



APRIL 25TH 2013
BUDAPEST, HUNGARY



4th European Science of Judo Poster Exhibition





Welcome Note

Dear Friends, Dear Colleagues,

Since 4 years the EJU organizes the European Science of Judo Poster Exhibition.

This year the presentation of the researchers' works was held in BUDAPEST (Hungary) within the Seniors European Championships.

On this occasion, 17 posters were realized by 39 authors and co-authors.

This year, the winner of the Poster Exhibition is **Mr. Fabio Capelletti** (ITALIA) with his work "Thermo-elastic effect on different mats after body impact in judo throws".

The second place (tie) was awarded to **Mr. Luís Monteiro** (PORTUGAL) for his work "Effect of fatigue on strength performance" and **Mr. Carlos Pablos Abella** (SPAIN) for the research "Hormones demands of judo training test".

On the occasion of this year's edition **Mr. Ivan Segedi, Ms. Tatjana Trivic, Dr. Hrvoje Sertic, Dr. Hans Dieter Heinisch, Mr. Vicente Carratala** and **Mr. Luis Monteiro** represented their researches on the spot.

We also note the presence of the Portuguese champion **Ms. Telma Monteiro** and the Ukrainian champion **Ms. Maryna Pryshchepa** at the Judo Poster Exhibition.

The European Judo Union sincerely thanks all the members of the Evaluation commission for their contribution.

We thank all the researchers for their participation and the quality of their work.



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Presentation Title:

Thermo-elastic effect on different mats after body impact in Judo throws



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Abstract

In Judo the relationship between tatami and judoka is extremely important, but often overlooked. The aim of this study is to analyze the different thermo-elastic responses of different tatami under impact load obtained by different Judo throws. The work was carried out taking infrared thermal images and by analysis of temperature profiles of the impact areas produced by Uke after the fall onto tatami.

The thermo-elastic effect is due to the conversion between the mechanical forms of energy and heat. It occurs when changes of stresses within a material element alter its volume. Density of energy created in material element is transformed into local change of temperature due to both the thermo-elastic (reversible) effect and to (irreversible) dissipative phenomena.

An infrared imaging system offer the opportunity to study the thermo-elastic effect related to the variation of the volume experienced by the polymer material (mat) under impact load (throws).

Because it is impracticable to reduce the magnitude of the impact during training and competitions, the correct throw execution and the use of proper mat (flexible structure under the mat) may reduce the magnitudes of impacts and vibrations, mitigating the adverse effects on the body of judoka.

Keywords: thermo-elastic effect, mat, judo throw

Abstract

In Jūdō the relationship between *tatami* and *jūdōka* is extremely important, but often overlooked. The aim of this study is to analyze the different thermo-elastic responses of different *tatami* under impact load obtained by different Jūdō throws. The work was carried out taking infrared thermal images and by analysis of temperature profiles of the impact areas produced by *Uke* after the fall onto *tatami*.

Introduction

It is well known that infrared thermography is a powerful non contact tool to measure surface temperature. In the recent years many applications are known in several fields, for example as an industrial application for assessing the thermo-elastic behaviour of polymer based materials (Meola et al., 2009).

The thermo-elastic effect is due to the conversion between the mechanical forms of energy and heat. It occurs when changes of stresses within a material element alter its volume. Density of energy created in material element is transformed into local change of temperature due to both the thermo-elastic (reversible) effect and to (irreversible) dissipative phenomena. The pioneering Lord Kelvin studies show that the temperature change is proportional to the change of stresses (Thomson, 1853).

Jūdōka are often exposed to impact of high magnitude and in a very short time. These impacts, mainly those along the vertical axis, represent a severe injury risk in the *jūdōka* wrist and ankle, and moderate injury risk in the hip.

As reported recently the most common mechanism of injury in Jūdō performance is during the standing fight when a competitor is being thrown (37%) and secondly during the grip fight (29,7%) (Pierantozzi et al., 2009). The presence of many internal organs in the hip, moreover, increases the risk of damage to this site and the impacts of the body of *jūdōka* over years of practice can cause some damage to the body. Beyond the biomechanical aspect of throws, the percentage of the body area involved in the fall appears to be a significant parameter in the risk assessment.

Experimental design

Subjects

One Caucasian male *jūdōka* (age 41 years, weight 79.5 kg, height 174 cm, *Jūdō experience*: 35 years) and one Caucasian male veteran *jūdōka* (age 54 years, weight 120 kg, height 184 cm, *Jūdō experience*: 40 years) volunteered to participate in this study. The nature and intent of the experiment were carefully explained and the subjects provided their informed consent.

