1st SCIENTIFIC AND PROFESSIONAL CONFERENCE ON JUDO

„APPLICABLE RESEARCH IN JUDO”

BOOK OF ABSTRACTS

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Hrvoje Sertić, Sanda Čorak and Ivan Segedi

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FOREWORD

The *Department of Judo and Combat sports* has decided to organize this conference, in cooperation with the Croatian Judo Federation, for several reasons:

- We are of the opinion that – as judokas, as former athletes, as coaches, and today as researchers – we want to establish a stronger connection between theory and practice, i.e. between scientific researches on the one hand, and sports results on the other.

  This is the reason why we want to found a fundamental conference on judo that will be held regularly every year.
- So far, the *Department of Judo and Combat sports* has cooperated exceptionally well with the Croatian Judo Federation, thus combining scientific research and practice, thereby confirming its scientific achievements, and ultimately contributing to the achievement of top-level results of Croatian judokas.
- Most of the Croatian national teams' coaches have graduated from the Faculty of Kinesiology (University of Zagreb) and a significant number of competitive judokas study at this Faculty as well.

By having participated at scientific conferences and congresses, organized by the *European Judo Union* (EJU) and the *International Judo Federation* (IJF), since 2005 and by having actively presented scientific and professional papers at those conferences and congresses, the wish of people who are employed at jobs connected with judo was to contribute to the development of this complex and beautiful sport, both from the professional and from the scientific point of view.

Therefore, the goal is to gather you, outstanding scientists, experts and coaches from the domain of judo, every year in one place, i.e. in Zagreb, in order to share our knowledge, insights and experiences, with the purpose of the development and progress of judo.

Thank you for coming and contributing, by your presence and active participation in presenting your research results and expert knowledge, to the establishing of this conference.

Full Professor Hrvoje Sertić, Ph.D.
Chairman of Department of Judo and Combat sports,
Faculty of Kinesiology, University of Zagreb
President of the Organizing Committee

FOREWORD

During the last ten years, Croatian Judo Federation has recorded a significant progress. That progress is measured primarily with achieved sports results, but among these results, except medals, we also include of strategic objectives, such as greater recognition of judo in Croatia, promotion and popularization of judo and implementation of education at all levels. At the Croatian Judo Federation, we are aware of the correlation between the realization of the most prestigious sport results and a high level of scientific and professional work.

To achieve all of the goals we have planned in each domain, from coaching and competition to organizational aspects and managing, we have to be open to acquisition of knowledge and learning. Conferences are such events where we can establish cooperation and learn from the examples of best practice and research. Therefore, we hope that together with the Faculty of Kinesiology, Zagreb and Department of Judo and combat sports, we can establish this conference as a **permanent forum of judo experts and researchers.** Therefore, we would like this conference to become a traditional event and as organizers we would also like to:

- Connect the science and research in judo with judo practice, i.e. to put the theories and research results directly in the function of development and the promotion of judo,
- Encourage collaboration and connection of all those who deal with and wish to engage in research in judo and/or use the research results,
- Educate coaches, competitors and other sport officials in judo and
- Highlight multidisciplinary aspects of judo that can be studied not only from the standpoint of physical education and kinesiology, but also from the standpoint of anthropology, psychology, sociology, economics, management, history, education and otherscientific disciplines.

All of you who are holding this publication in your hands, I would like to invite you to join us in our efforts **to bring together and establish a permanent network and communication of researchers in judo as well as those who use these results**. We have a common and very worthy goal - to continuously improve the quality and value of our sport.

Assistant Professor Sanda Čorak, Ph.D
President of Croatian Judo Federation
Vice President of the Organizing Committee

CONTENTS

BEYOND THE WHITE REFLECTING IMAGE THAT IS THE JUDOGI: RESEARCHES, WORKS AND THOUGHTS ON BALANCE, EDUCATION AND CREATIVITY IN JUDO

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Beyond the ippon so widely broadcasted, the specificity of judo is more than a simple success on the other (opponent/partner). The ratio between the number of hours devoted to competition and the number of hours devoted to training is around 1%. The throw in judo is a rare moment, it is to unbalance in a mechanics-physics way the opponent using strategies, tactics and technics, but these opponents are partners during 99% of the time of the judo practice. The balance will be approached as plural in judo: (i) gestural actions concerning the physics and mechanics of levers (throw down the other); (ii) relational actions (training with the others); (iii) analyzing actions (what are they doing? How can they be so skillful?

Publications and students realizations allow us to bring out how:

- This so-subtle way to catch the balance of the other can be educated by combining the variables that are the shifts and the families of techniques.
- Well-trained judokas can be highly accurate metronomes. Computers and digital camera allow to record and to compare gestural actions accomplished.
- Judokas' values are hierarchically organized : first, judo allow to learn to respect the other (survey of 1.000 judokas with 7 items, using the methodology of paired comparisons)
- There are many ways to combat in judo (survey of 400 students : 49% play to win, 33% play to take risks, 6% play in friendship, 8% have failed, 4% could not play [injuries, single]). There are many ways to practice randori, they highlight the complementary role to be taken by tori and uke in their training.
- Understand the judoka's organization in his system of attacks and the way he uses his favorite throws. After analyzing 6 high-level judokas and 30 fights, results show that there is no difference in their duration time of combat (ANOVA one way and Bonferroni test for post hoc: $F_{1.69}=2.64$; $p=0.177$) and they used 6.3 ± 1.5 attacks in this competition.
- Understand that learning kata (examples are built on the „go no sen no kata") can be a source of creativity and imagination.

Our conclusion is quite simple: „Judo more than sport" (UEJ logo)? We have to practice it in this way and do researches about this.

MOLECULAR HYDROGEN IN JUDO: NEW PERSPECTIVES

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Background: It is well know that optimal recovery from training and competition may provide numerous benefits for athlete performance. Importance of successful performance leads athletes to seek advantage that may improve performance. The recovery process is especially important in sports where an athlete may have to compete more than one occasion during a competition, such as judo. Hydrogen-rich water as a new supplement has been shown some beneficial advantage in athletes.

Hydrogen-rich water as a novel supplement has been shown some beneficial advantage in athletes, without any adverse health effects. Ostojic (2012) found that intake of hydrogen-rich water exhibits a high pH that may be beneficial for exercise-induced acidosis, with no adverse effects reported. Also, research on animal studies suggested that hydrogen-rich water may provide some benefits as a neutralizing agent (Abol-Enein et al., 2009). Although rare in the general population, exercise-induced metabolic acidosis is a common metabolic disturbance among physically active individuals (Robergs et al., 2004). It is characterized by low pH in body tissues and blood accompanied by the build up of lactate and a variety of neuromuscular and cardio respiratory responses (Cairns, 2006). Exercise-induced metabolic acidosis is a distinct form of metabolic acidosis that typically occurs during vigorous exercise when cells are forced to rely on non-mitochondrial adenosine triphosphate (ATP) turnover that leads to proton release and decrease in serum pH that could negatively affect exercise performance (Robergs et al., 2004). The initial goal for physically active individuals with acidemia is to raise the systemic pH with an alkalizing agent. When hydrogen is generated through magnesium reaction with water, solubilized hydrogen drink (e.g. hydrogen-rich water) exhibits high pH, low dissolved oxygen and extremely high dissolved molecular hydrogen. As a possible acidity-lowering agent, alkaline hydrogen rich water could be used by humans to combat the effects of acid produced by exercise. Several studies in our laboratory examined the effect of hydrogen-rich water in athletic environment, with main outcomes were blood buffering indicators during H2 intervention.

The purpose of our pilot study was to determine the effects of pre-exercise HRW intake on the acid-base response (directly by measuring changes in arterial blood pH, blood lactate and bicarbonate concentration) and recovery from high-intensity exercise. Thus, in this randomized, placebo-controlled, double-blind crossover pilot study we hypotheses that

acute HRW supplementation in well-trained judo athletes will improve short-term, high intensity performance, as well as recovery.

Material/Methods: This study was an open label pilot study conducted on 8 female judo athletes. Hydrogen rich water (HRW) was produced by dissolved one tablet (4g) into the drinking water. The subjects were randomly assigned into 2 groups. First group (N=4) were drink hydrogen rich water, and second one (N=4) drink water containing a placebo. Athletes were provided with one 300ml bottle of HRW or placebo, and instructed to drink it 30 minutes before beginning of Special judo fitness test (SJFT) at 09:00 PM on the day of examination. After the first measurement and acute training procedure, athletes were refrained from exercise for 48 hours. The same procedure of measurement and training procedure was repeated 4 days after the first measurement. During the second phase of experimental protocol, athletes from the first group (N=4) were drink water containing a placebo, and the second one (N=4) were drink hydrogen rich water. The oral hydrogen treatment formulation was provided by SevenPoint2TM (7.2 Recovery with HydroFXTM, Neport Beach, CA, USA) in tablet form. Lactate, arterial blood pH and bicarbonates were measured at baseline, 3-minutes and 5-minutes after exercise. All athletes performed a high-intensity intermittent anaerobic exercise, which consisted in a specific-judo test called Special Judo Fitness Test (SJFT) and developed by Sterkowicz (1996).

Results: Significant main effects for arterial pH ($F=4.464$, $P=0.021$) and lactate concentration were observed ($F=6.768$, $P=0.004$). There was no significant change in bicarbonate concentration. Additionally, intake of HRW increased post exercise arterial blood pH and prevented an elevation of blood lactate during high intensity exercise.

Conclusion: Hydrogen-rich water acts as an alkalizing agent, probably due to high content of anions and high reductive ability. These early findings are promising regarding potential application of hydrogen-rich water as alkalizing agent in both physically actives and non-athletic individuals.

Hydrogen delivered through H2-dissolved water seems to increase muscular performance, decrease fatigue, and improve exercise-induced acidosis in athletes. However, more research is needed to identify the exact mechanisms of hydrogen action, develop more practical and applicable therapeutic protocols, and validate the therapeutic potential of H2 in clinical setting.

References

1. Abol-Enein, H., Gheith, O.A., Barakat, N., Nour, E., Sharaf, A.E. (2009). Ionized alkaline water: new strategy for management of metabolic acidosis in experimental animals. Ther Apher Dial, 13, 220-224.
2. Cairns, S.P. (2006). Lactic acid and exercise performance: culprit or friend? Sports Med, 36, 279-291.
3. Ostojic, S.M. (2012). Serum alkalinization and hydrogen-rich water in healthy men. Mayo Clin Proc, 87, 501-502.

4. Ostojic, S.M., Stojanovic, M. (2014). Hydrogen-rich water affected blood alkalinity in physically active men. Res Sports Med, 22(1), 49-60.
5. Robergs, R.A., Ghiasvand, F., Parker, D. (2004). Biochemistry of exercise-induced metabolic acidosis. Am J Physiol, 287, R502-516.
6. Sterkowicz, S. (1995). Test specjalnej sprawności ruchowej w judo. Antropomotoryka, 12, 29–44. [in Polish]

DEVELOPMENT AND EVALUATION OF A SPECIFIC JUDO GRIP STRENGTH TEST

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Problem: *„The skills of gripping are the key to success in judo".* These are the words in which Neil Adams describes the outstanding function of the Kumi-kata in judo (1). In this sport, almost any strength transfer on the opponent is regulated by the hands via the combat clothing. Therefore, the strength to grip or hold the sleeve or lapel is very important to successfully execute fighting actions with throwing techniques.Not only coaching practice, but also sports sciences have been focusing on grip strength during the last few years (2-12, 14).However, most of the studies are based on measuring the „hand squeezing strength" by using the hand dynamometer (15), which is unspecific for judo.

Procedure: In line with preceding authors (4, 7), our system is to measure the grip strength performance at the sleeve and the lapel of the judogi.The test person grabs a tightened judo sleeve or lapel by a judo specific grip. The grip devices are pulled continuously in horizontal direction by a tension threaded spindle, which is operated by a gear box and an electric motor. By fixation the subject's upper arm we eliminate the influence of additional muscle groups (9). The grip strength is measured eccentrically. A force sensor between the spindle and the sleeve/lapel measures the effective strength. The amplified measurement signal is transmitted to a PC via an USB data acquisition module of Data Translation with a sampling rate of 100 Hz (quasi static measurement procedure). The measurement took about7 s, using a pulling speed of 2 cm/s. The signal was filtered by a low-pass 50 Hz filter. The maximum amount of the measured pulling force served as a characteristic quantity.

Research aspects:

1. Checking the reliability of the testing procedure.
   Test-retest reliability studies are of immediate importance for maximum grip strength of the right and the left sleeve grip. 15 elite judo players of Germany's male national team (age: 23.33±1.59 years, body weight: 88.55±15.24 kg, body height: 179.27±7.35 cm), were examined twice (with two days between the measurements).
2. Comparison of age and performance related differences in the level of grip strength.
   The grip strength of the senior male national team was compared with 14 elite junior judo players (age: 18.5±1.09 years, body weight: 85.71±25.19 kg).
3. Comparison of the differences between lapel and sleeve grip.
   Within the junior group the comparison included the maximal grip strength at sleeve and lapel.

Results and discussion:

(1) In the test-retest study, a significant correlation on the level of p = 0.005 was found (r = 0.87) for the sleeve grip. Thus, the reliability of the test could be confirmed.

(2) The comparison of the maximum holding strength at the sleeve of the two national teams showed a significantly higher level of performance of the senior males compared with the junior males (M = 881.7±154.9 N vs. 781.6 ± 102.6 N). The practical impact is found in the mean difference (13), $t_{[27]}$= 2.23, p = 0.03, d = 0.78, 1-ß = 0.65.

Scientific papers have provided different evidence relating to the level of grip performance in elite vs. non-elite athletes. On the one hand they have found differences in maximal isometric grip strength when comparing elite and non-elite judo players (7) or when comparing judo players with recreational athletes (6). Other authors established significant differences between elite and non-elite athletes (4) or found a better level of the sustainability in maximum grip strength in judo players vs. „ordinary" athletes (6). Our study indicates a significantly higher maximum grip strength performance of highly qualified judo players depending on age and level of performance.

(3) The grip strength performance in the sleeve grip (751.0 ±89.0 N) is significantly higher than in the lapel grip (372.5 ± 63.5 N).

Practical implications and prospects: The new testing device offers opportunities for a differentiated control of the level of performance and can be applied for continuous performance diagnostics in connection with the following research problems:

A summary of the international scientific studies indicates that judo players are not stronger than non-judo players in absolute terms (peak grip force), but the judo players had a higher resistance to fatigue (6). So one of our aims is to establish and to evaluate references in grip strength endurance.

Investigations about interventions of a specific grip strength training (which training contents and methods are appropriate to increase the grip strength?).

References

1. Adams, N. (1990). *Grips.* London: Ippon books.
2. Bonitch-Góngora, J. G., Bonitch-Domingués, J. G., Padial, P. & Belen, F., The effect of lactate concentration on the handgrip strength during judo bouts, Journal of Strength and Conditioning Research,2012, 26(7), 1863-1871.
3. Crosby, V. A., Wehbe, M. A. & Maywr, B., Hand Strength: Normative Values, Journal of Hand Surgery, 1994, 19A (1), 665-670.
4. da Silva, B. V. C., Marocolo Jr., M., de Moura Simin, M. A., Rezende, F. N., Franchini, E. & da Mota, G. R., Reliability in Kimono grip strength tests an comparison between elite and non-elite Brazilian Jiu-Jitsu players, Archives of Budo, 2012, 8(2), 103-107.

