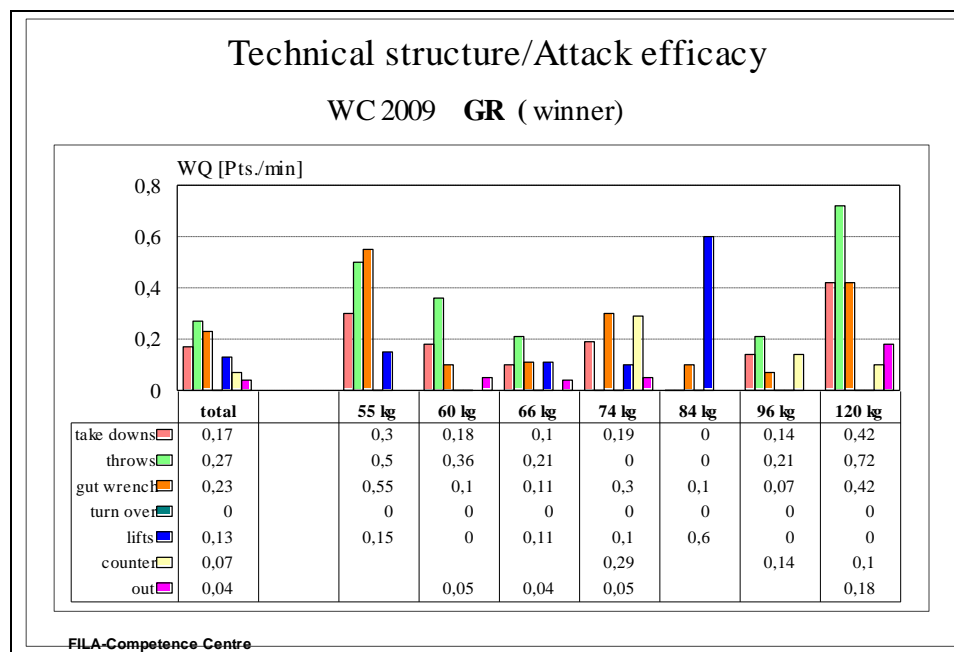


Fig. 18 Technical structure of the winner WC 2009

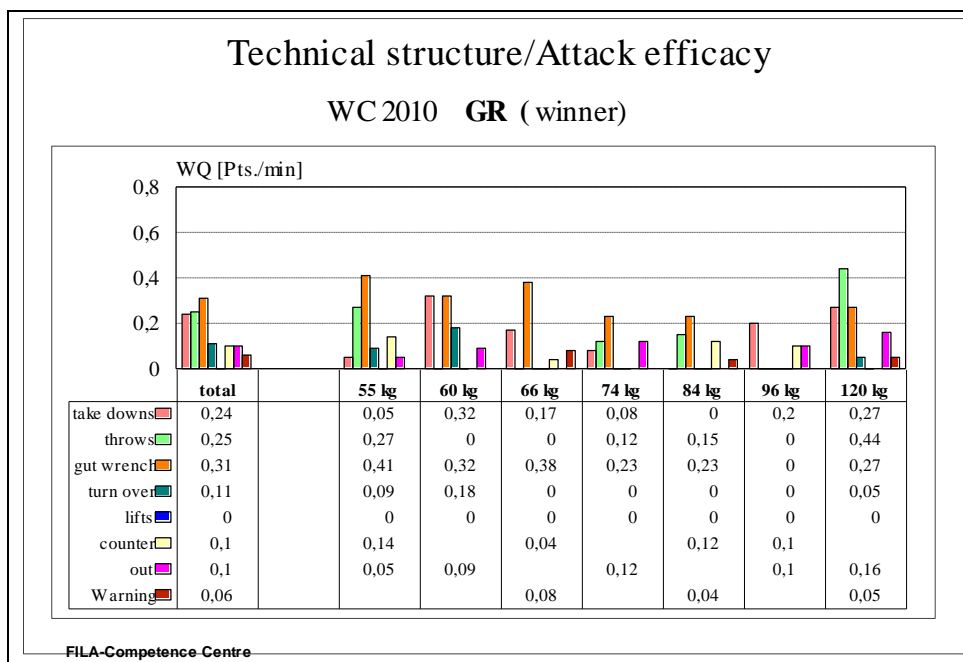


Fig.. 19 Technical structure of the winner WC 2010

Again 2010 the strategy changed clear (fig. 19). In Moscow we have had not only less technical points but the dominating technique had been the gut wrench followed by throws and take downs. The lifts disappeared completely.