Technical characteristics of tatami mats

The polyurethane agglomerate samples are obtained from hot-pressed particles (granules) mixed with substances as glue media. The upper side is covered with sanitized polyvinylchloride and the inferior one with special antislip.

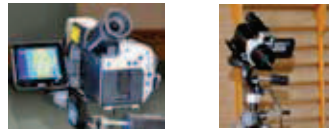
Dimensions: 2 x 1 x 0.04 m

tatami 1:
 $\rho = 250 \text{ kg/m}^3$; $\frac{\alpha}{c_p} = 5,32 \cdot 10^{-08} \text{ kg} \cdot \text{J}^{-1}$

tatami 2:
 $\rho = 220 \text{ kg/m}^3$; $\frac{\alpha}{c_p} = 5,38 \cdot 10^{-08} \text{ kg} \cdot \text{J}^{-1}$

Instrumentation

A NEC InfRec R300 (Avio Infrared Technologies Co., Ltd., Tōkyō) high-performance infrared thermal imaging camera with uncooled focal plane array (microbolometer) detector was used, operating at a resolution of 0.03° at 30°C, an accuracy of ±1°C, 1.21 mrad spatial resolution, a spectral range of 8-13μm, 640X480 thermal image pixels, recording at 30 frames·sec⁻¹, equipped with NS9500PRO software for Windows XP.



The NEC R300 infrared thermal imaging camera, equipped with a color LED display.

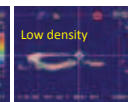
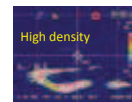
Jūdō throws test: The subjects completed two series of three repetitive Jūdō throws on the two different *tatami* mats. By the biomechanical point of view, the first throw was the **lever-based throw *Seoi-nage*** while the second one the **couple-type throw *Harai goshi***. Between successive throws a resting interval needed to cool down the mat was adopted.



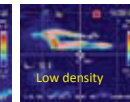
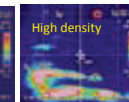
Results and Discussion

Impact surface areas on different density mats were obtained from captured infrared thermal images as shown in the following figures.

Ippon seoi nage



Harai goshi



By using the equation of the thermo-elastic effect under reversible and adiabatic condition :

$$T_{av} - T_0 = \frac{\alpha \cdot T_0 \cdot \Delta\sigma}{c_p \cdot \rho}$$

where:

T_{av} experimental average temperature
 T_0 room temperature
 α linear thermal expansion coefficient
 $\Delta\sigma$ compression factor
 ρ density
 c_p specific heat at constant pressure,

first we evaluated the compression factor which has the dimension of a pressure and is related to the acceleration of the body in the throws normalized by the effective impact area on the mat. Using the average T obtained from the infrared images, the derived $\Delta\sigma$ results are presented in **Tab.1** where a higher value for *Harai goshi* throw with respect to *Ippon seoi nage* is shown. As expected, $\Delta\sigma$ for each throw is not dependent on the mat density.

Tab. 1

	mat density	T_0	T_{max}	$T_{av}-T_0$	sd	$\Delta\sigma$	sd
Ippon seoi nage	250 kg /m ³	22,10	30.25	3,25	0,21	4,19E+07	1,72E+07
	220 kg /m ³	22,10	29.15	3,05	0,21	4,86E+07	3,38E+06
Harai goshi	250 kg /m ³	20,70	28.00	4,70	0,28	7,52E+07	6,40E+06
	220 kg /m ³	20,70	28.37	4,57	0,59	7,30E+07	7,89E+06

Tab. 2

	mat density	area /m ²	sd	area _i /BSA (%)
Ippon seoi nage	250 kg /m ³	0,0733	0,0050	3,8
	220 kg /m ³	0,0358	0,0015	1,8
Harai goshi	250 kg /m ³	0,1235	0,0071	6,4
	220 kg /m ³	0,0591	0,0021	3,0

The overall thermal effect was estimated by measuring the area on infrared thermal images and the average data are reported in **Tab.2**. In this work we assumed as constant the contribute of both the thermal effect due to the diffusive heat from the body on the impact and the (irreversible) thermoplastic effect. Thus, the material temperature variations observed in terms of area changes are mainly due to different

thermo-elastic responses. The results in **Tab.2** show that *Harai goshi* throws revealed higher thermo-elastic effects for both the mats with areas which are about two time of those found for *Seoi nage* throw.