5. Detanico, D., Budal Arins, F., Dal Pupo, J., dos Santos, V., Strength parameters in judo athletes: An approach using hand dominance and weight categories, Human Movement, 2012, 13 (4), 330– 336.
6. Dias, J. A., Wentz, M., Külkamp, W., Mattos, D., Goethel, M. & Borges, N. Júnior, Is the handgrip strength performance better in judokas than in non-judokas?, Science & Sports, 2012, 27, 9-14.
7. Franchini, E., Miarka, B. & Matheus, L., Endurance in judogi grip strength tests: Comparison between elite and non-elite judo players, Archives of Budo, 2011, 7(1), 1-4.
8. Franchini, E., Takito, M. Y., Kiss, M. & Sterkowicz, S., Physical fitness and anthropometrical differences between elite and non-elite judo players, Biology of Sport, 2005, 22(4), 315-328.
9. Heinisch, H.-D., Knoll, K., Kindler, M. & Haupt, H., Development and evaluation of a specific judo grip-strength-test, Poster presentation 4th European Science of Judo Symposium, Budapest, 2013.
10. Lee, S. & Quan, H., Hand Dominance of Elite Versus Non-Elite Judo Players, JudoInfo.com©2004 by Neil Ohlenkamp, Retrieved from http://judoinfo.com/research23.htm.
11. Leyk, D, Georges, W., Ridder, D., Wunderlich, M., Rüther, T., Sievert, A. & Essfeld, D., Hand-grip strength of young men, women and highly trained female athletes. European Journal of Applied Physiology, 2007, 99, 415-421.
12. Mathiowetz, V., Weber, K. & Volland, G., Reliability and validity of grip and pinch strength evaluations, Journal of Hand Surgery, 1984, 9(2), 222–226.
13. Rhea, M. R., Determining the magnitude of treatment effects in strength training research through the use of the effect size. Journal of Strength and Conditioning Research, 2004, 18(4), 918-920.
14. Sánchez, Á. G., Domínguez, A. S., Turpin, J. A. P, Tormo, J. M. C. & Llorca, C. S., Importance of hand-grip strength as an indicator for predicting the results of competitions of young judokas, Archives of Budo Science of Martial Arts, 2011, 7(3), 167-172.
15. Schmidt, R. T. & Toews, J. V., Grip strength as measured by the Jamar dynamometer, Archives of Physical Medicine and Rehabilitation, 1970, 51, 321–327.

JUDO: THE ROADS TO IPPON: BIOMECHANICS OF THROWS TACTICS IN COMPETITION WITH SUGGESTIONS AIMED AT ENHANCING EFFECTIVENESS OF COACHES TOOLS

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In this invited lecture the biomechanical analysis of tactical tools utilized by top athletes in high level competition is presented.

In the first part, the lecture starts with a very short summary of the researches carried out on biomechanics, thermal exchange and metabolic energy expenditure related to judo throwing techniques.

These data elicit the division in more and less energetically expensive and in most and least efficient techniques in term of mechanical power applied.

Both these divisions are strictly connected to the biomechanical classification of throws in Lever and Couple.

All Judo throwing techniques: classic, innovative and chaotic are particular ways to gain some vantage by forces, in space or time, with some specific movements based on: the two physical principles underlying the throwing techniques (Lever and Couple), the athletes' body shape and structure, the referee rules, the ways to transfer energy, and so on.

The whole biomechanics of throws is analyzed concisely, pointing out the classification and singling out the most important mechanical aspects

After this introduction of the most important current researches and tendency of technical-tactical actions, the analysis of tactical attacks and the biomechanics of tools utilized, is exploited.

Researchers in the world usually consider three tactical attack modalities of the adversary: direct attack, combination and action reaction attack.

Accordingly, in this lecture, some results obtained by different researchers in each of these modalities are compared.

In the second part it is developed the specific analysis of the technical-tactical support tools.

These tools allow to enhance the effectiveness of the athletes' special throwing techniques (Tokui Waza), increasing the probability to obtain Ippon.

Besides these support tools, we consider also what coaches and athletes realize as so important: the so called ***„Technical Psychology"***: the use of some specific technical actions

or new throws to increase psychological pressure and astonishment in the adversary, in order to obtain Ippon.

Biomechanical analysis allows both the classification of throws that can be combined in effective way, and the definition of how combinations should be constructed by the three groups: Chica ma waza, Ma waza, and To ma waza.

Groups that contain the most utilized throwing techniques for combinations.

The three previous classification groups arise from the variation of inter-distance between athletes.

The last part of the lecture emphasizes, in short way, the physics and biomechanics connected to judo competition that is defined as: ***„an interacting complex nonlinear system, with chaotic and fractals aspect"***.

This system must be analyzed studying the motion of „couple of athletes system" and evaluating their interaction (throws).

This conceptual simplicity highlights a very complex physical-mathematical approach.

The motion of athletes system should be analyzed by statistical Physics, whereas interaction (throws) should be analyzed by classical Newtonian Physics.

During the motion of Couple of Athletes System, human bodies show complex responses connected both to the human physiology and strong push-pull interactions.

Brownian tools are today the actual most sophisticated way of modeling motion in competition, starting from fractals till to multi-fractals aspects.

However not all is easy in the analysis of throwing techniques, from the physical point of view, except for the basic principles Couple and Lever.

If we study the specific mechanics of several throwing action in real competitions we can face some interesting physical aspects not totally well known, like: almost-plastic collision between extended bodies and for some Lever techniques we have to solve dynamical problem of bodies with variable mass that differs from the well known Classical Mechanics with constant mass.

In effect, in such a situation, the general methodological approach of mechanics must be properly modified; considering a deformable body with a finite extension, where special emphasis is given to the variable rotational inertia during throw, with interesting consequences about balance, linear and rotational momentum and motion of center-of-mass.

In this lecture all tools, both well known at coaching like level and new proposals as well, are classified and organized in scientific way, stressing the biomechanical principles that rule their application in high level competitions and assessing these basic tools to enhance effectiveness.

The clarification and understanding of the inner mechanics of these tools is a powerful help for coaching to teach competition tactics in useful way.

SPECIAL PHYSICAL FITNESS CONTROL IN JAPANESE ATHLETES

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Background & Study Aim: Physical fitness is one of the important factors affecting the quality of the tactical and technical activities in judo. This study aimed to further knowledge of: 1) body stance side preferred in performing tachi-waza (fighting in standing position); 2) level of fitness preparation of males and females; 3) effect of the dominant body side on the quality of performance in Special Judo Fitness Test (SJFT) and the effort perceived.

Material & Methods: Paired selection helped obtain the consistency of the characteristics of 9 male and 9 female subjects in terms of age (Males 18.0+/-2.3 vs. Females 17.2+/-2.3 years), training experience (9.9+/-1.7 vs. 10.7+/-2.9 years), skill level (1-2 dan) and another weight category. A dominant fighting stance (right or left) was determined. In another two days, the randomly selected subjects performed SJFT (visual instruction [1]) with the dominant and non-dominant body side. The data grouped according to the body side formed the condition / experimental factor. The analysis used non-parametric statistical tests when medians were compared. The differences were tested at the significance level set at $p<0.05$.

Results and Discussion: Distribution of the group sizes for left- and right-sided subjects in groups of males and females did not differ (Fisher exact test $p=0.667$). The contribution of left-sided subjects among the respondents was 0.39. Performing the throws in series A of SJFT with the dominant vs. non-dominant body side showed significantly better results in males (signed sign test $p=0.030$), but not in females (signed sign test $p=0.424$). Evaluation of the similarity of performing SJFT with the non-dominant body side in a judo bout during competition was significantly higher in males compared to females ($p=0.015$). Females feel higher fatigue when performing the test using the non-dominant body side (Kruskal-Wallis test $p=0.015$).

Other studies have demonstrated that achievements of men in national-level tournaments are correlated with results obtained in SJFT [2]. Furthermore, performance of SJFT depended on the age category (female cadets, juniors, seniors) [3] and, in both gender groups, on the level of aerobic and anaerobic capacity [3, 4]. All four dimensions as number of throws, HR's directly after effort and after 1 minute of recovery, and Index in SJFT should be compared to normative data [5, 6].

Conclusions and Practical Applications: A high number of contestants using the left dominant body stance occurs among both male and female athletes. Kenka-yotsu allows for using specific gripping techniques and angles of forceful affecting the opponents, thus deciding on the effectiveness of throws. The throws used during SJFT are most frequently performed using the dominant compared with the non-dominant body side, but the women are characterized by a specific pattern of performing consecutive series of SJFT compared to men. In practice, this ecological / not laboratory testing can be useful for coaches using available normative tables for evaluation of both males and females. Periodic repetition of research allows the talent identification by the assessment of progress under the influence of the training. In addition, fitness testing in judo can be included by coach in the assessment of the effectiveness of rehabilitation process and deciding how to workout with individual.

References

1. Special Judo Fitness Test URL: http://www.archbudo.com/text.php?ids=434 [Accessed 5 January 2015]
2. Sterkowicz S. Franchini E. Specific fitness of novice and elite judoists. J Hum Kinet 2001; 6: 81–98.
3. Jagiello W, Wolska B, Smulskij V. Physical preparation of female judo competitors at selected stages of long-standing sports training. Arch Budo 2009; 5: 47–53.
4. Sterkowicz S, Zuchowicz A, Kubica R. Levels of anaerobic and aerobic capacity indices and results for the special fitness test in judo competitors. J Hum Kinet 1999; 2(1): 115–135.
5. Franchini E, Del Vecchio FB, Sterkowicz S. A special judo fitness test classificatory table. Arch Budo 2009; 5: 127–129.
6. Sterkowicz-Przybycień K, Fukuda DH. Establishing normative data for the Special Judo Fitness Test in female athletes using systematic review and meta-analysis. J Strength Cond Res 2014; 28(12): 3585–3593.

USAGE OF 3D BODY SCANNING TECHNOLOGY IN JUDO

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Introduction:With the progress oftechnology andapplication of3Dbody scanner methods of measuring body segments, measures have become contactless, fast and above allaccurate (Simmons, &Istook, 2003; Zhangetal., 2014).The aim of this study is to present the method and technology of 3D body scanning and its usefulness for judo.

Methods: Sample included 10 judokas that are competing in national and international competitions with age 21.65 ± 3.45, height 176.12 ± 3.8 cm, weight 74.16 ± 6.95 kg and BMI of 23.82 ± 2.08 kg/m^2. All of them were right hand dominant. Measurements were conducted in a Physiological laboratory of Faculty of Sports, University of Ljubljana. Anthropometric measurement of body was performed by a 3D body scanner NX16 (TC^2, USA). The NX-16 utilizes a non-invasive scanning method to produce a true-to-scale 3D body model in 8 seconds (Apeagyei, 2010).The scanner uses photogrammetry technology, which projects patterns of structured white light on to the body. The way in which the pattern is distorted by the shape of the body is then recorded by 32 cameras. From this the body shape is digitally reconstructed from a raw photonic point cloud data which leads to a surface reconstruction of the body and allows for automatic landmark recognition as well as electronic tape measurements. We used 17 paired body variables as described in Šimenko & Vodičar, (in press). Results: For selected variables we obtained the following data for right - R and left - L paired value in cm: LSH - Long shoulder height R 141.87 ± 3.53 / L 142.12 ± 3.87, ASG - Armscye girth R 45.14 ± 3.33 / L 45.25 ± 1.64, SAL - Straight arm length R 57.46 ± 3.08 / L 57.04 ± 3.27, UAG - Upper arm girth R 33.35 ± 2.31 / L 32.87 ± 2.26, EG - Elbow girth R 28.28 ± 1.53 / L 27.76 ± 1.83, FG - Forearm girth R 28.58 ± 1.19 / L 28.12 ± 1.15, WG - Wrist girth R 17.49 ± 0.81 / L 17.09 ± 0.72, SWH - Side waist height to floor R 101.67 ± 3.90 / L 101.64 ± 3.87, OLL - Outside leg length R 102.47 ± 3.83 / L 102.55 ± 3.69, TL - Thigh length R 35.11 ± 4.81 / L 35.05 ± 4.90, TG - Thigh girth R 64.02 ± 5.18 / L 64.21 ± 4.79, MTG - Mid-thigh girth R 52.21 ± 3.59 / L 52.16 ± 3.75, MTH - Mid-thigh height R 67.01 ± 5.28 / L 67.04 ± 5.24, KH - Knee height R 50.04 ± 4.75 / L 50.11 ± 4.70, KG - Knee girth R 37.86 ± 2.74 / L 37.57 ± 2.67, CH- Calf height R 37.08 ± 6.3 / L 36.98 ± 6.93 and CG - Calf girth R 35.98 ± 2.00 / L 35.98 ± 1.93.

Conclusions and Practical Applications: 3D scanner NX16 produces over 140 body measurements from which in our case 17 paired segment variables were retrieved in just 8 seconds. Those variables can be used to determine the morphological status of our judokas. This data can be later used for monitoring body development in youth or elite judokas.

3D analysis can also be useful in determining body asymmetries which can lead to occurrence of injuries and on this topic has already been used in judo by Šimenko, & Vodičar, (in press). Data can also be used as a reference values in case of injuries in recuperation and rehabilitation to normal status before injury. Therefore 3D scanning technology represents a promising and useful tool for judo, but still needs further research to achieve even greater practical implications.

References

1. Apeagyei, P. R. (2010). Application of 3D body scanning technology to human measurement for clothing Fit. *International Journal of Digital Content Technology and Its Applications*, *4*(7), 58–68.
2. Simmons, K. P., & Istook, C. L. (2003). Body measurement techniques: A comparison of three-dimensional body scanning and physical anthropometric methods for apparel application. *Journal of Fashion Marketing and Management, 7(3)*, 306–332.
3. Šimenko, J., & Vodičar, J. (in press). Evaluation of body symmetries in judo. In M. Doupona Topič, & T. Kajtna (Eds.) *Youth sport: Proceedings book / 7th Conference for Youth Sport, Ljubljana, 12-13 December 2014*. Ljubljana: Fakulteta za Šport.
4. Zhang, K., Zheng, J., Gao, C., Thomas, D., Li, X., & Heymsfield, S. (2014). Rapid-accurate anthropometric body shape assessment with low-cost novel 3D imaging system (391.2). *The FASEB Journal*, *28*(1 Supplement).

IMPACT OF DIRECTIONAL ASYMMETRY ON COMPETITION PERFORMANCE IN JUDO: A PILOT STUDY

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Introduction: Directional asymmetry is characterized by a symmetry distribution that is not centered around zero but is biased significantly (Tomkins & Kotiaho, 2002) and is largely attributable to differential mechanical loading during bone growth, for example, handedness (Özener, 2010). Determining body (a)symmetries is important, because possible asymmetries may lead to severe physical consequences making it easier for the occurrence of injuries (Stradijot, Pittorru, & Pinna, 2012). DA has not been widely used in judo in connection to competitive performance, therefore the aim of this study is to present the relationship of DA to competitive performance in judokas.

Methods: Sample included 6 judokas that are competing in national and international competitions. Participants were 19.6 ± 1.72 years old, their height 175.67 ± 4.91 cm, their weight 71.28 ± 4.78 kg and all of them were right hand dominant. Measurements were conducted in a Physiological laboratory of Faculty of Sports, University of Ljubljana. Measurements of body composition were performed using bioelectrical impedance analysis InBody 720 (Biospace Co., Ltd) to measure body weight, body mass index (BMI), skeletal muscle mass (SMM), body fat mass (BFM), right and left arm lean mass and right and left leg lean mass. Anthropometric measurement of body was performed by a 3D body scanner NX16 (TC^2, USA). We used 17 paired body variables as described in Šimenko & Vodičar, (in press). We collected competitive performance from total number of points in final standings of 2014 competition year on the freely accessible web page of Slovenian Judo Federation. DA was calculated as R-L body value as used in Özener, Pelin, Kürkçüoğlu, Ertugrul, & Zagyapan, (2011). Absolute values were taken|R – L| for calculating asymmetry of paired variables and the average personal asymmetry value.