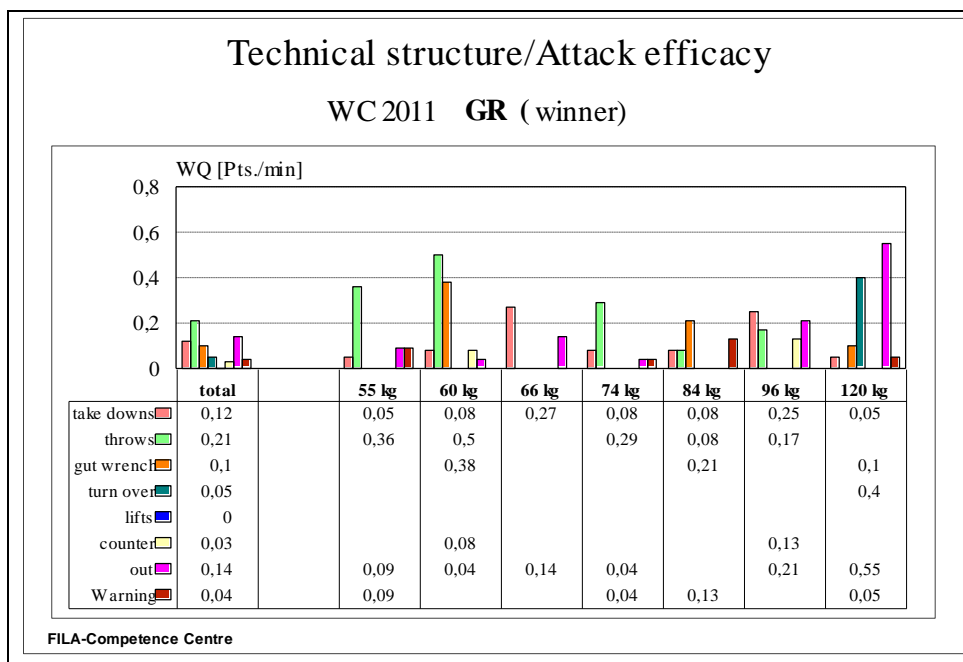


Fig. 20 Technical structure of the winner WC 2011

In Istanbul 2011 had been even less technical points and dominating techniques are the same as already noticed in 2010 (gut wrench, take downs and throws) (Fig. 20). But the order has changed 2011. The most successful techniques were the throws, followed by the take downs and gut wrench. Striking is the sharp increase in 2011 of the technique "Out". Particularly frequently use this technique the world champion in the 120kg weight class, 96kg and 66kg. The world champion in the 66kg weight class ever comes out with two low-risk techniques, the take down and "pushout"

4. “Challenge” a respectable task also for the coaches

Already last year we stressed out that FILA had increased the fairness in our sport further with its decision to show the video evidence on large screens to the public and to give the coaches the opportunity to demand the Challenge. This year, we could take a further technological progress with the integration of the timeline into the video image. However, one must realize that, unfortunately, coaches use the Challenge more and more for increased tactical purposes (clip 8). This video clip underlines the position that the coaches should responsible minded use the Challenge in the interest of their athletes.

WORLD CHAMPIONSHIP 2011- ANALYSIS AND SOME RECOMMENDATIONS

FILA President Rafael Martinetti

The 2011 World Championship marked the end of the 3rd year of the Olympic cycle in the wrestlers' preparation for the London 2012 Olympic Games. In Istanbul, on the wrestling mats, the wrestlers competed for the first six Olympic qualification places in each weight category.

Let us note that the number of athletes and countries taking part in this Championship was much higher than last year. While in 2010 only 64 countries participated in FS wrestling, this year their number reached 80. Similarly, in GR wrestling, 64 countries participated in 2010 and 73 in 2011. Regarding FW, 52 countries took part in Moscow and 62 national federations in Istanbul.

We are pleased to note that in some countries the technical and tactical skills of wrestlers who were considered as „outsiders“, have greatly improved. For example, under conditions of strong competition, the athletes of the following national federations won the right to participate in the Olympic Games:

- Puerto Rico (FS, 60 kg, 6th place)
- Venezuela (FS, 74 kg, 5th place - GR, 60 kg, 6th place)
- Nigeria (FS, 96 kg, 5th place)
- Croatia (GR, 74 kg, 3rd place)
- Colombia (FW, 48 kg, 5th place)
- Cameroon (FW, 72 kg, 5th place)
- Latvia (FS, 84kg, 5th place)

As to the results by team, these countries won higher places (in the wrestling style where they were qualified) than the teams of China, Hungary, Germany, Greece, Georgia, Armenia, Ukraine, Korea, Austria, Romania, India, which were less motivated and even below their potential.