As expected, passing from high to low density mat, the thermo-elastic effect for both the throws reduced to half and such a remarkable decrease is observed even for small variations of the mat density.

By using the Dubois equation the *Uke* body surface area was calculated as:

$$BSA = (W^{0.425} \cdot H^{0.725}) \cdot 0.007184 = 1.943m^2$$

where W is the body weight (kg) and H is the height (m). By dividing impact surface areas obtained in the IR images by the BSA value, the percentage of body surface impacting on the mat may be evaluated. These findings are very important in the assessment of injuries. There is a close relationship of injury effect with the involved body surface area (impact surface), since, given the same force, the more limited the impact area, the higher the pressure and, therefore, the stronger the harmful effect produced (major body penetration).

Conclusion

An infrared imaging system offers the opportunity to study the thermo-elastic effect related to the variation of the volume experienced by the polymer material (mat) under impact load (throws). Several basic informations could be obtained from such a methodology. Because it is impracticable to reduce the magnitude of the impact during training and competitions, the correct throw execution and the use of proper mat (flexible structure under the mat) may reduce the magnitudes of impacts and vibrations, mitigating the adverse effects on the body of *jūdōka*. From literature data, moreover, taking into account the variability among several throws and among forces involved in throws, the impact surface of 3-5% of the total body surface seems to be an acceptable risk for *Jūdō* athletes.

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We are also indebted to Prof. A. Sacripanti, for his suggestions and tutoring during the operation with the infrared thermal camera.



Presentation Title:

Effect of fatigue on strength performance



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Abstract

Judo is a sport characterized by brief bouts of high-intensity, intermittent exercise that requires neuromuscular performance. This study aim to determine the effect of fatigue on arm extensor muscles upon power, velocity, strength and rate of force development (RFD) output levels, throughout a simulate contest in judo athletes.

Sixty-three male judo athletes of five national teams participated in this study, and were classified in two performance groups (elite, n=30; sub-elite, n=33). All participants performed an intermittent judo test - the COPTTEST (a 5 minutes duration test, with 9 Nage-komis, 9 Uchi-komis, 9 Juji-gatame and 4 repetitions of Bench-press (BP) with the power-load in each minute, i.e., T1 to T5). BP load was the previous calculated power-loadings of the arm extensor muscles, and 3 measures were collected: (1) power, (2) velocity, and (3) RFD. Power-load (~50%1RM) was tested on a free-weights BP exercise, and an Isocontrol – Dynamic 5.1 Software was used to collect data. Standard statistical methods, one-way analyses of variance (ANOVA), and the repeated measures analysis of variance (between T1-T2 till T5) were used. The level of significance was set at 0.05.

Significant differences were observed between: (1) performance groups in power, strength and RFD; (2) evaluations (T1 to T5) in power, velocity, and RFD. Moreover, the effect of fatigue on power, strength, velocity, and RFD (all, p=NS) is independent of performance group.

Results showed that elite athletes were powerfull (+69 W to 200 W), stronger (+69 N to 184 N) and have superior explosive muscle strength (+15778 N.s-1 to 32648 N.s-1). In accordance, the maximization of the power development capacity must be a key component of judo training programs. Nevertheless, during the contest, the observed slight reduction in power and velocity (in both, elite and sub-elite groups) must be investigated (i.e., changes in the contractile apparatus vs reduced muscle activation).

Keywords: power, explosive strength, explosive strength resistance, fatigue



Effect of fatigue on strength performance

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Introduction

This study aim to determine the effect of fatigue on arm extensor muscles upon power, velocity, strength and rate of force development (RFD) output levels, throughout a simulate contest in judo athletes.

Methods

Sixty-three male judo athletes of five national teams participated in this study, and were classified in two performance groups (elite, n=30; sub-elite, n=33). All participants performed an intermittent judo test - the COPTEST (a 5 minutes duration test, with 9 Nage-komis, 9 Uchi-komis, 9 Juji-gatame and 4 repetitions of Bench-press (BP) with the power-load (~50% 1RM) in each minute, i.e., T1 to T5). BP load was the previous calculated power-loadings of the arm extensor muscles, and 3 measures were collected: (1) power, (2) velocity, and (3) RFD. Power-load was tested on a free-weights BP exercise, and an Isocontrol – Dynamic 5.1 Software was used to collect data. Standard statistical methods, one-way analyses of variance (ANOVA), and the repeated measures analysis of variance (between T1-T2 till T5) were used. The level of significance was set at 0.05.