Results: Measured values were body mass index (BMI) were 22.97 ± 1.51 kg/m2, skeletal muscle mass (SMM) 37.62 ± 2.18 kg, body fat mass (BFM) 5.1 ± 1.47 kg and competition success 773 ± 1095.45 points. With 3D body scanner we measured left and right variable and calculate the DA for following variables: ALM – arm lean mass DA 0.07 ± 0.05, LLM – leg lean mass DA 0.16 ± 0.10, LSH - Long shoulder height DA 0.92 ± 0.92, ASG - Armscye girth DA 2.08 ± 1.99, SAL - Straight arm length DA 0.85 ± 1.00, UAG - Upper arm girth DA 0.90 ± 1.07, EG - Elbow girth DA 1.07 ± 1.20, FG - Forearm girth DA 0.50 ± 0.50, WG - Wrist girth DA 0.50 ± 0.39, SWH - Side waist height to floor DA 0.03 ± 0.08, OLL - Outside leg length DA 0.23 ± 0.12, TL - Thigh length DA 0.22 ± 0.13, TG - Thigh girth DA 0.70 ± 0.38,

MTG - Mid-thigh girth DA 0.77 ± 0.56, MTH - Mid-thigh height DA 0.02 ± 0.04, KH - Knee height DA 0.07 ± 0.16, KG - Knee girth DA 0.40 ± 0.24, CH- Calf height DA 0.50 ± 0.55 and CG - Calf girth DA 0.18 ± 0.17.

Discussion and conclusions: Averaged individual DA for judokas was 0.51 ± 0.09 from which we can assume that judokas closer to the DA of 0.51 have greater competition success. Perhaps the DA value of 0.50 is the most significant for judokas and their way of exercise because this value was determined by adding the worse, medium good and excellent judoka. Greater or lesser DA may currently mean that judokas would have worse performance. It may be a trend to focus towards DA, but considering the sample size it may not be necessarily true. It would be necessary to further research this area on a larger sample of judokas and research the differences among weight categories.

References

1. Özener, B. (2010). Fluctuating and directional asymmetry in young human males : effect of heavy working condition and socioeconomic status. *American Journal of Physical Anthropology*, *143*(1), 112–120.
2. Özener, B., Pelin, C., Kürkçüoğlu, A., Ertugrul, B., & Zagyapan, R. (2011). Analysis of facial directional asymmetry in extreme handed young males and females. *Eurasian Journal of Anthropology*, *2*(2), 96–101.
3. Stradijot, F., Pittorru, G. M., & Pinna, M. (2012). The functional evaluation of lower limb symmetry in a group of young elite judo and wrestling athletes. *Isokinetics & Exercise Science*, *20*(1), 13–16.
4. Šimenko, J., & Vodičar, J. (in press). Evaluation of body symmetries in judo. In M. Doupona Topič, & T. Kajtna (Eds.) *Youth sport: Proceedings book / 7th Conference for Youth Sport, Ljubljana, 12-13 December 2014*. Ljubljana: Fakulteta za Šport.
5. Tomkins, J. L., & Kotiaho, J. S. (2002). Fluctuating asymmetry. *eLS*. Retrieved from http://onlinelibrary.wiley.com/doi/10.1038/npg.els.0003741/full

EFFICIENCY OF USING DIFFERENT METHODICAL PROCEDURES IN THE PROCESS OF TEACHING JUDO THROWING TECHNIQUES

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Introduction: One of the key aspects in the success of the training process is its efficiency. Time is one of the limiting factors in the training process, and the ratio between the time invested and success represents the efficiency of the process itself. It can be said that the efficiency is the difference between a good and a bad training process. Knowledge of and optimum usage of methodical procedures is one of the ways to increase the efficiency of the training process. Their usage is especially prominent in the process of learning and practicing new technical elements. The time required to be invested by the athlete to automate certain movements as well as the quality of performance is dependent upon the usage of the said methodical procedures. Although very important, this topic was not analyzed in a greater number of works [1, 2, 3, 4].

Goal Of The Paper: The goal of this research was to estimate the efficiency of using varied methodical procedures in the process of teaching throwing techniques.

Methods And Materials: The sample group consists of 56 students of the Faculty of Kinesiology that have never before practiced judo. The participants have been divided in three groups. The first group consisted of 17 participants who practiced throws using three specific methodical procedures (tendoku renshu, uchi komi and nage komi), the second group consisted of 17 participants who practiced throws using two specific methodical procedures (uchi komi and nage komi), and the third group consisted of 22 participants who practiced throws using one only nage komi method. All participants used the identical protocol for practicing throws. Protocol consisted of identical demonstration of the throwing techniques, identical time for work (practicing throws) and identical corrections for all participants, with the only difference being the methodical procedure used during the throwing practice. Throws used for the conduct of the research were: morote seoi nage, tai otoshi, okuri ashi harai, deashi harai, ouchi gari, kouchi gari, harai goshi, uchi mata, osoto gari. After the envisaged time for practicing each individual throw elapsed, the participants performed two repetitions of each individual throw, on camera. Experts then graded the better of the two repetitions on a scale of 1 to 5. The experts who took part were associates on the judo course who were involved in the education process for at least 3 years, all black belt holders with at least 15 years experience in judo.

Results and discussion: The order of throws according to a cumulative average grade (from best graded to worst graded) is as follows: okuri ashi harai (2,78), deashi harai (2,52), osoto gari (2,38), morote seoi nage (2,22), ouchi gari (1,90), harai goshi (1,88), uchi

mata (1,86), kouchi gari (1,71), tai otoshi (1,69). If we focus on average grades for each individual participant group, the worst grades were achieved by the participant group which practiced throws by using only nage komi method, and the best grades were achieved by the group which practiced throws by using uchi komi and nage komi methods. Still, the application of the multivariate analysis of variance (ANOVA) does not result in a statistically significant difference between the participant groups according to the grades awarded for the throws. Aside from numerical differences displayed by arithmetic mean, there are statistically significant differences for individual throws measured by independent samples t-test. According to that analysis, group 2 achieves statistically significantly better results than group 3 for throws tai otoshi and okuri ashi harai. Also, there exists a statistically significant difference in grading the throw tai otoshi between group 1 and group 3. According to the achieved results, it can be said that using a larger number of different methodical procedures at the beginning of the learning process for certain techniques will not result in a better throw performance. In this case the tendoku renshu method proved to be superfluous at the beginning of the learning process. It can be assumed that the practicing of throws without partner („empty throws") is too abstract for participants who are not experts in judo. This conclusion can be generalized and applied to younger judoka population, who still do not possess the ability to „imagine" i.e. practice techniques without partners. Such application of methodical procedures to this population would seem to be a waste of time. On the other hand, the practicing of throws by performing only integral throws (synthetic method) indicates the weakest effect in the process of learning the throws. It is important to respect the fact that every mistake included in each discrete phase of the throw (kuzushi – tsukuri – kake) will influence the performance of the next phase and in the end will influence the integral throw itself. For this reason it is recommended that the practicing of throwing techniques is approached analytically.

Conclusion: After analysis of results we can conclude the following: 1. Using tendoku renshu method is not efficient with beginner population; 2. the practicing of the techniques by using only the nage komi method (synthetic method) results in the poorest adoption of the techniques in the beginning of the training process.

References

1. Bratic, M. (1998). The quantitative changes that originated from the application of different methodological procedures in the process of aquiring and improving complex motoric movements in judo. Physical Education, 1, 39-45.
2. Kalina, R.M., Barczynski, B., Jagiello, W., Przezdziecki, B., Kruszewski, A., Harasymowicz, J., Syska, J., Szamotulska, K. (2008). Teaching of safe falling as most effective element of personal injury prevention in people regardless of gender, age and type of body build – the use of advanced information technologies to monitor the effects of education. Archives of Budo, 4.
3. Lhuisset, L., Margnes, E. (2014). The influence of live vs. Video model presentation on the early acquisition of a new complex coordination. Physical Education and Sport Pedagogy.
4. Murray, J.F. (1981). Analysis of two methods of teaching falling in Judo. International Journal of Sport Psychology, 12(4), 275-281.

FAST RECOVERY AND PROPER CARE OF THE INJURY FROM JUDO

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First time when I started playing Judo in Japan, I was 12 years old. Since then, not only I have actually seen several injuries, but also I have been injured myself. Most common Judo injuries are sprain, strain, rupture, dislocation and fracture.

Sprain and strain is more likely the most often injury among not only Judokas, but also other sports players. I honestly doubt if there is someone who has never sprained or strained joints because it is even happening in our daily life, especially ankle, knee, elbow, shoulder, fingers and spine. Therefore, the initial treatment that can recover faster is very important for the athletes.

Classical orthopedic treatment for the sprain and strain is same as fracture which is immobilization. I have seen many athletes who severely suffered from losing ROM (range of motion) after long period of recovery, due to way too long immobilization. It is the critical issue for athletes, not only decreasing their performance, but also joint, which lost ROM, will more likely cause the same injury. This is the reason people say sprain and strain can happen again and again.

Proper care of sprain and strain must be following (in the case of sprain of ankle while playing Judo)

1. Right after injury stop playing Judo, never force to play
2. Put ice on the swollen part as soon as possible (this should be done immediately after every injury, even if it is fractured or dislocated)
3. If there is severe pain and player has difficulties to walk, it is recommended to take X-ray, because something might be fractured.
4. Put tape or tight supporter around the ankle. Here is important to try to not apply extra pressure on the swollen ankle from walking, so it is smarter to use crutches in the case of going out.
   a. Keep icing everyday as much as possible. 30min ice and 30min break, repeat this 3 times in the morning, and evening.
   b. After one week, the injured needs to start manipulated therapy such as Chiropractic, and Physical therapy. Icing is still much more important than ultrasound, electronic therapy and all kind of passive treatment.
5. Every day keep stretching ankle as much as possible at home. Even special care is still needed, one week is enough to immobilize. We must start concerning to

recover ROM. It is highly recommended to take a hot bath every day, not only for the proper recovery of the ankle, but also to refresh and increase immune system of the whole body. Athletes who have chronic lumbar pain might have prolonged recovery, so it is important to manipulated active therapy on lumbar part as well.

Classical orthopedic treatment is immobilizing of the ankle for more than 3 weeks. After that to only start exercising the ankle is obviously way too late.

Preventive care for the athletes is a minimum task. Nerves that control all major muscles are coming out from spines, so regular spinal care is the most important for them.

PRELIMINARY ANALYSIS OFTHE TRAINING EFFECTS IN THE PROJECT „JUDO IN SCHOOLS”

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Introduction**:** In order to involve more children in sports, to make a positive impact on the full of the anthropological development, improving social skills, and to make educational effects of physical exercise, in Rijeka in 2008, the project of „Judo in schools” has began. It began to be implemented in eight primary schools, with the support ofthe City of Rijeka, the Croatian Olympic Committee and Judo Club „Rijeka”. After only one year, a first informal school championship was held, with participation of 114 competitors, attendants of the program. After four years of application, the project thas developed in more schools, and similar project was launched also in Zagreb, by the establishing sports association „Zagreb judo schools”.

Following the example of developed countries, such as Japan, France and the Netherlands, where this judo program was proven as very effective in the prevention of violence among children, the adoption of healthy life styles, team work, development of positive values such as tolerance and self-control, from the beginning of school year 2013/2014, project „Judo in schools” began to be implemented in all Croatia under the auspices of the Ministry of Science, Education and Sports and the Agency for Education.

In its basic tenets, the project has been finalized with the following tasks:

- To apply judo elements in a way that is adapted to various schildren age groups, which primarily involve the safety and development of basic movement and motor development, with parallel development of educational components through regular exercise.
- To strictly control conditions with clearly defined rules of procedure and conduct with respect to the specific characteristics of judo sport, in order to allow the use of forms of psycho-social training that includes the following components:

  1. **Construction of positive personal characteristics**
     Initiative, perseverance, self-control, self-confidence, the ability to respond in emergency situations
  2. **Developing and improving mental processes**
     Cognitive and intellectual processes that are closely related to the specific training (attention, the power of perception and logical thinking).
  3. **Development of motivation, positive values and awareness in the community.**
     Principals of judo: **Maximum efficiency** (*Seiryoku Zenyo*) and **Mutual assistance for common progress** (*Jita Kyoei*), are the principles which in its original form contain

numerous examples of the positive impact of hard training of judo on the positive development of personality.

Methods: In this study, a total of 60 children (21 girls and 39 boys), participants of the project „Judo in schools" in the city of Rijeka, have been tested, and they were divided into two groups.The first group consists of 30 students who have been training more than two years, and another 30 students whose trainings started from the beginning of the current school year 2014/2015. The average age was 10,53 years, but the group that trains longer was in average older for a 1,5 years.

The applied instruments were*: Emotional Skills and Competence Questionnaire* (Takšićet al. 2010; Molanderet al. 2011), it consists of three subscales that examined self-assessment of student abilities: 1) identifying and understanding emotions, 2) expression and naming emotions, 3) regulation and controlling emotions. In addition, the data on evaluation marks at mid-yearin mathematics, Croatian language, physical education (PE), and also in conduct were taken.

Results And Discussion**:** An analysis ofthe difference between the two groups in the above-mentioned variables was made.The most significant finding shows that the group which trains for a longer period of time has significantly better grades in conduct and evaluation of PE-e. In other variables there was no significant difference. In the second group, the one that recently started with trainings, a tendency towards less criticism in the self-assessment of their emotional competence was found. It is important to mention that in other tested variables there were no significant differences related to gender of children.

Conclusion: Following the obtained results, a conclusion can be made, that practicing judo had significant educational effects, as are almost all children in the group in which judo was practiced for a longer period of time, had exemplary behavior. It also can be noted that after a minimum of two years of the implementation of the project, there is a visible difference in behavior, in the adoption of motor skills and achievements, the development of motor and functional abilities, compared to children who have just started Judo trainings.Therefore, there is justification for the project „Judo in schools" which represents a significant contribution to the development of anthropological characteristics of students in Croatian elementary schools.

References

1. Molander, B., Holmström, S., & Takšić, V. (2011). South and North: DIF Analyses of University-Student Responses to the Emotional Skills and Competence Questionnaire. Psychological Topics, 20, 3, 425-447.
2. Takšić, V., Mohorić, T. & Duran, M. (2010). In search of „the correct answer" in an ability-based Emotional Intelligence (EI) test. Studia Psychologica. 52, 3, 219-228.
3. Bradić Slaviša, Zagreb (2013) „Judo tehnike za djecu- priručnik za trenere"
4. Dragić Branko,Novi sad (1996), „Džudo za obrazovanje trenera"
5. Drid Patrik, Todorov Ivan and others Beograd (2014), „Džudo nauka i praksa"
6. Kano Jigoro (2005), „Mind over the muscle"

RELATIONS PARENTAL SUPPORT FOR YOUNG JUDOKA WITH THE SPORT EXPERIENCE OF FATHER AND MOTHER

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Introduction: All values and beliefs related to sports are transmitted from parents to children, and that is the main driver of sports activities for children. Parental warmth defined amount of love, support and encouragement that the parents provides, as opposed to hostility, rejection and mocking children. Parental support significantly affect the child's entry into the sport and to their access to sport, their level of involvement and their physical and emotional well-being. Sports active parents will motivate children to practice sports. For physical more vivid parents is very likely to have physically active children. Parental activity and beliefs about the sport were significantly associated with participation in sport. The question is whether the intensity of parental support vary depending on the sporting experience of parents.