We must note the ranking of some wrestlers of the following countries even if they did not qualify:

- Mexico (GR, 60 kg, 10th place out of 40 - FW, 55 kg, 10th place out of 41)
- Guinea-Bissau (FS, 74 kg, 14th place out of 45)
- Namibia (FS, 55 kg, 21st place out of 45)
- Madagascar (FS 66 kg, 23rd place out of 46)
- Tajikistan (FS, 96 kg, 7th place)
- Ecuador (FW, 55 kg, 11th place out of 40)
- Peru (FW, 55 kg, 24th place out of 41)
- Ireland (FS, 84 kg, 9th of 46)
- Brazil (FW, 72 kg, 10th out of 31)

and of many other countries who improved a lot their competition level during the World Championship.

A thorough analysis of the World Championship 2011 showed the efficiency of the implementation of the FILA program in the development of the Olympic wrestling on all continents.

301 athletes took part in FS wrestling and competed in 341 matches against 263 matches in 2010. 25 matches out of 341 ended by fall (= 7%), 14 matches ended by technical superiority (21 falls and 11 technical superiority in 2010). 302 matches out of 341 ended by points. 69 matches (= 20%), ended after the third round, 45 matches (= 15%) ended without technical points. For these matches the winner was declared during the extra time (of the standing position of the clinch).

In FS the wrestlers executed 63 holds of three technical points, 62 technical holds of two points. Mainly in matches of 1/8, 1/4 and 1/2 finals, the holds of 1 point prevailed (maybe because the athletes were psychologically stressed as it was the last championship before the Olympic Games.)

In GR wrestling 309 wrestlers took part in 346 matches. In the seven weight categories 14 matches (= 4%) ended

by fall, 3 by technical superiority and 329 (= 95%) by points, of which 107 ended after the third round. During 57 matches (= 15%), no competitor obtained technical point (during the two minutes). In GR wrestling, participants executed 75 technical holds of three points, 151 holds of two points.

The general analysis of the 2011 World Championship shows the high level of the technical-tactical and psychological preparation of the wrestlers of the following countries:

- Iran (GR and FS)
- Belarus
- Turkey
- Kazakhstan (GR)
- Japan (FW)

The athletes of these countries won not only gold medals at the World Championship one year before the Olympic Games, but they showed their technical skills and a spectacular wrestling.

However, it should be noted that the successful organisation of the World Championship was facilitated by the objective refereeing of the referees who had a prior conversation with the FILA President.

The Olympic Palace which was full every day of the championship applauded enthusiastically the wrestlers for their spectacular technical skills.

Let us note in particular:

- Omid Norouzi (IRI, GR)
- Jordan Burroughs (USA, FS)
- Victor Lebedev (RUS, FS)
- Sharif Sharifov (AZE, FS)
- Reza Yazdani (IRI, FS)
- Saori Yoshida (JPN, FW)
- Kaori Icho (JPN, FW)
- Stanka Zlateva (BUL, FW)
- Tatsuhiro Yonemitso (JPN, FS)
- Mehdi Taghavi (IRI, FS)
- Rovshan Bayramov (AZE, GR)
- Alim Selimau (BLR, GR)

and other wrestlers who during each match executed at least two technical holds. They became the stars of the championship and they showed the beauty of the Olympic wrestling disciplines.

For a steady development of wrestling in the future and an increase of spectacular wrestling, the Bureau FILA will study the following:

1. Small changes in the competition rules, to stimulate (or increase) the interest of the participants during the competitions to gain more control over the technical and spectacular holds they may execute during the competitions.
2. To increase spectacular holds, with the assistance of the national federations and the organizers of international competitions and to encourage the work of the personal coaches of the champions and winners of the competitions, because the coach is a creative worker in sport.
3. To continue to provide technical assistance to the coaches to improve their knowledge and the methods of wrestlers' preparation so that they execute more technical holds during the prescribed period instead of waiting for the draw of the clinch.

In agreement with the FILA Bureau, the best personal coaches of wrestlers who conducted the most spectacular matches during the world championship 2011, for each style, will receive the title of best coach of the year:

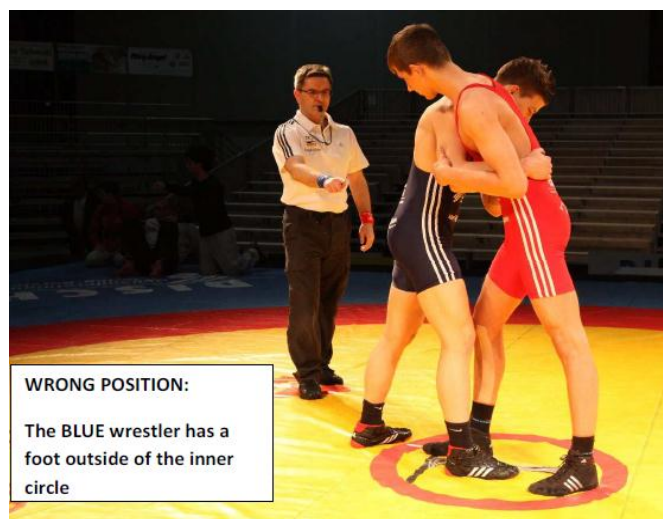
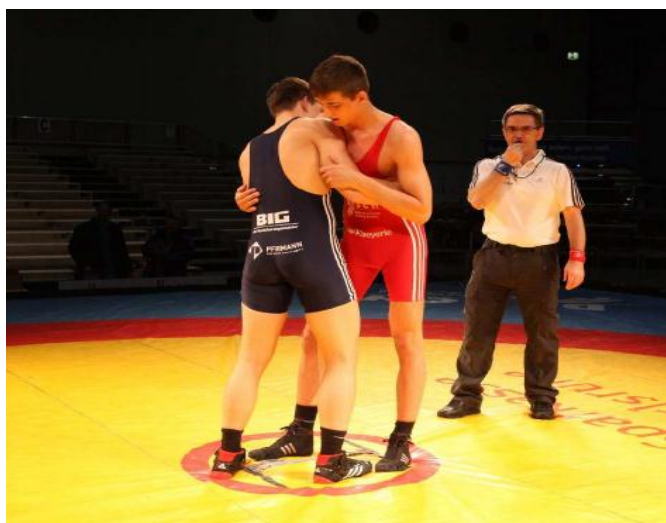
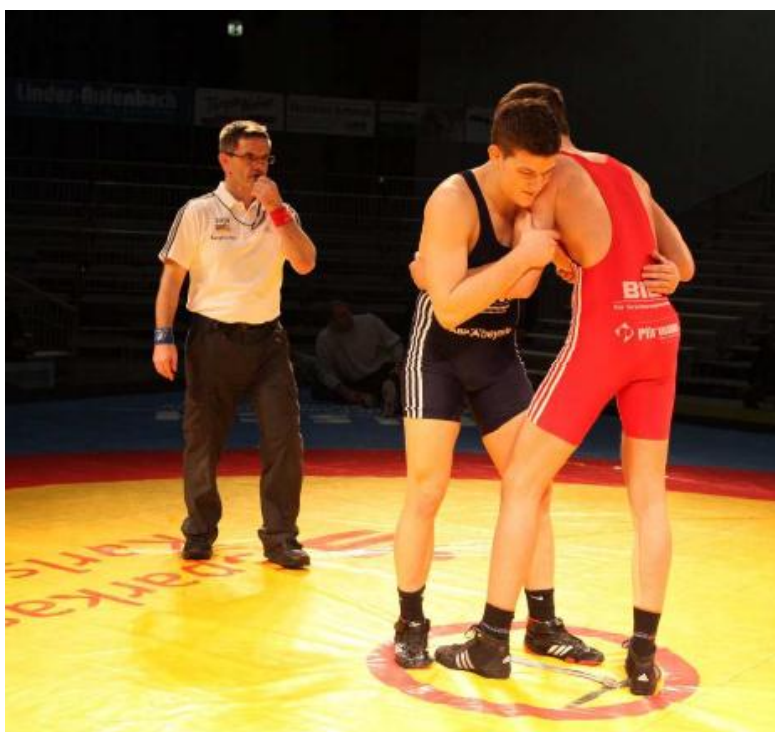
- In GR wrestling, Mohamad Bana (IRI), coach of Omid Noroozi (60 kg) who won 5 matches. On average in each match he won 6 technical points against his opponents.
- In FS wrestling, Marc Manning (USA), coach of Jordan Burroughs (75 kg) who won 5 matches. On average in each match he won 5.8 technical points against his opponents.
- In FW, Simeon Shterev (BUL), coach of Stanka Zlateva (72 kg) who won 5 matches. On average in each match she won 5.4 technical points against her opponents.

This analysis was proposed in collaboration with Stephan Kazarian, Secretary of the Technical Department.

STRICT APPLICATION OF THE CURRENT WRESTLING RULES

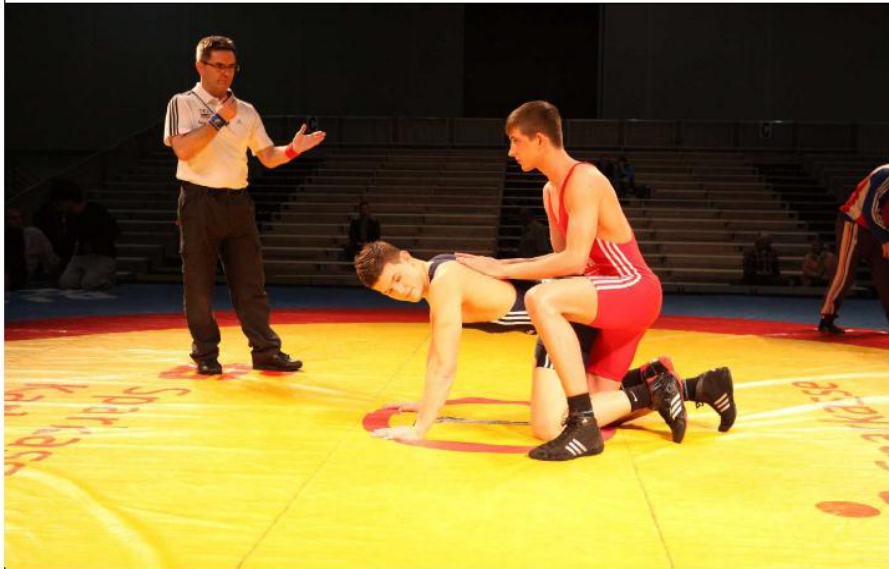
This presentation with pictures from the FILA Circular of 13th December 2011.
Photos: Bianca Heinzlbecker 11.01.2012