Results

Significant differences were observed between:

(1) performance groups in power, strength and RFD (Table 1);

Table 1.

		1 st Min	2 nd Min	3 rd Min	4 th Min	5 th Min	P-value	Breaking
Power (N)	Elite	632.00	598.30	581.90	563.70	553.50	***	12.4%
	Sub-elite	472.40	455.90	450.60	444.30	432.00		8.6%
Strength (N)	Elite	740.40	732.50	730.60	731.10	725.80	***	2.0%
	Sub-elite	609.00	607.40	602.30	603.50	605.80		0.5%
Velocity (m.s ⁻¹)	Elite	0.82	0.79	0.77	0.73	0.73	NS	11.0%
	Sub-elite	0.77	0.74	0.73	0.72	0.70		9.1%
RFD (N.s ⁻¹)	Elite	89718.70	84846.70	87238.40	85055.70	83210.00	***	7.3%
	Sub-elite	63165.40	60176.30	62403.60	64361.40	58938.40		6.7%

(2) Evaluations in power, velocity, and RFD (Fig. 1)

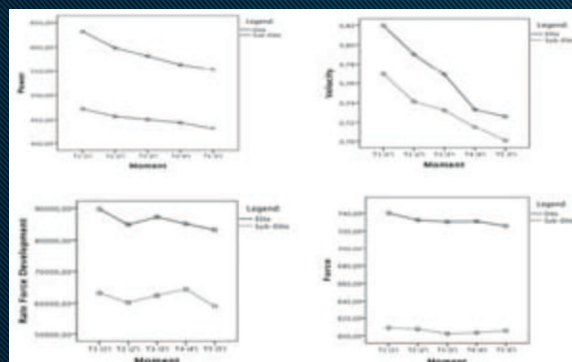


Figure 1.

The effect of fatigue on power, strength, velocity, and RFD (all, $p=NS$) is independent of performance group.

Conclusion

Elite athletes were powerful, stronger and have superior explosive muscle strength. In accordance, the maximization of the power development capacity must be a key component of judo training programs.



Presentation Title:

Hormones Demands of Judo Training Test



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Abstract

Using a biochemical analysis in saliva, to identify the response of testosterone (T) and cortisol (C) on the application of a specific test for Judo. For this we used a sample of 9 judoka, male, 24.1 ± 3.1 years of age, 180 ± 8.4 cm in height and 73.3 ± 8.3 Kg in weight that participated in this study. It examined the concentration hormonal (cortisol and testosterone) me four times, M1 (rest 24 hours before the test); M2 (pre-test); M3 (post-test) y M4 (24 hours after the test). Were produced significant increases in M1 M2 and M3. A significance level of $p < 0.05$ was applied. In relation to the concentration of testosterone, there is a significant increase in the following moments of evaluation: M1-M3 ($p=0.001$); M2-M3 ($p=0.001$) and a significant decrease in M3-M4 ($p=0.005$). The level of concentration of cortisol presents an increase at the same moments M1-M3 ($p=0.015$); M2-M3 ($p=0.047$) and a decrease in M3-M4 ($p=0.004$). It can be concluded that the specific Test, stimulates a great hormonal response to the level of cortisol levels of testosterone. The test can be characterized as an activity short and intense, and yet a good meter of the state of force resistant specifies in Judo.

Keywords: testosterone, cortisol, hormones, salivary, judo, acute stress response

Hormones Demands of Judo Training Test

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1. Introduction

Judo is Olympic sport, in which movements are technical and powerful and different tactical strategies. The conditions physical and physiological are indispensable for success in training, and more important in competition. The hormonal mechanisms are of great importance to maintain the homeostatic balance of different human body systems and activation of adaptive mechanisms. Depending on their metabolic role, testosterone (T) is used as a marker in many studies of anabolic physiological analysis of exercise. Not least, cortisol (C), considered as the stress hormone, that its constant elevation could be associated with muscle atrophy, lack of strength and energy deficit, as well as to assess the level of recovery of the metabolic system, then the exercise. This study analyzes variation in hormone levels (T) and (C) for conducting an assessment test specific to Judo (ECJ).

2. Method

This was a longitudinal study of character with the assessment of hormone levels in 4 different times.

The anthropometric data collection was made early in the first day of passing the tests.

The sample comprised a total of 9 subjects all male, mean age 24 (\pm 3.1) years. Level have an average weight of 77.3 (\pm 8.8) kg.