The goal of this study is to show the nature of the relation of parental support for children in judo in relation to sport and experience of the mother and father.

Methods: The sample consisted of 93 young judoka from Bosnia and Herzegovina, the age of the respondents from 12 to 15 years. For the assessment of parental support in young judoka used scale of parental support RPS-1 (BOSNAR 2003). The scale was made in two versions, for parents and for children's assessment of parental support. Here is the version used for a child's assessment of parental support. Response to the particles (25 particles) are provided in five degrees, so that the minimum possible score of 25, while the maximum score of 125 points. The scale has four dimensions of parental support: Parental belief in the benefit of sport (9 items), ensuring material conditions for sports (6 items), learning to model (3 particles), positive reinforcement (7 items).

The scale has a query about the level of the sport experiences of mother and father: He did not play / la sport, played / la is in school competitions, competed / into sports club at the district or region, achieve / the results of a national ranking, scoring / by the results of inter-country ranking.

Results and Discussion: Canonical correlation showed that there was no significant association between parental support and the level of the sport experiences of parents. When we look at separately four of sight support. The highest parental support children see the form of insurance financial requirements allowing them to sports. High score in the form of grants parental belief in the benefit of sport and in the dimension of positive reinforcement. The young judoka are the least parental support had in mind the teachings

of the model. This means no matter what the children have a lot of support in dealing with the judo, not enough parents give their own example to the children had in their models for learning. This result can be explained by the fact that a lot of parents did not deal or very little play sports.

Conclusion: Based on the research we can conclude that there is no association between parental support for young judoka and sporting experiences of their parents. There is a significant support in all four forms of parental support to young judoka.

JUDO IN CROATIA BEFORE 1951.

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Introduction: It is well known fact that Jigoro Kano founded the Kodokan school in 1882. in intention to teach a new form of jutsu, which he called modern Judo. Judo already existed before as an ancient form of jiu jitsu-e, but Kano modernized it and implemented the most effective elements of many other jiu jitsu styles (schools). At the beginning of the 20th century Judo began to expand and develop in Europe with the primary goal of training the army and police forces. In those times, training was based mainly on learning the elements of self-defence. At that time, in Japan tendency of unification and classification techniques and exercise (Buttokukai) has emerged, and judo as one style of jutsu, transformed into an independent and recognized martial art.

This trend has been followed by numerous judo schools and their masters in Europe (Kawaishi, Tani, Koizumi).

The official start of judo exercise in Croatia is considered to be the foundation of the first judo club (*Jiu-do club „Zagreb")* in 1951. But numerous evidences indicate that in this area Judo existed as a form of exercise and training at the beginning of the 20th century. This evidences put Croatia side by side with the European countries in which judo came on early 20th century.

Discussion: First mention of ju jutsu in Croatia (often called „*Džiu-džicu*" or „Điu-đicu"), was in 1905. when the first book „*Džiu-džicu, Japanski način samoobrane*" (Jiu-Jitsu, Japanesemethodof self-defence) was printed in Đakovo.

„The importance of Điu-đicu *consistsmainly the fact that the opponent should be grabbed on particularly sensitive areas of the body and that he consequently feels particular pain which still increases if he tries to rid..."*
Barun Aumura, „Džiu-džicu" Đakovo, 1905.
Transcript from the book „Sportska publicistika u Hrvatskoj".

In „Maritime School Rijeka" Monograph, asa commenton the one photo from 1905. year, stands an explanation that *„Naval Academy Cadets are practicing martial arts"* and In June edition from 1911. of "*Novi List*" (newspaper published in Rijeka, Croatia), on his travel trough Rijeka, professor's Kasulukow „jujitsu" skills, and his presentation for „*large audience and city law enforcement officers"* were mentioned.

There also were some similar courses in other cities, and a mention of one was found, for members of the"*Sokol*" association and law enforcement officers which were held in Split in 1914. by Andrey Shumakov, who has been learning and practicing Jujutsu in Vienna.

The first organized exercise of JuJutsu skills was mentioned in 1920. in Zagreb in the Athletic Club*"Hašk"*, school run by RalphI Hoke. There are numerous records about his training and school, with detailed description of the demonstration performances, and other events.

Transcript from the daily press talks about the presentation of policemen, and later mr. Hoke's students, which shows that exercising in the police was well organized.

„Recently, here in Yugoslavia, the first step forward has been made in that matter, when the Royal Police directorate in Zagreb officially introduced Jiu-Jitsu ...."
(„Điuđicu", Ralf I. Hoke, page 8)

„Yesterday in 5 P.M. in the afternoon, *on the „*Hašk*" playing field*, *with great general public interest, public presentation of police Jiu-*Jitsu *school was held*, *which has shown excellent results, after only two months training with* head *teacher Hoke*, athletic *trainer of „*Hašk*"..."*
(„Điuđicu", Ralf I. Hoke page 69)

Oto Baugarten **(**1913.-1945.) comes in Zagreb in 1939.where he also begins with teaching JuJutsu skills and leading the school until 1942. He studied in Vienna where he was teaching JUJUTSU and training the Vienna police.

Since 1945 in Zagreb, a boxer Alfredo Barković and wrestler Branko Sviben, have started the first trainings. In 1947.they met an American soldier who taught them the first steps of Ju Jutsu. In that time started organized exercising for police at Nova Ves.
(Interview: Branko Sviben and Andrew Habulin).

Conclusion: Guided by the historical facts and comparison between the modality and the reasons of the official start of the judo exercise in Croatia, it is obvious that the elementary patterns of exercise are exactly the same. The link between this patterns and previous teachings is exercising self-defence for various structures of society in Europe. Exercise and the existence of judo in Croatia are almost identical as the development time and quality in other European countries. If there is a fact and the argument that other European countries verified the process of transition from jutsu to judo, this process of transition in our region should have the same value.

Further collection of historical and scientific facts, which is focused on historical materials and events, and finding links between them, can reinforce this research.

References

1. Bradić Slaviša, „JUDO SAMOOBRANA-PRIRUČNIK ZA TRENERE" Zagreb (2012)
2. Bradić Slaviša, „Judo tehnike za djecu- priručnik za trenere" Zagreb (2013)
3. Ralf I.Hoke, „Điu Đicu" Zagreb, 1920 Mala sportska biblioteka
4. Judo zveza Slovenije 2012, Maribor „60 let juda v Sloveniji- Judo včer-judo danas"
5. Zagrebački judo savez, 2001. „Judo u Zagrebu-pola stoljeća"
6. Richard Bowen, „100 Years of Judo in Great Britan 1.i 2" IndePenPress,(2011)

MANAGING SPORT ORGANIZATIONS: A CASE OF CROATIAN JUDO FEDERATION

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The growth of published papers in the last 20 years illustrates well the attention that sport management gains in scholar and professional circles. Sport is characterized by a number of unique features which make sport management different from management of other economic activities. According to Hoye, Nicholson and Smith (2008) these unique features refer to sport consumer behavior, government relations, sport regulations, strategy in sport, organizational structure, human resources management, sport culture, sport governance and performance management. Many sport organizations around the world are undergoing change in terms of professionalization of management and introduction of management roles. While the dominant management culture in the past was the traditional culture of volunteer managers, management of sport organizations today requires numerous managerial skills and knowledge. Achieving the best sports results possible while at the same time using financial resources efficiently leads to the need for strategic planning methods and tools.

Recent study about the assessment of Hellenic national sport federations (Karastathis, Afthinos, Gargalianos and Theodorakis 2014) also revealed the lack of studies in sport's sector on quality management and organizational performance management. Study findings revealed that processes of management's excellence do exist and are applied but neither often nor systematically. The majority of authors concluded about the need for further research to explore and thus facilitate the development of a new understanding and theory development within emerging field of sport management research (Webb, Rowlland and Fasano 1990; O'Boyle, Hassan 2014).

Two studies conducted in Croatia (Škorić, 2011; Čorak, Boranić Živoder and Marušić 2014) discovered that many national sport federations as the main sport organizations in Croatia use only some management tools although the progress from 2011 to 2014 has been reported especially in the area of the implementation of strategic planning instruments. Based on the results of these studies, the goal of this paper is twofold: first, to define the most important management issues for sport federations and evaluate the activities of Croatian judo federation (CJF) according to level of use of those issues at the beginning and the end of the observed period (2005-2014). The evaluation has shown that all those strategic management issues do not completely explain the growth/development of the CJF. Theoretical framework that can be used and is giving a new insight in explanation of the work of CJF is the theory of learning organization (Senge 1990) that use the concepts

of personal development, mental models, joint vision and team learning to describe and illustrate the behavior of organizations.

For future research the authors suggest further investigation on use of the concept of team learning for sport organizations. Of course, the application of basic management concepts and techniques are prerequisite for success of not-for-profit sport organizations, especially national federations as umbrella organizations that still rely mostly on volonteer work.

FREQUENCY OF THROWS IN ELITE KARATE FIGHTERS

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Background: Recent changes in karate rules have led to new goals in the field of karate training. The introduction of new ipon, nihon and sanbon point system resulted in new styles of karate combat and particularly influenced the structural complexity of competitive discipline kumite. Structural characteristics of karate are classified in six basic groups. Throws (nage waza) in combination with punches (tsuki) carry the most points. Tactical variant of throwing and sweeping are most frequently used as a counterattack technique for interception and front foot sweep, a combination element in unrealized techniques of foot attacks (extended attack), a throwing technique in unrealized individual techniques or combinations in both attack or counterattack phases, for shortening the distance in cases the other techniques are not applicable and for entering the clinch.

Since the previous studies have not provided a sufficient insight regarding the use of throwing techniques in elite karate fighters, there is a need to define such parameters in order to successfully implement training processes in karate.

Materials and methods:*Population and sample entity*-The sample was comprised of the total of 274 competitors who took part in 137 matches. Each individual competitor was observed in maximum of three matches. All of the competitors were seniors - male, older than 18 years, participants of the 19th World Karate Championship, which took place in Tokyo in 2008. The competitors originated from 97 countries from five continents (Africa, America, Asia, Australia and Europe). *Sample variables*-The sample variables in this study were descriptive technique and tactics variables Nage waza-tsuki (NWTS_nn, NWT_bn, NWT_nk, NWT_bk) divided into individual non-scoring attack techniques („TEH"nn), individual scoring attack techniques („TEH"bn), individual non-scoring counterattack techniques („TEH"nk) and individual scoring counterattack techniques („TEH"bk).

Methods of data analysis: The data was extracted through the analysis of the digital records of 274 karate combats which took place during the 2008 World Karate Championship in Tokyo. All the matches were recorded using a Samsung digital DVD camera. The data was officially recorded by three trained and experienced evaluators from Combat Sports Department of University of Zagreb Faculty of Kinesiology. The evaluators have observed each fight according to the interobserver agreement. The criteria for the registration of each technique (frequency) were:

- Scoring technique (realized) represents every technique marked by the judge
- Non-scoring technique (unrealized) represents every technique which was not marked by the judge, and which was performed in a full range of motion
- Attacking technique represents every technique performed prior to the reaction of the opponent
- Counterattacking technique represents every technique performed after, or as a reaction, to the opponent's attack.

The reliability of the evaluators was very high (kappa coefficient 0.94). The analysis included the frequencies of techniques in order to estimate the individual indicators of the technical and tactical activities. The registration of situational indicators was carried out with the help of specialized software package DARTFISH 4.5.2.0. The data were verified for consistency and entered into a program for statistical data analysis Statistics 7 (StatSoft Inc., Tulsa, USA).

Results:The results indicate that the nage waza tsuki technique in the overall technique frequency appears as: non-scoring attack technique – NWTnn (176 recurrences – 3.79%), scoring attack technique – NWTbn (4 recurrences - 0.02%), non-scoring counterattack technique – NWTnk (85 recurrences – 1.83%) and scoring counterattack technique – NWTbk (7 recurrences – 0.15%). In total technique frequency in elite karate matches throwing techniques are represented with 5.79%.

Conclusion:This rate of nage waza tsuki technique in the total karate technique frequency can be explained by its highest point value (sanbon). Considering this, together with the certain attractiveness of this combination, it is still underrepresented in the total terms of frequency in a karate match. The reason behind this can be found in the very high biomechanical complexity of this combination. In addition to the high complexity, there is a great risk of rapid counterattacks by the opponent. Consequently, the analysis of the most frequent techniques suggests that the competitors in the World Cup did not want to take unnecessary risks and perform these type of techniques. Such low frequency, together with high biomechanical and training complexity, brings into question the continued existence of nage waza tsuki and other foot techniques in a karate match.

Conversely, there is a great potential for increasing the frequency and efficiency of naga waza tsuki technique, which would further increase the attractiveness of karate matches.

AVERAGE AGE OF THE MEDALISTS AT MAJOR SPORTING EVENTS IN JUDO

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Introduction: The question of optimal age for best results in judo career, is frequently asked in the academic community and among sports coaches. The aim of this paper is to determine the period which represents the average age for winning Olympic games (OG) and World championship (WC) medals at the senior level in judo (total for both sexes and separately by gender). The specific aim of study is to determine a difference in the average age of the male and female medalists at major judo competitions. The same parameters will be considered on a sample of European judoka to determine the possible deviation from the overall global trend.

Methods: The study was conducted on a sample of 41 major sporting events in judo at the senior level: 12 Olympic Games (1964 to 2012) and 29 World Championships (1956 to 2014). The dataset represents the calculated age of the medal winners in these contests on the basis of which the package Statistica 7.0 calculated basic descriptive parameters (mean and standard deviation) for each competition taking into account the total of both sexes and each gender separately.

Results and Discussion: The average age of medalists including all the OG in judo ever held is 25.1 years (SD=0.8) which is slightly lower than the average age considering the OG in period 2000 to 2012 (AM=25.7; SD=0.3), indicating that the Olympic medal as the greatest achievement in judo usually win in the age of 25.5 to 26 years, looking at the pattern of the last four OG. In a sample of last four Olympics, female win medals at a later age than male (the male AM=25.7; SD=0.2; the female AM=26.0; SD=0.5). The average age of the medal winners in all WC held 24.9; SD=1.4, indicating that the WC medals throughout history until today conquered most often in the period of 23.5 to 26.3 years. Looking WC 2001 to 2014 the average age od medalists was 24.8; SD=0.5 which is not such a difference compared to the whole sample of all held WC which indicates that these are the figures that show the average age for winning WC medal in the modern judo. Looking at the results of the 2008 to 2014 data show that the Olympic medals coming a year later than the WC's (WC AM=24.7; SD=0.2; AM=25.6; SD=0.5). In the male it is AM=24.9; SD=0.3 for WC, AM=25.5; SD=0 for the OG while in the female the difference of the average age is even more than one year (WC AM=24.6; SD=0.3; AM=26.1; SD=0.6). From 2008 to 2014 ther male have won the Olympic medals in a somewhat earlier age than the female (the male WC AM=24.9; SD=0.3, OG AM=25.5; SD=0; the female WC AM=24.6; SD=0.5; OG AM=26.7; SD=0.8). The parameters of Europeans follow the world trend in which they win the Olympic medals at a later age (25.3 to 26.2) than the WC's (24 to 25.5).