Greco-Roman Wrestling – Starting position at the beginning of each period:
„Chest to chest“, feet in the inner circle

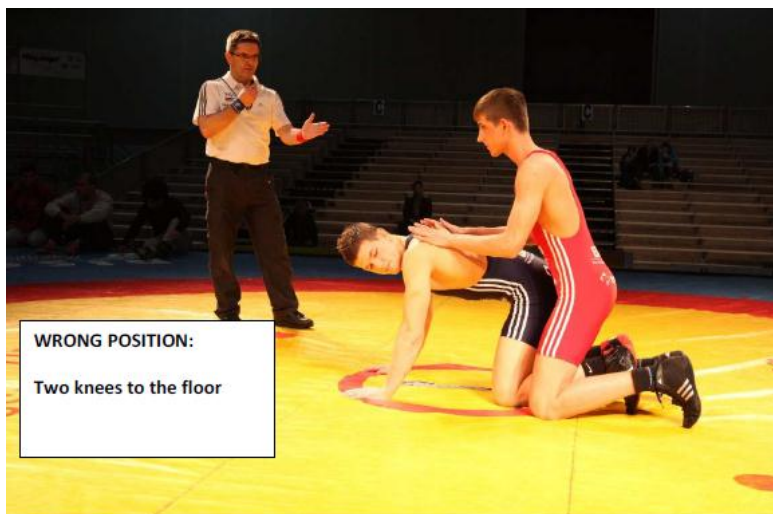
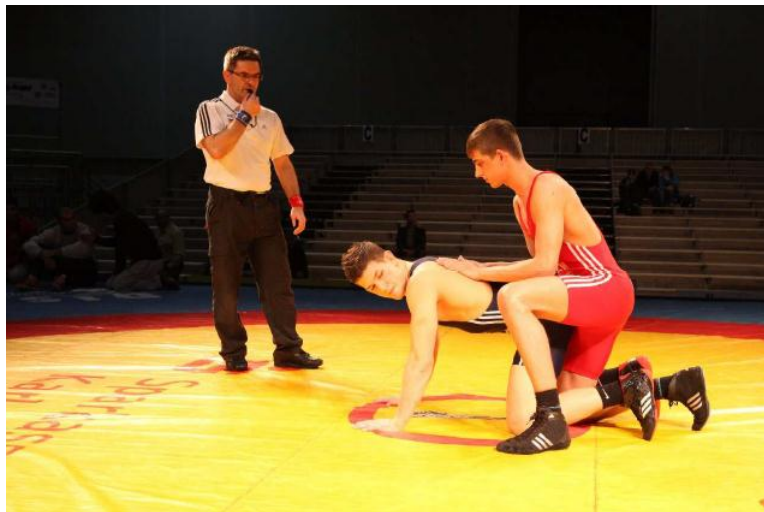


Greco-Roman Wrestling – Starting „par terre“ position:
The top wrestler puts his two hands on his opponent's shoulders and ONE knee to the floor.

The referee orders „IN POSITION“, waits for the position to be correct and stable...