Finally, in relation to the size factor, have a mean of 180 (\pm 8.3) cm.

The anthropometric data analysis of participants was made through descriptive analysis

We used a one-way ANOVA with repeated measures to evaluate and interpret the concentrations of

cortisol and testosterone taken at four different times.

To relate the values of testosterone and cortisol in different measurements is use not Student t test

for dependent samples.

It was taken the value of $p \leq 0.05$ to identify statistically significant concentrations in the four stages of assessment.

Procedures

Its main objective is to evaluate the hormonal responses of cortisol and testosterone during the conduct of (ECJ). This type of design is commonly used in studies of hormonal responses in sport and therefore does not constitute an objection to the significance of the results to be obtained and so little for comparison with other results obtained in other studies.

For the respective analysis, was made a schedule for the collection of saliva, conducted in 4 stages:

1. Day before the completion of the Review, in the same time period of implementation of this.
2. Day of the completion of the Test, 5 minutes before it.
3. Day of the completion of the Test, 5 minutes after making it.
4. Day following the completion of the test, at 24 hours after the test.

Specific Judo Test

The ECJ has been constructed from an evaluation system that allows mixed and inclusive design different protocols or Comprehensive Test of Resistance (TRI) depending on the sport. Its aim is to bring athletes to the limit of their physical abilities.

This test focuses on the fatigue Resistance to the Explosive Force (RFE) for the flexor muscles of the

upper limbs, with quick thrusts repeated until exhaustion. Its application in judo, we will:

- 1 - Get results from both their own abilities and events in isolation, as the interaction between them.
- 2 - partial assessments against a global assessment, and finally, ensures an assessment of the power in the short series, compared with an assessment of the series resistance in the very long and full test results.

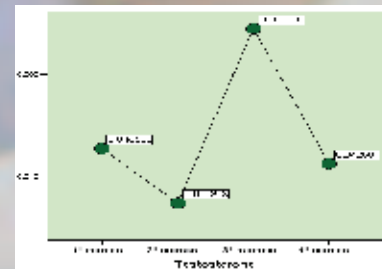
The results, show that the ECJ is a maximum effort. The responses on the level of effort and feelings

that I had the athlete just after the test, indicated in all cases, it was very hard effort and close to the feeling competitive, especially at local fatigue of the muscles of the upper limbs, feeling that compared to the blocking effect in fighting muscle harder.

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3. Results



Testosterone

Depending on the variation of T, we can identify the specific physiological characteristics in relation to exercise duration and intensity.

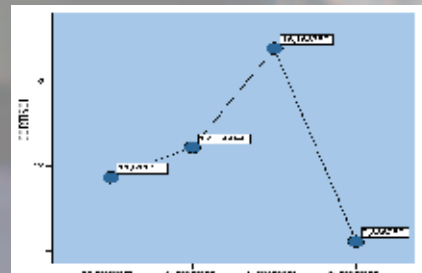
After performing resistance exercises, are significant increases were obtained with a significance level of $p \leq 0.005$, a subject trained, as is the case in our study.

When performing an analysis of the variation of T between M1 and M2, we can see there is a decrease of T, but not significant $p = 0.059$, contrary to previous studies where there is a state after lifting of the respective hormone, in response to a mental preparation for the physiological demands of exercise and found no increases in T before the competition. This difference may be explained by differences interpersonal sample under study .

Between M2 and M3, there has been a very significant increase, $p = 0.001$ which corresponds to the range of the exercise. Has also verified a significant increase in the concentration of T, when athletes undertake large sprints intensity .

Also the realization of large-force training intensity caused a significant increase in the concentration of T.

Cortisol



Cortisol (C), one of the stress hormones and consequent measuring adaptation to metabolic changes caused by exercise, not only during the performance thereof, as well as in the post-recovery.

The first change identified with an increased concentration of C is between M1C (24 hours before testing) and M2C (5 minutes before the test), with a p value = 0.214. This change can be explained by the study of the increased concentration of C by an anxiety state entities exercise performance or competition.

Between M2C and M3C, the biggest change is verified during the study, regarding the timing of the pre test and the time immediately following the completion of the test with a maximum interval of 5 minutes, in which C is an increase of the concentration a p -value = 0.047, with significant relevance, because it lies very close to the values previously established.

When observing the M3C and M4C interval, you can check a very significant change ($p = 0.005$), but with a reduced concentration of C. So we can say that an interval of 24 hours is sufficient for the recovery of the test and that athletes are physically fit as there is no level of significance between M1C and M4C when $p = 0.0241$.