Conclusion: Although there are exceptions to every rule, the most important conclusions of the study are as follows: in the modern judo judokas in the world win the Olympic medals later (25.5 to 26) than the WC's (24.3 to 25.3). As these are also the most valuable sports achievement in judo can be considered that the age from 24.5 to 26 years represents the optimal period for winning OG and WC medals at the senior level in judo (male 24.5 to 26; female 24.5 to 26.5). The female win Olympic medals at a later age than the male while the WC showed no significant difference between the sexes. Europeans follow the world trend in which they win the Olympic medals at a later age than the WC's. The European male follow the world trend of the optimal period for winning major medals, while this is not the case for the European female who reach that period a year earlier. In subsequent research, it is appropriate to explore potential reasons (anthropological, physiological, selection etc.) that lead to the data obtained in this study.

References

1. Electronic source. Database Judoinside.com /download 1st of the July 2014/

PERIODIZATION IN JUDO: WINNING THE EUROPEAN AND WORLD CHAMPIONSHIP MEDALS IN THE SAME SEASON

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Introduction: „The condition of sports form is characterized by extreme specific operating ability and willingness of athletes to achieve the highest sports results. Optimal sports form and high competitive result in a rule must match (Milanovic 2010)". In accordance with the statement that „the number of competitions and financial motivation of top athletes significantly increased (Sikorski 2011)", an extremely important role in the achievement of planned targets for the season has a properly designed plan and training program with a predetermined schedule of sports form (single-cycle or more-cycle periodization). The aim of this study is to determine the number of judoka who won the European Championship (EC) and World Championship (WC) medal in the same season (2001 to 2014) and difference by gender for that parameter. The specific objective is to determine the rank of success of certain categories for Europeans at the Olympic Games (OG), as well as the difference in the number of the male and female from Europe who have won a medal at the Olympics per capita of European participants.

Methods: The study was conducted on a sample of 28 biggest judo competitions at the senior level: 15 EC (2001 to 2014), 9 WC (2001 to 2014) and 4 Olympic Games (2000 to 2012). The first set of variables represent the number of judoka who won the European and World Championship medal in the same season. The second set of variables represents the number of medals at the Olympics won by Europeans per capita of participants for the period 2000 to 2012, divided by categories (number of medals won in relation to the total number of European competitors). Based on the variables package Statistica 7.0 calculated basic descriptive parameters (mean and standard deviation).

Results and Discussion: Total average (2001 to 2014) says that 13.4 people (SD =3) won the EC and WC medal in the same season at senior level. The female average is AM=7.4 SD= 1.9; the male AM=6.0 SD = 1.8 which can be explained by the fact of larger massiveness of the male in judo which leads the fact that there are more teams which have more than one competitor capable to winning the biggest medal by category which is infrequently case in the female. In 2014 was recorded the best results in this parameter when 10 female and 10 male won a medal at the EC nad WC, which is almost twice as many as than in 2001. Looking at the rank of success of certain categories of European competitors at the OG, the male are determined by a clear trend where they won most of medals in the heaviest categories (90,100, + 100) against the smallest number of medals in the lightest -60 kg (more than half as much as the +100 which is the most successful category for Europeans). The female's most successful category is -63 kg, more than three times more

successful than the least successful -52. Rank of the most successful to at least the following: the male (+100 AM= 0.176; -90 AM= 0.172; -100 AM= 0.170; -66 AM=0.165; -81 AM=0.145; -73 AM=0.129; 60 AM=0.072), the female (-63 AM=0.200; -70 AM=0.198; -78 AM=0.196; -48 AM=0.174; -57 AM=0.154; +78 AM=0.091; -52 AM=0.064). In both sexes the notes to the top three ranked categories including small differences stand out on the performance against the others. Also, is determined by the difference in performance by gender where the European female (AM=0.154) are slightly more successful than the male (AM =0.147) in the number of medals won per capita of European competitors at the OG for the period from 2000 to 2012, although the difference is not so big.

Conclusion: In recent years is concluded that exists the higher number of judoka who won the EC and WC medal in the same season than was the case earlier. There is a higher number of cases in the female. Periodization with more cycles is becoming more frequent, due to the increasing number of official competitions in the same season. European judoka achieve better results at the OG in heavier categories compared to lighter. The European female are slightly more successful than the male in the number of medals won per capita of the European competitors at the Olympic Games for the period 2000 to 2012. In subsequent research, it is appropriate to explore potential reasons (anthropological, financial etc.), which stay behind the data obtained in this study.

References

1. Milanović, D. (2010). *Teorija i metodika treninga*. Zagreb: Kineziološki fakultet Sveučilišta u Zagrebu.
2. Sikorski, W. (2011). *New approach to preparation of elite judo athletes to main competition*. Journal of Combat Sports and Martial Arts 2011; 1(2); Vol. 2, 57-60
3. Electronic source. Database Judoinside.com /downloaded 10th of July 2014/

JUDO ATHLETES´ METHODS OF WEIGHT REDUCTION PRIOR TO A SPORT PERFORMANCE

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Introduction: The reason why judo athletes, but even another combat sports athletes try to lose weight before the competitions is an idea to gain a certain advantage over their opponents. The methods, means and experience with losing weight play a significant role. The problem might appear, if we talk about a drastic loss of a high percentage of a weight in the short period of time. This might be the cause of a decrease in their sport performance and this kind of weight loss can negatively influence an athlete´s organism and even might have fatal results in terms of health. The aim of our research was to know the Slovak habits, along with weight loss methods that judo athletes use prior to a competitive performance. Next, we attempted to determine whether there are differences in the methods of reducing weight between the male and female population.

Methods: There were 73 judokas participating in our research of junior and senior category (27 women and 46 men) from Slovakia. The average age was 23,5 (± 8,3) years, with an average height of 176,86 cm (± 5,2), with an average body weight of 78,1 kg (± 8,3) and the number of years in judo 14,4 years. The average age of women was 20,9 (± 3,1) years, with an average height of 167,5 (± 4,1) cm, average body weight of 60,6 (± 6,06) kg and the number of years in judo 11,4 year. All the participants were full members of the Slovak Union of Judo and at the time of the research they held the rank of 2nd kyu to 4th dan. As the main method of data collection we optioned for an anonymous verified questionnaire. For the data analysis and subsequent interpretation we used statistical method Chi – square, parametric unpaired t - test and the logical analysis.

Results And Discussion: 53% of men and 48% of women said, the first experience with weight loss had been during the younger and older school age (14 years or less). 30% of men and 20% of women reported a normal weight loss, which is shorter than 7 days. 51% of men and 55% women in our study reduced their body weight one week prior to the competition. Only 19% male and 25% female judokas confirmed reducing weight from two to three weeks before the competition. Dehydration was claimed by 82% of men and 80% women. 56% male and 72% female stated positive attitude towards the use of a sauna during the weight loss. The maximum weight loss recorded was 8 kg (women) and 11 kg (men). 56% of men and 72% of women think that the way they’re reducing their weight or the means of weight loss they used in the past is not correct, yet they do continue in this manner, because they find these methods working.

Using statistical methods Chi-square and unpaired t-test we compared the answers of the men and women and found that the men compared to the women regulate their body weight more frequently during the competitive season (chi = 2,96, $p \leq 0,01$). The reason for this may be significantly lower number of judo competitions for women in Slovakia. The highest average reduced weight before the performance was 5,7 kg (men) and 4,8 kg (women) and this difference proved to be significant ($t = 2,37$, $p \leq 0,05$). Usually the men reduce their weight during the competitive season on average of 2,6 kg and women on average of 1,8 kg. This difference was also shown to be significant ($t = 2.47$, $p \leq 0.01$). For another answers to the questionnaire which could be statistically processed we did not find any significant differences between male and female population in judo.

Conclusion: Based on our research, we can conclude that in Slovakia, there are no differences between men and women in the habits and methods used for the intentional body weight reduction before the sport performance in judo.

References

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CREATINE KINASE RESPONSES TO TRAINING CONTEST SIMULATION IN JUDO CAMPS

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Introduction: Creatine kinase concentration (CK) in blood is commonly reported as an indirect marker of muscle breakdown. Elevated levels of CK can suggest significant skeletal muscle damage. Previous research using CK markers in judo has suggested it may be a useful tool in evaluating effects of training in judo (Blach et al., 2007). Greater understanding of responses to training can allow for more informed training prescription.

Aim: To understand CK responses to contest simulation training loading undertaken in preparation camps for major championships to allow better training prescription going forward.

Participants: Data was collected with consent over six different camps post six separate days of contest simulation training. Number of athletes on each camp varied but data is included from thirty five different athletes (18 males and 17 females) with all weight categories represented with N=2/3 in each.

Methods: CK markers were collected daily first thing in the morning from athletes on several training camps. Pin prick blood sampling was used to collect samples and a Reflotron Plus Clinical Chemistry Analyser was used to assess blood plasma for CK responses. CK values evaluated were those gained on arrival at camp (post one weekend rest) and one (approximately 12-14 hours) and two days (approximately 36-38 hours) post cessation of exposure to contest simulation training days. Number of contests undertaken varied between 4 and 6 and lasted 5 or 4 minutes depending on current IJF rules.

Results: On arrival to camps resting CK levels were seen to be 287 (+/- 118) (U/I). The average increase in CK levels seen the morning post test fight training was almost threefold (270%) at 776 (+/-386) (U/I). By 38 hours post training levels had dropped on average by 25% for most athletes with mean values at 580 (+/- 288) despite continued lighter training. Only 4.5% of samples had not dropped in 38 hours.

Conclusion: Contest simulation training in judo does seem to create an almost threefold increase in skeletal muscle breakdown in comparison to at rest. This is greater and in contrast to some previous literature which has suggested randori training does not result in significant increases in muscle breakdown (Umeda et al., 2008). With lighter training the recovery from this damage does seem to start before 38 hours post. Rested CK levels obtained are higher than suggested population norms which should be considered when reporting data to athletes and coaches. It is also important to note the large variations in

CK responses seen which may anecdotally be due to gender, muscle mass and weight category and possibly injury impact. CK may be a useful tool used in line with other subjective markers to understand load and responses to training to allow management of fatigue and impact on training prescription.

MORPHOLOGICAL ASYMMETRY IN JUDOKAS

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Introduction: Judo belongs to the category of asymmetric sports, since during the realization of most of its techniques the left or the right side of the body is dominantly used. In asymmetric sport disciplines, the development of a certain degree of morphological asymmetry occurs, due to the physical and neurological demand of the locomotor system of the dominant extremity, in relation to the non-dominant one. The research showed that daily activities (the tendency towards greater functional usage of the dominant extremity in relation to the non-dominant one) can be a factor that would cause a morphological asymmetry (Steele and Mays, 1995).

The basic aim of the research was to determine the morphological asymmetry in judokas of different competitive success.

Methods: All the examinees were active competitors, winners of medals at the state and international championships, with the preferred right grip, and their average age was 21±2.2 years. The examinees were divided into two groups, according to the competitive success: successful (n=16) and less successful (n=19). The sample of variables in the evaluation of morphological asymmetry of judokas consisted of 11 anthropometric characteristics (morphological measures) that were measured separately on the left and the right side of the body. The following characteristics were measured: wrist diameter, elbow diameter, knee diameter, flexed upper arm circumference, forearm circumference, wrist circumference, thigh circumference, lower leg circumference, upper arm skin fold, upper leg skin fold and lower leg skin fold.

Results and Discussion: The results of descriptive statistics showed that the right body side values of successful judokas, in almost all the variables, except for the knee diameter variable (-0.44 mm), were greater than the left body side values. In less successful judokas the right body side values were also greater, except for the two variables: knee diameter (-0.41 mm) and upper arm skin fold (-0.01 mm). Such result was expected, regarding the fact that only judokas who preferred the right body side of judo guard were included in this research. In percentage, the greatest differences between right and left body side in both sample of examinees was in upper body part. According to Franchini (2011), judokas used upper body more often that the lower body part. It is interesting to point out the results in wrist diameter and circumference. In successful and less successful judokas the differences were 1 and 1.1%. Such results could be explained by the greater usage of right hand in guard fight. It is considered that the preferential usage of extremities as a preselection for a certain movement direction, e.g. rotation around the longitudinal axis, could lead towards the asymmetry of the morphological characteristics that can lead to

ossification of body parts in elite athletes (Krzykała, 2012). Further on, greater flexed upper arm (1% of difference) and forearm circumference (1.2% of difference) was noticed in less successful judokas in relation to more successful judokas. The lower difference of the noted anthropometric characteristics in more successful judokas could be explained by the usage of both body sides in defense and attack, unlike the less successful judokas. The lowest differences between left and right body side were noticed in skin folds. Such result was expected because it was proved that the local fat tissue reduction caused by the physical strain was not possible (Ramirez-Campillo et al., 2013). The results of independent samples T-test show that there was no statistical difference between successful and less successful judokas in any of the applied morphological variables. Such result could be explained by the relatively low number of examinees and relatively low difference in quality of the two observed groups.

Conclusion: The motor asymmetry determination variables should be also analyzed in the future researches. Namely, previous researches indicate the greater influence of the variables used for the evaluation of motor abilities on the judo fight success, than the variables of motor measures. It is therefore assumed that there would be greater differences between the two groups in motor variables, than in this research where the variables of motor status were observed.

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References

1. Franchini, E., Del Vecchio, F. B., Matsushigue, K. A., & Artioli, G. G. (2011). Physiological profiles of elite judo athletes. Sports Medicine, 41(2), 147-166.
2. Krzykała, M. (2012). Dxa as a Tool for the Assessment of Morphological Asymmetry in Athletes, Dual Energy X-Ray Absorptiometry, Prof. Abdelah El Maghraoui (Ed.), ISBN: 978-953-307-877-9, InTech
3. Ramirez-Campillo, R., et al. (2013). „Regional fat changes induced by localized muscle endurance resistance training." J Strength Cond Res 27(8): 2219-2224.
4. Steele, J., & Mays, S. (1995). Handedness and directional asymmetry in the long bones of the human upper limb. International Journal of Osteoarchaeology, 5(1), 39-49.

BODY WEIGHT OF ELITE JUDO ATHLETES AFFECTS TO THE SPECIAL JUDO FITNESS TEST RESULTS

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Introduction: The Special Judo Fitness Test (SJFT), developed by Sterkowicz (1), is a specific judo test predominantly anaerobic, and it has shown better results for assessing the physical condition of judokas than other test as the Wingate Anaerobic Test (2). Despite the fact that the SJFT is one of the test most used in judo research, there is a lack of information about how weight categories could affect to the performance evaluated through this test. Although some body composition aspects have been related to SJFT results in elite judo males (3,4) and females (5), athletes from all weight categories are usually analyzed as one group. Additionally, SJFT classificatory norms are established with no weight-category groups, so the relationship between body weight and SJFT performance should be clarify in elite judo athletes. Thus, coaches could obtain a more adequately evaluation of their athletes by using the mentioned test, and they could make more personalized adjustments in the training program.

Aim: The aim of the study was to determine whether weight categories affect to the SJFT performance in elite judokas.