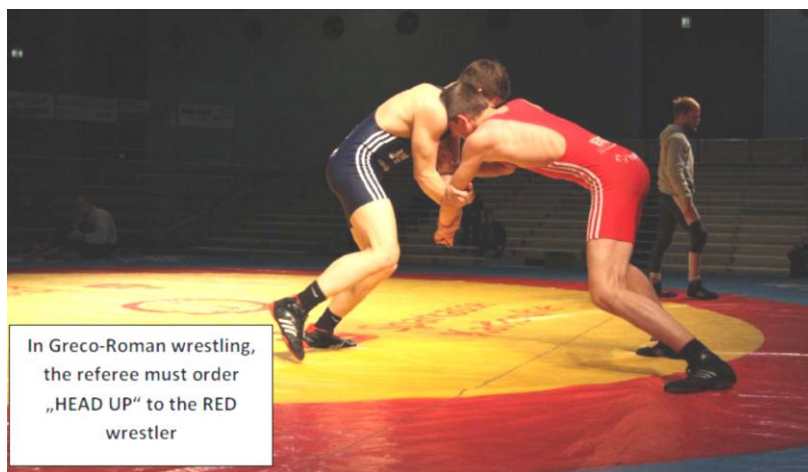
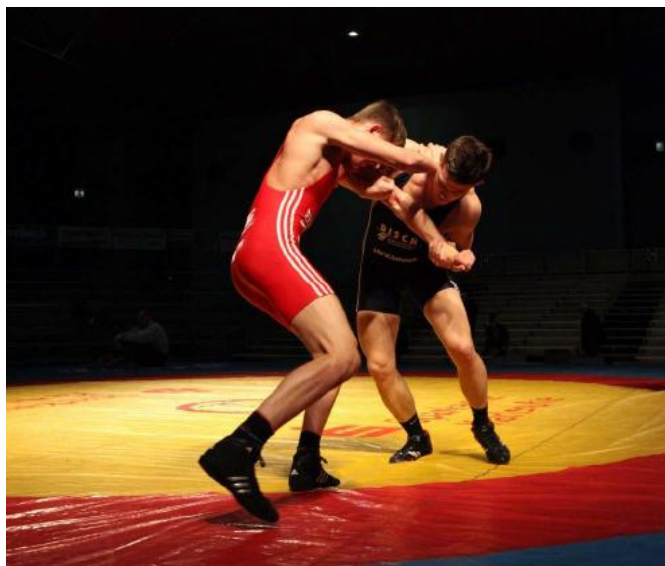


... and then whistles .

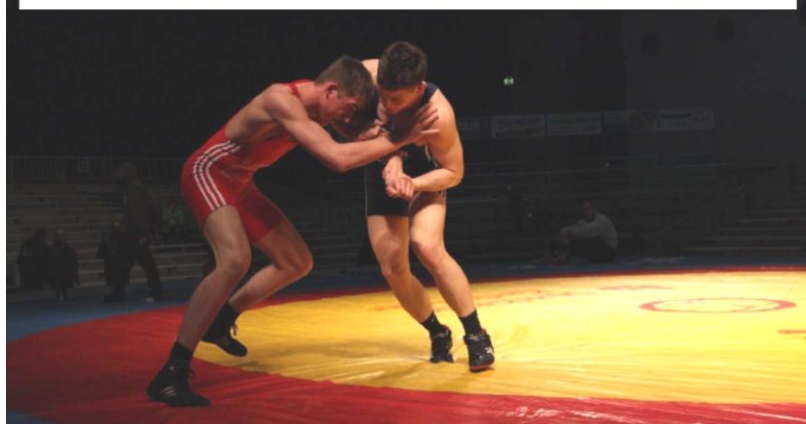


FAULT: Repeated entrance in the Red Zone

The referee must warn the wrestler at fault by saying: „RED... ZONE“



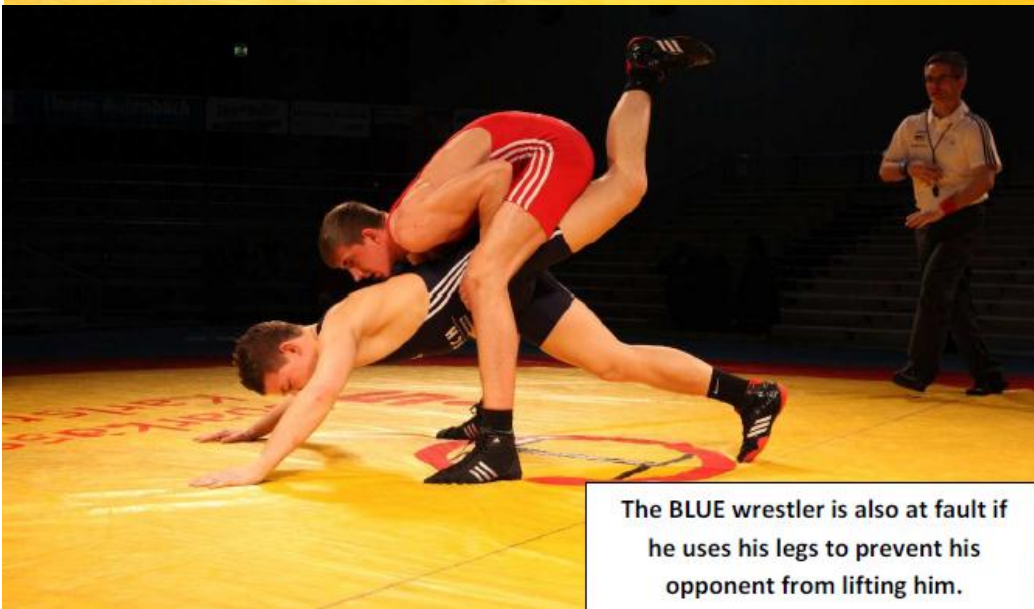
If the RED wrestler continues to display passivity despite the referee's verbal warning, the referee must stop the bout and give a caution to the RED wrestler (at fault in this case) and 1 point to the BLUE wrestler.



FAULT in Greco-Roman wrestling: The bottom wrestler lifts his legs

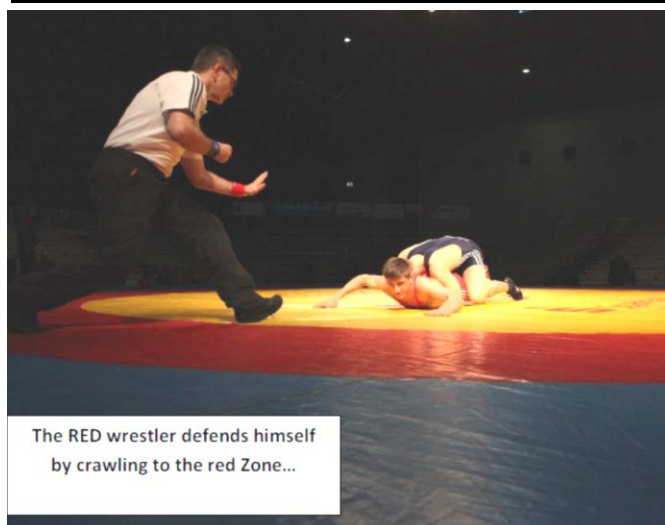
It is prohibited for the bottom wrestler to lift, push or press with his legs.

The referee must give a verbal warning to the BLUE wrestler. If he persists or repeats the fault, the referee must give him a caution and 2 points to the RED wrestler.

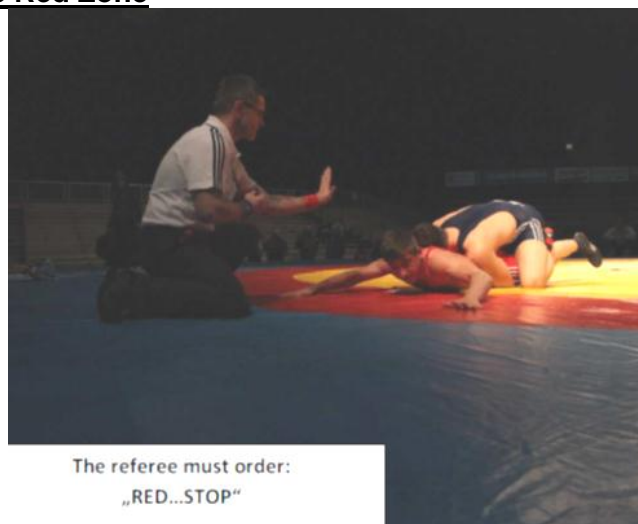


The BLUE wrestler is also at fault if he uses his legs to prevent his opponent from lifting him.

Fault in Greco-Roman Wrestling: Crawling to the Red Zone

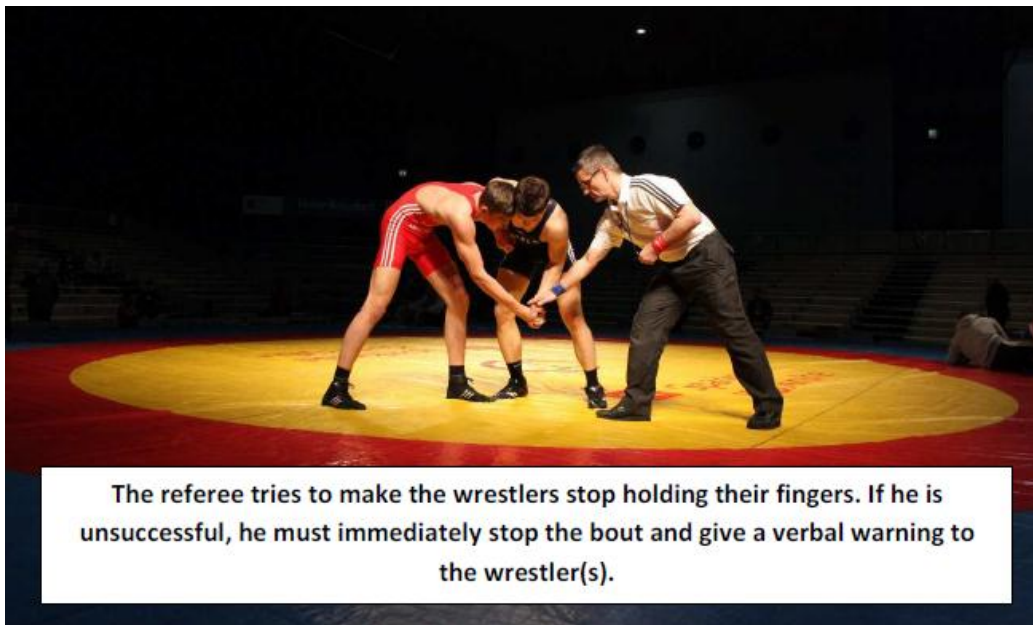


The RED wrestler defends himself by crawling to the red Zone...