Method: A total of 80 elite judo athletes (40 males) from Serbia and Bosnia & Hergovina participated in this study. Athletes from all weight categories competing at senior or junior divisions were included. All judo athletes were weighed, and performed the SJFT (1). In this test the evaluated athlete (tori) begins the test between two ukes (of similar body weight than tori) at 3 m from each one. Tori must complete as many throws as possible by applying ippon-seoi-nage (one shoulder throw) to the ukes. The test is composed of three parts (15, 30, and 30 seconds) separated by 10-seconds recovery periods. Heart rate (HR) was measured immediately after and 1 min after the test (Polar Team2, Polar, Finland). The SJFT index was calculated according to the following equation: Index= (HR after + HR 1 minute after) / total number of throws. For the statistical analysis correlations between body weight and SJFT variables were determined by using the Spearman test, analyzing males and females separately.

Results: Body weight of males was significantly correlated with SJFT index ($r= 0.974$, $p= 0.005$) and total number of throws ($r= 0.501$, $p= 0.001$), but not in females ($r= -0.025$, $p= 0.878$; $r= -0.003$, $p= 0.984$ respectively).

Conclusion: Our results showed that male judokas with higher weight obtained worse performance results evaluated through the SJFT. In this line, it also has been reported that

the throwing speed (seoi-nage technique) was higher in lighter male judokas compared with heavier ones (6). Thus, the weight category of elite judokas should be considered when interpreting the SJFT results, and probably classification norms should be adapted in order to allow the coach enough information to adequately assess the physical condition of each athlete. On the other hand, SJFT variables and weight were not significant correlated in females. It has been previously established in elite Serbian female judokas, that more successful athletes had lower body fat and perform better the SJFT (higher number of throws) than less successful athletes (7). For that, it could be expected that female athletes with higher body mass execute less number of throws. However, our results did not show this significant correlation, as it occurred in males.

References

1. Sterkowicz, S. Test specjalnej sprawnosci ruchowej w judo. Antropomotoryka 12: 29-44, 1995.
2. Szmuchrowski, LA, Rodrigues, SA, Corgosinho, RF, et al. Correlation between the performance in the Special Judo Fitness Test and the Wingate Anaerobic Test. Arch Budo 9:175-179, 2013.
3. Katralli, J, and Goudar, SS. Anthropometric profile and Special Judo Fitness levels of Indian judo players. Asian J Sports Med 3:113-118, 2012.
4. Franchini, E, Nunes, AV, Moraes, et al. Physical fitness and anthropometrical profile of the Brazilian male judo team. J Physiol Anthropol 26:59-67, 2007.
5. Smulski, W, Wolska, B, Jagiello, W, and Sawczyn, S. The correlation of general and sport-specific preparation indices of elite female judo competitors with their age-somatic characteristics. Arch Budo 7:233-238, 2011.
6. Almansba, R, Franchini, E, Sterkowicz, S, et al. A comparative study of speed expressed by the number of throws between heavier and lighter categories in judo. Science & Sports 23:186-188, 2008.
7. Drid, P, Maksimovic, N, Matic, R, et al. Fitness profiles of female judokas of the Serbian national team. Medicina dello Sport 62:251-263, 2009.

MENTAL OR COGNITIVE TRAINING FOR YOUNG JUDOKAS – AN EARLY START TO A NEGLECTED ASPECT OF SPORT PSYCHOLOGY

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It is well documented that in elite sports both the mind and the body needs rigorous training to be as fit as possible. The importance of being able to endure numerous sessions on the tatami, to mobilize motivation for hundreds of training hours, to cope with injuries etc., is acknowledged and mental training is integrated in most elite athletes' training schedules.

Traditionally, mental or cognitive training has been introduced at a late stage in an athlete's career, when anxiety and stress prevent the judoka from optimal performance. We argue that mental training can be initiated at a much earlier age, and that this will give an advantageous fundament.

The authors present how the Norwegian Judo Federation has introduced the concept of mental training to the very young judoka in our coach educational program. We discuss at what stage different mental or cognitive training technics should be introduced, and the benefits of offering our young athletes the psychological, mental or cognitive training.

EFFECTS OF CHANGES IN JUDO RULES ON ATTACKING EFFICIENCY INDEX BETWEEN THE NATIONAL CHAMPIONSHIP OF BOSNIA AND HERZEGOVINA 2010 AND 2014 YEAR

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Introduction: In order to judo fight gets the highest possible intensity, the same conditions for both competitors to show their best performance and the ease of understanding and monitoring for viewers, International Judo Federation (IJF) has changed its rules in 2013. year. The aim of this research is to evaluate effects of changes in the rules of judo sport in attacking efficiency index techniques of judo between the National Championship of Bosnia and Herzegovina in 2010. year and 2014. year.

Methods:The sample comprised 141 fight with the analysis of the National Championship of B&H in judo in 2010. and 215 fight with the National Championship of Bosnia and Herzegovina in judo in 2014., for seniors in all seven weight categories.

The sample of variables makes 163 throwing techniques and 33 grappling techniques from 2010. year and 199 throwing techniques and 57 grappling techniques from 2014. year. The effectiveness of the technique is calculated based on the points made by the contestants during the execution of certain techniques for which the judges awarded as Ippon, Waza-ari and Yuko. Intra-observer percentage errors of reliability ranged from 0.00% to 0.00%, and the inter-observers reliability ranged from 0.00% to 1.08%, which is acceptable to 5%, which is the level of limiting error, was calculated using the equation (1) (Hughes, Cooper, & Nevill, 2004). Percentage error = (V1-V2) / (Vmean) x 100% (1). To determine total efficiency index (Sa) between National Championships of B&H in judo, equation (1) from (Adam, Smuraj,& Tyszkowski, 2011) was used. Sa=M/n (2) In order to determine the Attacking efficiency index (AEI) of individual throwing techniques and grappling techniques, equation (2) from (Adam, Smuraj, & Pujszo, 2012) was used. AEI = 5 x M + 7 x M + 10 x M / n (3)

Results and Discussion: Results of the analysis indicated that the overall efficiency index (Sa) throwing techniques in 2010. year was (1.14), while in 2014. year decreases to (0.93). The situation in the parterre techniques is different in 2014. year, there was a growth in (0.26) in relation to the 2010. year, where the index of efficiency was (0.23). By analyzing individual efficiency index (AEI) throwing technique and technique on the ground in 2010. year, the most effective techniques are: Ippon Seoi Nage (1:09); O Uchi Gari (1:05); Uchi

Mata (0.94); O Soto Gari (0.91); Sukui Nage (0.87); Kesa Gatame (0.77); Tani Otoshi (0.74); Kami Shiho Gatame (0:43); Okuri Eri Jime (0:43); Seoi nage (0:42) and De Ashi Barai (0:32).

Analyzing individual efficiency index (AEI) throwing technique and technique on the ground in 2014. year, the most effective techniques are: Ippon Seoi Nage (1.19); Uchi Mata (0.88); O Soto Gari (0.87); Kesa Gatame (0.69); O Uchi Gari (0.62); Okuri Eri Jime (0.60); Tani Otoshi (0.60); Tomoe Nage (0.44); Juji Gatame (0.42); De Ashi Barai (0.37) and Ko Uchi Gari (0.35). Previous research regarding the effects of changes in the rules (Ito et al., 2014; Kiyoshi et al., 2013) have shown that changes in the rules to sport, they had no part in the transformation of certain segments of judo match in terms of offensive efficiency.

Conclusion: These results represent good guidance trainers in what direction should be to design a training process in judo, based on attacking efficiency index indicators of individual throwing techniques and grappling techniques for male seniors.

References

1. Adam, M., M. Smuraj, S. Tyszkowski (2011). The diagnosis of the technical-tactical preparation of judo competitors during the World Championships (2009 and 2010) in the light of the new judo sport rules. Archives of Budo. 7: 5-9.
2. Adam, M., M. Smuraj, R. Pujszo (2012). The individual profile of the technical-tactical preparation of the World judo Championships in 2010-2011. Journal of Martial Arts Antropology. 12 (2): 50-59.
3. Hughes, M., Cooper, S.M., & Nevill, A. (2004), Analysis of notation data: reliability. In Hughes, M., & Franks, I.M. (2004), (Eds.) Notational Analysis of Sport, 2nd edn: Systems for better coaching and performance in sport (pp.189-204). Second Edition. London: Routledge.
4. Ito, K., N. Hirose, M. Nakamura, N. Maekawa, M. Tamura (2014). Judo Kumi-te Pattern and Technique Effectiveness Shifts after the 2013 International Judo Federation Rule Revision. Arch Budo 2014; 10: 1-9.
5. Kiyoshi, I., H. Nobuyoshi, N. Mitsuru, N. Maekawa, M.Tamura, N. Hirotsu (2013). The transformation of technical-tactical behaviors for hand techniques used in attacking below the belt after the 2010 International Judo Federation rule revision. Arch Budo, 1: 1–6.

SUCCESS AND FAILURE ATTRIBUTIONS OF CROATIAN JUDO PLAYERS

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Introduction: Attribution theory explains the purpose and consequences of different interpretations used for success and failure. Attributions are the reasons we believe have led to success and failure in activity. We make attributions because we want to explain, understand and predict our own as well as others' behavior or we are trying to justify, feel better or make a better impression. Understanding of the previous successes and failures allows us to better prepare for new challenges and increase the likelihood of successful outcomes in the future. Because of that, attributions are highly important in sport situations. The preferred set of attributions for sport performers are stable, controllable and global causes for success while failure should be attributed to unstable, controllable and universal causes(Allen et. al. 2009). Influence of locus of causality is not as clear but some authors (Cox, 2005; Hamilton & Jordan, 2000) suggest that, in achievement situations, people tend to make internal attributions for both success and failure thus taking the responsibility for their actions.Although attributions are extremely important in sports context, there is an evident lack of research of attributions on Croatian athletes. Therefore, the aim of this study is to examine how young Croatian judo players interpret the reasons of their own achievements for their most successful and least successful competition.

Methods: The sample is made of 106 international level competitors from 20 clubs in Croatia. To estimate the dimensions of attributions we used the Causal Dimension Scale (CDS-II; McAuley, Duncan and Russell, 1992).

Results and Discussion: Results show that athletes attribute their highest competitive achievement mainly to psychological reasons. 59% of judo players believe that reasons for their success on the most successful competition are related to psychological preparation, predominantly to motivation (23%), self-confidence (13%) and relaxation (8%). 29% of judo players believe that reason for their success is good physical preparation and 12% of them attributed success to other factors such as health or happiness. Similar trend was found in the case of their largest competitive failure. 66% of judo players believe that reasons for their failure on the least successful competition are related to psychological preparation, predominantly with lack of concentration (15%), lack of motivation (14%) and high anxiety (13%). 12% of judo players believe that the lack of physical preparation contributed to this failure and 22% of them attribute failure to other factors such as health, luck, referees etc. More detailed analysis shows that the attributions of success in

this sample are predominantly internal, stable and personally controlled. In other words, judo players attribute their success to their own continued commitment, hard work and effort investment. Analysis of the causes for the least successful competitive performance shows internal, unstable and personally controlled attributions. In this case, they believe that insufficient commitment in this particular competition and the insufficient skill level and knowledge contributed to their failure. These are all the factors they themselves can control and change in order to maximize the chance of successful performances in the future.

Conclusion: Based on results obtained, we can conclude that the athletes who participated in this study interpret their achievements in a way literature considers desirable. Also, the results have important practical repercussions. On one hand, this research offers contribution to understanding the way athletes attribute their own success or failure on actual competition. On the other hand, it shows the importance and need for psychological preparation as an integral part of sports training. The reasons judo players stated in this study suggest that they believe psychological preparation is extremely important for their athletic success and that the lack of it significantly contributed to their failure. These results do not diminish or underestimate the importance of fitness, technical and tactical preparation but shows obvious need, expressed by the athletes, to include psychological preparation in greater extent than is currently present.

References

1. Allen, M.S., Jones, M.V. & Sheffield, D. (2009). Causal attribution and emotion in the days following competition. Journal of Sports Sciences, 27(5), 461–468.
2. Cox, R. H. (2005). Psihologija sporta: koncepti i primjene. Jastrebarsko: Naklada Slap.
3. Hamilton, P.R. & Jordan, S.J. (2000). Most Successful and Least Successful Performances: Perceptions of Causal Attributes in High School Track Athletes. Journal of Sport Behavior, 23(3), 245

DIFFERENCES IN THE COURSE OF THE JUDO FIGHT IN THE HEAVIEST CATEGORIES BETWEEN TWO WORLD CHAMPIONSHIPS

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Introduction: In past few years International Judo Federation introduced many changes of competition rules. They wanted to make judo more attractive for audience and to promote „positive" judo (to encourage fighters to seek ipon in every fight). Biggest change was made at the end of 2012. After the experimental period that lasted until the next World Championship in Rio de Janeiro, they confirmed the rule change and made it official for the next Olympic period. The aim of the research was to investigate the differences in the course of the fight in the heaviest categories (-100kg and +100kg) between two World Championships (Paris 2011 and Chelyabinsk 2014), held prior and after competition rules change.

Method: Observational methodology was used. Two judo experts, with at least 3 Dan black belt and master in Physical Education, have analyzed total of 40 matches from two World Championships. All the fights from last sixteen until the end of the category were observed. They have registered following actions:

a) Type of attack (direct, counter attack, combination)
b Efficiency (effective attacks, penalties, ineffective attacks)
c) group of performed technique, both effective and ineffective, (ashi waza, koshi waza, te waza, sutemi waza)
d) kumikata stance (ai yotsu, kenka yotsu, same side grip, cross grip, only tori holds kumikata)

From statistical procedures χ^2 test and Z-test were used to identify the difference between the samples.

Results and Discussion: Results of the χ^2 test have shown there are no statistical differences in the efficiency and the type of the executed attack, while there are significant differences in the group of performed technique and kumikata stance. Since there are no significant differences in efficiency, we can say that after the change of competition rules heaviest judokas didn't change their efficiency. There was no difference in scoring (ipon, wazari, yuko) or in the number of penalties. Also, the number of quality ineffective attack didn't increase. Referees were encouraged to award more penalties then before, but they were also instructed to have higher standards for awarding the score (IJF, 2013). When we take into consideration that number of penalties was earlier was also high (Pujszo, Marek, &

Kuźmińska, 2014), these results were expected. Type of the attack used most frequently was direct attack (73,0% and 80,65% respectively). There were differences in frequency of using the attack via combination (13,0% in 2011. and 6,45% in 2014.) but at the we haven't found differences in the whole sample ($\chi 2=5.54$; sig=0,063).

Significant differences in waza used in standing position was found ($\chi 2=9,32$; sig=0,025). Results of Z-test shown significant decrease in using of ashi waza (41.12% to 29.5%), increase in using of koshi (10.15% to 17.0%) and te waza (19.29% to 26.0%), while sutemi waza retained almost the same level (29.44% and 27.5%). While increase in use of koshi waza was to be expected due to a rule change that forbids leg grab and therefore opportunity to easily counter the technique, increase in te waza was not expected.

Kumikata stance was one of the main points in the rule change. Breaking grip with two hands was forbidden. Also, holding of any unstandardized kumkata now needs to be followed by immediate attack. These two actions are now penalized with shido. These changes have led to a different use of kumikata stance. Use of standard kumikata stance (ai yotsu and kenka yotsu) increased while use of unstandardized kumikata stance decreased (same side grip, cross grip, only tori holding grip). Since now the breaking of the kumikata is harder, due to a rule change, increase of ai yotsu and kenka yotsu was expected. It was shown that shorter time allowed to hold unstandardized kumikata led to a significant decrease in frequencies of cross and same side grip.

Conclusion and practical application:Implementation of new rules led to a change of the course of the fight in the use of the waza and kumikata. New fighting reality made fighters to adopt and use different fighting strategies.

The obtained research findings about different aspects of judo fight may be used by coaches and judokas to find new training methods for the establishment and breaking of grips, as well as for defending themselves against different throwing techniques.

References

1. Pujszo, R., Marek, A., & Kuźmińska, A. (2014). The course of the judo fight in the heaviest category (+ 100kg) seen from the perspective of attacks in the standing position, based on the Olympic Games in London 2012. Ido Movement for Culture. Journal of Martial Arts Anthropology, 14(1), 63-71.
2. International Judo Federation - IJF. Refereeing & Organization Rules Changes – Explanations. http://www.ijf.org/ (accessed May 3, 2013)

LITHUANIAN WOMEN'S JUDO CHAMPIONSHIP MATCHES (TIME-MOTION) PECULIARITIES

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Aim of work: To verify differences between weight category of women's judo matches in time-motion at Lithuanian Judo Championship.

Tasks of research:

1. To identify time-motion differences in all weight categories.
2. Evaluate Lithuanian women's judo matches time-motion judo matches data.

There was applied literature, competitions matches protocols and educational monitoring data analysis in our study.

The time-motion indicators consisted of total combat time, standing combat time, displacement without contact, gripping time, groundwork combat time, pause time and total time of technique. The study was conducted at Lithuanian Judo Championship 2014.

Results and Discussion: Regarding time-motion per match and per cycle, was found that total time of technique ($p < 0,025$) and groundwork combat time ($p < 0,016$) significantly different between weight category under 52 kg ant under 70 kg. Groundwork time as well as significant difference ($p < 0,031$) was found between weight categories under 63 kg and under 70 kg. Displacement without contact time significant difference ($p < 0,035$) was observed only between weight categories under 48 kg and under 52 kg. Among other weight categories no time-motion significant difference was found, as well as between Lithuanian and Brazilian female matches data.

Conclusion: Our hypothesis (light weight matches time-motion data significantly vary with heavy weight categories) proved only partially, since it was found significant differences only between 52 kg and 70 kg weight categories. However, the obvious differences between the lightest and heaviest categories - the heaviest weight category (over 78 kg) athletes in almost all time-motion (except groundwork combat time) indicators are maximum.

RESEARCH ON EFFECTS OF TRAINING PROGRAMS IN JUDO

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Introduction: Methodological research in sport is focused on the analysis of effects diverse training methods as well as effects of training programmes have on athletes' performance and on their states in particular stages of fitness and sports form development across typical cycles of both the annual and perennial periodization. Unfortunately, the fewest scientific evidences have so far been provided of the efficiency of certain exercise and teaching methods. Investigations are needed to obtain information on the most quality methods for in conjunction with age, gender and quality level of athletes in particular cycles of both the annual and perennial periodization.

Long Term Training Effects Of Judo: Recommendation on long-term orientation training is present in various sports in order to avoid overload or overuse injuries and detrimental effects of early specialization and for athlete to achieve their top-level results in mature phases, in senior categories (Malina, 2010). Programs that over-emphasize immediate performance as opposed to learning, results in absence of child's fundamental developmental experiences (Vaeyens et al, 2008). Moreover, studies of top athletes show that, before reaching the highest achievements, athletes were enrolled in average of 2.4 sport activities. This supports necessity of multilateral sports training in the early stages (Malina, 2010). The long-term approach to planning and programming training in Judo was adopted and implemented the sport system in Canada, Australia, the UK and South Africa through national guidelines for the development of athletes. There is no longitudinal research on training effect of judo on various abilities and skills of athletes. Existing research on long term influence of judo practice has been more focused on immune function of judo athletes, strengthened muscular function and improved reaction to stress as well as greater efficiency of metabolism as a result of prolonged judo practice (Miura et al, 2005; Toshihiko et al, 2013; de Oliveira et al, 2009).

Effect Of Short-Term Training Programs: To optimize sport performance, the need for planning and programming of annual cycles, preparation and competition period is essential. Various researches have shown that the applied training programs in judo results in adequate functional and motor adaptation of judo athletes. Increases are visible in bone mass (Kim et al, 2013), muscular strength and power of athletes (Bratić, Radovanović, Nurkić, 2008), aerobic and anaerobic abilities and decreases in weight, body mass index, and body fat content (Celik, Ruchan, 2011) while sprint interval training program for elite judoists is effective to increase anaerobic power in a short period during off-season training, and to decrease negative metabolic reaction induced by match (Kim et al, 2011).

Recently, great accent has been put to tapering as main procedure which (by its reduction in training load) allows the recovery and further training-induced adaptations along with competition performance enhancement (Papacosta et al, 2013). Judo athletes should taper at least a week before competition to enhance anaerobic performance and power in trained judo athletes (Papacosta et al, 2013).

Conclusion: Sports practitioners should use findings of scientific research to continually adjust training methods and procedures in accordance with characteristics of sport groups they are working with, then with working conditions and specific features of a particular cycle of sports preparation.

References

1. Bratić, M; Radovanović, D; Nurkić, M. (2008). The effects of preparation period training program on muscular strenght of first-class judo athletes. Acta Medica Medianae 2008;46(4):22-26.
2. Celik, N, Ruchan, I. (2011). Effects of competition term trainings on leptin values of female judokas. African Journal of Pharmacy and Pharmacology Vol. 5(6), pp. 683-687
3. Malina, R.M. (2010). Early sport specialization: roots, effectiveness, risks. Curret Sports and Medicine Reports 9 (6):364-371.
4. Kim J, N. Lee, J. Trilk, E.-J. Kim, S.-Y. Kim, M. Lee, H.-C. Cho. (2011). Effects of sprint interval training on elite Judoists. International Journal of Sports Medicine 32(12):929-934.
5. Kim PS, Shin YH, Noh SK, Jung HL, Lee CD, Kang HY (2013). Benneficial effects of judo training on bone mineral density. Biology of Sport 30:295-299.
6. Masashi Miura, Takashi Umeda, Shigeyuki Nakaji, Qiang Liu, Masaru Tanabe, Arata Kojima,Yousuke Yamamoto and Kazuo Sugawara (2005). Effect of 6 months' training on the reactive oxygenspecies production capacity of neutrophils and serumopsonic activity in judoists. Luminescence 20: 1–7.
7. de Oliveira, DX, Procida, IR, Borges-Silva, CN (2009). Effect of training judo in the competition period on the plasmatic levels of leptin and pro-inflammatory cytokines in high-performance male athletes. Biological Trace Element Research 135(1-3):345-54.
8. Toshihiko, K; Umeda, T; Kojima, A (2013). Influence of a 3-month training program on muscular damage and neutrophil function in male university freshman judoists. LUMINESCENCE 28, 2: 136-142

ADAPTED JUDO FOR CHILDREN WITH CEREBRAL PALSY

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Judo club for people with disabilities „Fuji", founded in 2012, carries out its main program: Judo for children with cerebral palsy. Cerebral palsy (CP) is a disorder of movement and posture due to a defect or lesion of the immature brain (Bax, 1964). It is the most common cause of severe neuromotor deviations in children, and thus represents a burden for the affected child, its family, health and educational institutions as well as society as a whole (Mejaški - Bošnjak, 2007:125). It has been proved that judo can be successfully used in rehabilitation of damages caused by CP. During the 1970s', Dr. Masano Murai developed a method of judo rehabilitation based on his observations of the Bobath method and research conducted at the Research Peto System Laboratory in Hungary. Dr. Murai concluded that ukemi-waza from judo can be adapted to treat children with CP. It is believed that utilizing such techniques can have an effect on development of physical and mental abilities. In recent years, more research has been conducted in the field of the method of judo rehabilitation (Nakajima et al, 2012; Ion Ene, Rosu and Neofit, 2014). Guided by one of the basic principles of judo, Jita Kyoei, we designed a program that not only helps in the rehabilitation of children with CP, but also helps healthy children to learn how to become better and more useful members of the community.

In this paper we intend to:

1) showcase modifications of certain judo techniques that can be used for training children with CP and
2) show how children with CP can improve their social integration through judo.

It is necessary to make adjustments for each judo technique according to every child's individual abilities. The warm up part of the training is conducted in a sitting or kneeling position, depending on the individual abilities of each child, and has the task of preparing the body for the main part of the training. The goal is to increase the body temperature, speed, strength and elasticity of muscles (possibly preventing injuries), and to increase the concentration and focus on further training. Most of these exercises are also the part of physical rehabilitation of people with CP, and are focused on activation of the abdominal muscles, balance and postural control. Afterwards, more specific exercises are being conducted, part of which are adapted techniques of judo ukemi-waza. The main part of the training involves learning new techniques and repetition of already learned judo techniques. Nage-waza, osaekomi-waza, shime-waza, and kansetsu-waza are adapted to the unique abilities of each individual. The core of the methodology of teaching judo techniques in children with CP lies in the understanding of the fact that CP does not affect

individuals the same way, so therefore it is not possible to lay the foundations of universal teaching methods for adapted judo techniques. The biggest adaptation of judo techniques is necessary in nage-waza. All nage-waza are performed in a kneeling position with the exception of ashi-waza, which have been phased out completely. Minimum adaptations are necessary among osaekomi-waza. Shime-waza and kansetsu-waza are also taught, but are exclusively conducted on partners without difficulties or coaches. It is important to note that even though it is not possible to modify all judo techniques, the majority of techniques can be performed by people with CP while maintaining the principles and purpose of each technique. An integral part of the training are modified forms of randori. It is this part of the training that has the most profound effect on development of the fighting spirit. Children with CP are given the opportunity to train with peers without disabilities. Through that experience they can break down psychological barriers of their difficulties, they can feel as equals, it raises their self-confidence and they begin to see themselves as athletes. The final part of the training includes specific stretching exercises as well as learning the theory of judo.

According to Jigoro Kano, the main goal of Judo is self-improvement. The broadness of that concept assures that it can be achieved even by children with CP. Judo can have a key role in improving the psychological and physical condition of children with CP. Even though CP is not curable, that does not mean it cannot be improved upon. According to our experience, children with CP, who managed to successfully integrate Judo into their lives, have shown improvements in coordination, muscular tone, aerobic conditioning, balance and postural control, motivation and self-esteem. Until more research is conducted, the measure of this improvement is based on the anecdotal evidence, subjective opinions and feedback from children with CP, their parents and their physical therapists.

References

1. CeDePe – Društvo osoba s cerebralnom i dječjom paralizom Zagreb. (2014)., Pristupi u terapiji cerebralne paralize, http://cedepe.hr/images/slike/74/pristupi-u-terapiji-cp.pdf
2. CeDePe – Društvo osoba s cerebralnom i dječjom paralizom Zagreb. (2014)., Novija klasifikacija cerebralne paralize, http://cedepe.hr/images/slike/74/novija-klasifikacija-cp.pdf
3. Delladio, S. (2014). Judo za djecu s teškoćama. Diplomski rad. Zagreb: Kineziološki fakultet.
4. Drašković, M., Lučić, M. (2014). Paraolimpijski školski dani u Zagrebačkoj županiji. Zagreb: HOA.
5. Ion Ene, M., Rosu, D. i Neofit, A. (2014).Judo adapted to the therapy of disabled children. Social and Behavioral Sciences, 137 (2014), 37 – 42., www.sciencedirect.com
6. Mejaški – Bošnjak, V. (2007). Neurološki sindromi dojenačke dobi i cerebralna paraliza. Paediatria Croatica, 51(1), 120-129.
7. Nakajima, T. i sur. (2012). Disabled People and the Potential of Judo Rehabilitation: Case Studies of Rehabilitation through Judo in Japan. http://judoresearch.org/wp-content/uploads/2012/03/Taka-Nakajima.pdf

CREATION AND VALIDATION PROCESS OF A WRITTEN AND MOTOR TEST TO EVALUATE USHIRO-UKEMI PERFORMANCE

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Introduction:This study aims to create and find evidence of validity and reliability of written and motor tests to evaluate ushiro-ukemi (UU) performance. Kano (1970) and Inokuma & Sato (1986) descriptions grounded the adopted UU characterization in this paper and this characterization were validated by experts opinions (Carvalho et al., 2011):

UU sequence positions:

1) Stand up position with straight arms ahead, pointing the horizon.
2) Squat position with arms straight ahead pointing the horizon.
3) Sitting position down near the heels.
4) Backward roll with the chin on the chest, raising the legs.
5) The floor is hut with palm of the hands and with straight arms at an approximately 45o angle with the body.
6) The legs are lowered onto the floor.

Sampling: four classes (n=93) of elementary and junior high students randomly composed the control (G0=18) and experimental group (G1=75) on a 1:3 class relation.

Material and methods: UU written test (UUwt) contained 4 questions: 1 about nomenclature and 3 about UU movement aspects. Students' answers scored 2.5 or 0 at each of the 4 questions, in a dichotomous scale (right or wrong). The UU motor test (UUmt) consisted on 3 attempts. Students received scores in a ordinal scale at each attempt: 0 (zero) for no performance or for a performance which did not characterized UU; 5 (five) for a performance with moderate errors, but still characterizing the UU; 10 (ten) for a perfect execution. The motor test result was the average of the 3 attempts. The final result of the UU evaluation, the UU tests, was the average of the UUmt with the UUwt result:

UU tests = ((UUwt sum) + (3 UUmt attempts average))/2.

Results: A) Descriptive analysis: UUtests results for G0 average are 1.6 + 1.27 sd and G1 are 9.33 + 0.92 sd. B) validity analysis - when comparing the UUtests results of G0 to the

UUtests results of the G1, adjusted Mann-Whitney U Test showed evidence of validity for this evaluation (U=0.00; adjusted Z=-6.93; p>0.0001). However while analyzing only the UUwt results separetely, adjusted Mann-Whitney U Test showed evidence of validity for this evaluation (U=21; adjuted Z=7.851; p<0.0001) and the UUmt results has also shown evidence of validity alone (U=0.0; adjusted Z=7.187; p<0.0001). C) reliability and other analysis - Kuder-Richardson method of rational equivalence (KR-21=0.80) presented evidence of reliability for the written test questions. The discrimination and difficulty indexes for each question, respectively, were satisfactory: 1) 0.83 and 0.58 (nomenclature); 2) 0.61 and 0.69 (head position); 3) 0.78 and 0.61 (justification of question 2); 4) 0.50 and 0.75 (arms positioning when hitting the ground). The motor showed also evidence of reliability, according to Cronbach alpha. Their discrimination (1.0) and difficulty (0.50) indexes for all 3 attempts were perfect.

Conclusion: the found evidence of validity, reliability as well as the adequate discrimination and difficulty indexes allow us to conclude that the written test and the motor test may be applied as a suitable instrument to evaluate the UU performance. They can be applied together, using the average of both results or even separately, depending on the situation. However their utilization together may better cover different and necessary aspects for the UU knowledge and performance.

References

1. CARVALHO, MCGA; CARVALHO, BM; CARVALHO, FLP; OLIVEIRA JUNIOR HD; CUNHA, GG; Landau, L; DANTAS, EHM. 3D Character Animation Demonstrating Ushiro-ukemi Pedagogical Progression. In: Human Computer Interface International Conference, 2011, Orlando. Lecture Notes in Computer Science. Heidelberg: Springer, 2011. v. Poster. p. 320-324.
2. INOKUMA, I. & SATO, N., 1986, Best Judo, Kodansha International.
3. KANO, R., 1970, Illustrated Kodokan Judo. Japan: Kodansha

THE ACTIVITY OF CREATINE KINASE IN PLASMA OF THE ELITE MEN JUDO PLAYERS DURING DIRECT STARTING PREPARATION

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Background: It has been well established that a single bout of severe exercise affects the activities of enzymes of muscle origin in blod or plasma. Changes in plasma activity of creatine kinase an enzyme located mainly in skeletal muscles and hear have attracted particular attention since the enzyme has been recognised as a marker of muscle damage in response to muscular work.Rational usage of training load requires searching for optimal methods of directing of the training process, based on the results of various types and forms of control. In many sports disciplines, as well in judo, there is the possibility of evaluating the competitors body reactions on the applied training load, on the basis of the enzyme CK (creatinine kinase) activity measurements in plasma. In elite sportsmen, whose training regimen require day to day strenuous activity during weeks before competition, a cumulation of metabolic disturbances may occur affecting their performance.