The referee must order:
„RED...STOP“

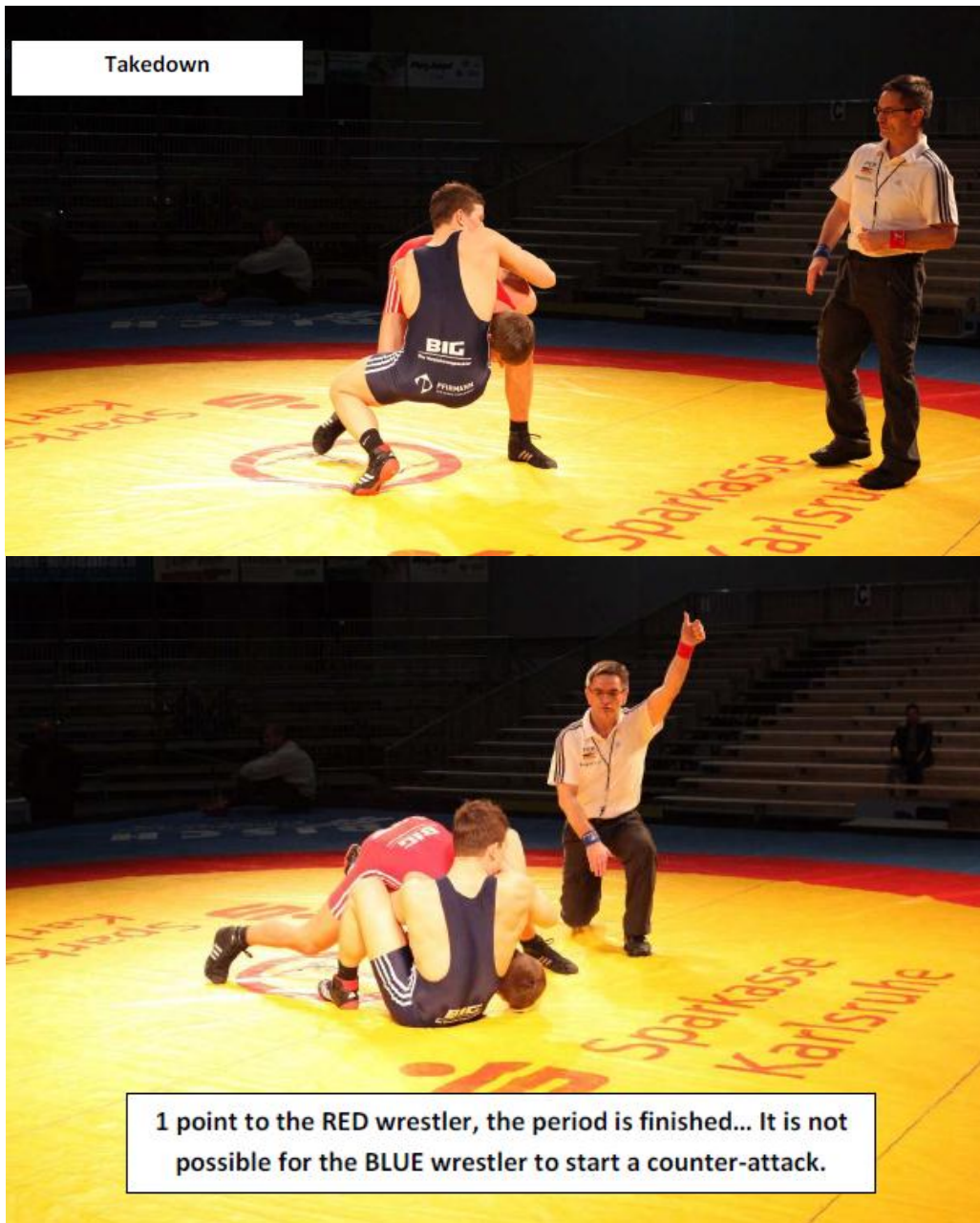
FAULT in Greco-Roman, Freestyle and Female Wrestling: Holding the fingers



Freestyle and Female Wrestling: Correct position for the Clinch



Takedown



1 point to the RED wrestler, the period is finished... It is not possible for the BLUE wrestler to start a counter-attack.