The aim of the study was to evaluate the effect of exercise during training sessions on the changes in creatine kinase activity in the blood plasma of judo contestans, during direct competition preparation to European Championships.

Material and methods: 10 members of the Polish national men team participated in the tests. The study was undertaken during the national polish men team training camp before the European Championships. Trainning volumes, intensities and recovery periods were determined by the coach. Since judo performance cannot be easily quantified, training loads were expressed in arbitrary points and computed from the duration of individual exercise units and the corresponding post-exercise heart rates.

The creatine kinase activity marking was done every morning for 10 days. Blood drawn from the ear on the day following the training session was tested. The testing blood was taken from an ear petal on an empty stomach. The CK activity was marked by spectrophotometric method using the Dr Lange photometer-LP 400, and the ready to use „Analco" set.

The statistic analysis was done by students' T-test for the dependent variable and by counting values of correlation factor by Pearson. Statisticaly important level $p<0.05$.

Results: The results of biochemical research gain remarkable value, because they allow to evaluate actual contestants' reactions under influence of applied training load, that might be the starting point to rationall planning of consecutive trainings or microcycles. The dependence issue between the size of the training load and CK activity in plasma, requires more research, that would take under consideration analysis of training load from the point of the content as well as the intensivity.

The results of biochemical research gain remarkable value, because they allow to evaluate actual contestans reactions under influence of applied training load, that might be the starting point to rationall planning of consecutive trainings or microcycles.

Discussion: In the present study, a unique opportunity emerged to follow the changes in plasma CK activity during training of elite sportsmen. The most importanat finding of the current study is the relationship between daily training loads and individual plasma CK activities determined on the followin mornings. The decreases in plasma CK levels, observed following the days of rest or of low training loads, support the assumption that the changes in enzyme activity are a sensitive marker of muscle stress in response to training.

Conclusions: The test results show that the changes in creatine kinase activity in blood plasma following exercise were mainly dependent on the type and intensiveness of physical exercise. The results also suggest that marking creatine kinase in blood plasma might become a useful test in the evaluation of training effects in judo in the future.

References

1. Hortobagyi T., Denaham T. Variability in creatine kinase methodolical, exercise and clinically related factors. Int. J.Sports.Med. 1989.10:69-80.
2. Fry R., W., Morton A. R., Keast D. Overtraining in athletes. An update. Sports Med. 1991. 12: 32-65.
3. Karamizrak S.O., Ergen E., Tore I.R., Akgün N. Changes in serum creatine kinase, lactate dehydrogenase and aldolase activities following supramaximal exercise in athletes.J. Sports Med. Phys. Fitness 1994, 34:141-146.
4. Clarkson P.M., Nosaka K., Braun B. Muscle function after exercise-induced muscle Damage and rapid adaptation. Med. Sci Sports Exerc. 1992, 24:512-520.
5. Yuan I., Kwong A. W. K., Kaptein W. A., Fong C., Tse M., Glatz J. F. C. I et al. The responses of fatty acid-binding protein and creatine kinase to acute and chronic exercise in junior rowers. Res. Q Exerc Sport, 2003, 74, 277-283.
6. Hübner-Woźniak E., Stupnicki R., Hackney A. C. Changes in plasma creatine kinase activity and urea concentration monitored daily during training of elite wrestlers. Sports Med Training Rehab., 1997, 7, 207-214.
7. Hübner-Woźniak E., Lerczak K., Lutosławska G., Błach W., Borkowski L. Changes in plasma creatine kinase activity throughout 10 successive days of judo training. Biology of Sport. 1996, 3,197-202.
8. Błach W., Migasiewicz J., Witek K. Wpływ obciążeń treningowych na aktywność kinazy kreatynowej we krwi zawodników judo w okresie bezpośredniego przygotowania startowego.[w:] red. Kuder A. i in. Proces doskonalenia treningu i walki sportowej. AWF Warszawa. 2004, tom 1, 15-17.
9. Costill D. L. i in. Adaptations to swimming training:influence of training volume. Medicine and Science in Sports and Exercise, 1991, 3.

EFFICIENCY OF SPECIALIST TRAINING WITH EMPHASIS ON INFLUENCE OF SELF DEFENSE ELEMENTS AND JUDO TRAINING AMONG INTERVENTION POLICE OFFICERS

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The research was conducted on a sample of two groups consisting of 65 intervention police officers with aim of identifying efficiency of six month long program of specialists training for special population members. Both groups were working according to official program, but experimental group had a program saturated with more elements of self-defense, judo training, and training in which modern methodological organizational forms of work dominated, stage training, circuit training using free weights, weight machines and kettle bells adequate to police officers` individual characteristics. Research showed that experimental group made statistically significant changes in assessment test of explosive strength, long jump, assessment test of repetitive strength, pull ups and dips, assessment test of muscle arm strength, assessment test of absolute strength, bench-press and assessment test of repetitive relative strength, bench press/70% body mass. Achieved results in experimental group we can assign to impacts of elements of a specialist training program, elements of police self defense, elements of judo training and training in which modern methodological organizational forms of work dominated, stage training, circuit training using free weights, kettle-bells and also elements of situational sparring, free style combat (randori).

SPECIFIC JUDO EXERCISES FOR DEVELOPING RELATIVE REPETITIVE STRENGTH

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Equation specifications success in judo is hypothetical or scientifically established hierarchical structure of characteristics and knowledge of athletes that are important for achieving high sports achievements (Sertić, 2004). In the first place the most important motor ability is strength, and strength is divided to the maximum, repetitive, explosive and static strength.

Repetitive strength is the ability of long-term work in which is necessary to develop appropriate external load. If it comes to mastering the external load (weight or partner), it is the absolute repetitive strength, and when an athlete repeatedly overcome by the weight of his own body (chin-ups, push-ups), it is a relative repetitive strength.

In this training we use only judo belt as a help tool. Performing exercises with the belt can be substantially closer to the engagement of specific muscle groups and movements that they perform at application techniques in judo. The goal of this study is to show how using judo belt can do quality training specifically focused on the open air or in space in which we have no quality conditions for the implementation of the training intensity and strength. The above mentioned exercises are used predominantly for specific preparations of judokas. Contidering that fact in judo fight most engaged are back muscles, arms and shoulders (Sertić, 2004) and so this type of training will be adjusted to affect the development of the same. Specific exercises we do with a belt is in a way that we hung belt 0.5m of judoka and the ends of belt are in a free position. The exercises that we perform in this training are:

1. One-handed back pulley - Judoka is holding one hand to the end of the belt and is pulling to the up position
2. Two-handed back pulley - Judoka is holding with both hands to the end of the belt and pulls to the up position
3. Wide chin ups – Judoka is hanging outstretched arms, holding ends of the belt wide grip and is pulled up
4. Reverse rowing – Judoka is hanging at an angle outstretched hands, feet on the floor and pulls up
5. High-pulley lateral extensions – Judoka is slightly hanging outstretched hands and feet on the floor, and retreats into an upright standing position in a way that expands the hands in front or in side position

6. Narrow chin-ups – Judoka is hanging outstretched hand, with narrow grip holding ends of belt and is pulled up
7. Climbing and descending by the belt – Judoka is hanging holding on both hands with the end of the belt and climbs alternately one, then the other arm to the top and in the same way it moves down
8. Back and down pulley by the belt – Judoka is hanging at an angle outstretched hands and with feet on the floor and climbs alternately one, then the other arm to the upright standing position, and in the same manner down
9. Hanging leg raises – Judoka is hanging stretched body holding only ends of the belt, and inhale and raise the legs as high as possible
10. Abdominal „twist" - Judoka is hanging stretched body holding only ends of the belt, with legs in front position, and with your legs alternately goes to the left and right.

The above mentioned exercises (exercises 1, 2, 3, 4, 5, 6, 7, 8 and 9) in the specific sense serves to simulate the first phase of the throw (distortion opponent balance - „kuzushi") in almost all hand side and throwing techniques.

Exercises 10 and 11 are intended to strengthen the abdominal muscles as well as to stabilize the hull. Abdominal muscles are very important and under heavy involvement in judo fight on the ground when you need to free ourselves from the procedure of holding or defend a position ground floors.

Conclusion:The study has shown that with the help of belt martial arts, as a very simple and cheap tools, you can do very high quality training to develop strength in the open or in areas of modest material conditions.

References

1. Milanović, D. (2010). Teorija i metodika treninga. Zagreb: Odijel za izobrazbu trenera Društvenog veleučilišta u Zagrebu, Kineziološki fakultet Sveučilišta u Zagrebu.
2. Sertić, H. (2004). Osnove borilačkih sportova. Zagreb: Kineziološki fakultet Sveučilišta u Zagrebu.
3. Sertić, H. i sur. (2013). Specifične kondicijske vježbe s judo pojasom. Kondicijski trening, Stručni časopis za teoriju i metodiku kondicijske pripreme 4 (1), 29-32.

NEUROMUSCULAR PROFILE OF ELITE MALE AND FEMALE JUDOKAS WIYH ASSESSMENTE USING TENSIOMYOGRAPHY

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Introduction: Arms muscles strength is considered to be an important factor of performance in Judo. Supporting specific motor skills and actions. Therefore, like in other capacities such as endurance, specific tasks, age, gender and specific positional roles may induce different strength patterns. Additionally, several authors argue that strength weaknesses and/or unbalances are related to soft tissue injury risk. For these reasons, strength assessment and control is of critical value for monitoring the effects of training programs and injury risk factors. The efficient coordination of agonist and antagonist muscles is one of the important early adaptations in resistance training responsible for large increases in strength (Baker & Newton, 2004, 2005; Robbins et al., 2010). Weak antagonist muscles may limit speed of movement; consequently, strengthening them leads to an increase in agonist muscle movement speed (Jaric et al., 1995).Balance control abilities are essential for top athletes to reach optimal performance in competitions, especially for judokas (Perrin et al., 2002). Judo can be divided into attack and defense abilities, both of which influence winning. For response to attack, control of proper distance and force application to destabilize the rival through movement derives from control in balance. Despite the usefulness of the TMG, reference data of theses muscles (Latissimus Dorsi, Bíceps Brachial, Triceps Brachial and Pectoralis Mayor) are not known in judokas, nevertheless in other sports it has been used for this purpose, being used as neuromuscular reference values in elite athletes, or as a mean to determine the athlete´s lateral and functional symmetry, as it has been suggested by García-García et al. (2015) in kayakers (Latissimus Dorsi, Deltoideus and Trapezius).

Purpose: The aim of this study is to assess the contractile properties and the lateral symmetry percentages of muscles: Biceps Brachial, Triceps Brachial, Pectoralis Major and Latissimus Dorsi of elite men and women judokas, reach the balance agonist/antagonist of arms and determine the gender influence and the specific training in the assessed parameters.

Methods: Twenty-eight volunteers participated in this study, divided into two groups: ten elite women judokas (WJ), eighteen men judokas (MJ), (age: 21.6 ± 3.3 vs. 20.4±5.2 years; height: 1.60 ± 0.02 vs. 1.75±0.05 m; body mass: 60.5 ± 9.3 vs. 76.7±13.1 kg) have been assessed through tensiomyography (TMG). The maximal displacement (*Dm*), delay time (*Td*), contraction time (*Tc*), sustained time (*Ts*), and half-relaxation time (*Tr*) were obtained

in both side of each muscle in all subjects. Reliability of the TMG assessment was tested by means of the calculating intraclass correlation coefficient reliabilities (ICCRs), and almost the values obtained were over 0.8. A t-test ($p \leq 0.05$) and Cohen's d effect sizes were implemented, and we turned to the algorithm of TMG-BMC tensiomyography® to determine the lateral symmetry percentages.

Results: The results show that, WJ and MJ differ only more Time contracting their Biceps Brachial right us (29.9±6.9 vs. 24.2±3.5 s; p= 0.032), more *Td* (23.1±1.9 vs. 21.3±1.6 s; p= 0.027), and less percentage of lateral symmetry (83.2±6.6 vs. 89.7±5.8 %; p= 0.018). If the Tc decreasing and the Dm increasing involve a good response following the muscle training. In Latissimus Dorsi left (L) and right (R), the maximal displacement (*Dm*) present lower results in WJ than MJ (left, 4.2±3.2 vs. 7.5±3.4 mm; p= 0.016, right, 3.4±2.8 vs. 7.3±3.5 mm; p= 0.004). In Pectoralis Major L and S, MJ have more of maximum radial displacement (*Dm*) than de WJ (2.9±2.0 vs. 6.0±3.0 mm; p= 0.003, right, 2.6±1.7 vs. 5.3±2.2 mm; p= 0.001), and the Time contraction is significant in the right, (20.7±5.0 vs. 25.1±4.5 ms; p= 0.037) and marginal differences in the left side (21.5±4.1 vs. 25.3±7.0 ms; p= 0.081). The lateral PM symmetry is similar between WJ and MJ (83.7±7.5 vs. 82.5±10.4%; p= 0.727). The WJ show lower sustained time (*Ts*) than the MJ in the R and L Triceps Brachial (88.7±42.5 vs. 155.7±56.7 ms; p= 0.002, 83.4±58.8 vs. 169.4±68.8 ms; p= 0.002). There were no significant differences between WJ and MJ in balance of arms agonist/antagonist, only marginal differences in the right arm (67.8±14.1% vs. 77.6±12.0; p= 0.081), however this ratio 67.8 % is not good for the high performance.

Conclusion: Judo players showed muscles with ability to rapidly generate force during contractions. The neuromuscular profile provided could help in identifying the normative data that are important for the different actions (pull/push) in order to optimize the training and recovery process of each individual player. In conclusion, the specific training seems to have a significant influence on the WJ neuromuscular profile compared to MJ.

References

1. Baker, D., & Newton, R.U. (2004). An analysis of the ratio and Relationship between upper body pressing strength. *Journal of Strength and Conditioning Research*, 18, 3, 594–598.
2. Baker, D., & Newton, R. U. (2005). Acute effect on power output of alternating an agonist and antagonist muscle exercise during complex training**.** *Journal of Strength and Conditioning Research,* 19, 1, 202-205.
3. García-García, O., Cancela-Carral, JM., Huelin-Trillo, F. (2015) Neuromuscular Profile of Top Level Women Kayakers, Assessed Through Tensiomyography. *The Journal of Strength and Conditioning Research, (*Publish Ahead of Print).
4. Jaric, S., Rpoert, M., Kukoli, and Ilic (1995). Role of agonist and antagonist muscle strength in rapid movement performances. *Eur. J. Appl. Physiol.,* 71, 464–468.
5. Robbins, D.W., Young, W.B., & Behm, D.G. (2010).The Effect of anUpper-Body Agonist–Antagonist Resistance Training Protocol on Voulme Load and Efficiency. *The Journal of Strength and Conditioning Research*, 24, 10, 2632–2640.