4. Conclusion

This study had specific objectives, analyze the acute hormonal response (T and C) and the respective influence of a specific judo test (ECJ) in anabolic and catabolic systems. We have found that the ECJ, applied to this type of sample, can be considered of great intensity, as seen an acute adaptation in relation to the two hormones studied.

We conclude that the ECJ, stimulates a hormonal response to the level of the T and C, and also that this test is an exercise of short duration, high intensity, since in the post-realization, both hormone levels are significantly higher. We can confirm that this specific test is a stress factor, high intensity and consequently a good gauge specific capabilities Judo specific conditional.



Presentation Title:

The Origin, Essence, and Biomechanical Foundations, of Itsutsu-no-kata [The Forms of Five] – Kodokan Judo's Esoteric Sixth Kata

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Abstract

Our purpose is to provide a comprehensive study of Kodokan's sixth and most esoteric kata, the itsutsu-no-kata, which recently became part of the European Judo Union (EJU) Kata Championships. Our threefold research hypothesis is that itsutsu-no-kata is: (1) not an original creation by Kano Jigoro; (2) an abstract non-self-defense-oriented exercise of which common explanations are historically flawed; (3) impossible to properly teach or evaluate by current EJU scoring criteria. We address these questions through a critical analysis based on rare original historic source materials and biomechanical evaluation. Our results show that itsutsu-no-kata pre-existed in Tenjin Shin'yo-ryu jujutsu under the name Goku'i kuden gohon [5 orally transmitted essentials] hence predating Kano's creation of the Kodokan in 1882. The kata was taught to Kano by his second jujutsu teacher, Iso Masatomo, the School's Third Headmaster and by Inoue Keitaro. The kata initially intended by Kano to be expanded to ten techniques has remained a miseihin-no-kata [unfinished kata] with a temporary project name. The techniques' original names reflected the movements' meaning. Kano imported this exercise to symbolically depict sei-ryoku zen'yo through cosmic movements expressed by the human body. The changes he implemented unintentionally altered the underlying biomechanical principles. After 1927 Kano revised judo's original threefold purpose expanding it with a fourth, namely ishinho [mental satisfaction] achieved through biteki kansei no kanyo [cultivation of aesthetic sensitivity], one of the objectives this kata sought to realize. The kata's highest aesthetic ideal is nyushin shimyo [extraordinary unworldly skill], a quality comparable to yugen in No theater. Present day Kodokan explanations are flawed and not supported by either the underlying biomechanics or its historic foundations. Preventing further decay of this kata among instructors and kata judges requires intellectually comprehending it as an ikimono [living thing] of which the essentials are far beyond merely copying its mechanical patterns.

Keywords: history, jujutsu, kata, philosophy, Tenjin Shin'yo-ryu



The Origin, Essence, and Biomechanical Foundations of *Itsutsu-no-kata* [The Forms of Five] – *Kōdōkan Jūdō's* Esoteric Sixth *Kata*

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Abstract

Our purpose is to provide a comprehensive study of *Kōdōkan's* sixth and most esoteric *kata*, the *itsutsu-no-kata*. We address these questions through a critical analysis based on rare original historic source materials and biomechanical evaluation. Our results show that *itsutsu-no-kata* pre-existed in *Tenjin Shin'yō-ryū jūjutsu* under the name *Goku'i kuden gohon* [5 orally transmitted essentials]. The *kata* was taught to Kanō by his second *jūjutsu* teacher, Iso Masatomo, the School's Third Headmaster and by Inoue Keitarō. The *kata* initially intended by Kanō to be expanded to ten techniques, has remained a *miseihin-no-kata* [unfinished *kata*]. The techniques' original names reflected the movements' metaphoric meaning. Kanō imported this exercise to symbolically depict *sei-ryoku zen'yō* through cosmic movements expressed by the human body, but in some cases unintentionally altered the underlying biomechanical principles. The *kata's* highest aesthetic ideal is *nyūshin shim'yō* [extraordinary unworldly skill], a quality comparable to *yūgen* in *Nō* theater. Present day *Kōdōkan* explanations and insights are flawed and teaching and evaluating approaches limited to nonsensical copy cat replications of the *kata's* mechanical pattern, instead of students being guided to comprehend the *ikimono* [living thing] character and *shu-ha-ri* evolution towards mastering this *kata*.

Introduction

Instead of the current 10, there were 7 original *kata* of *Kōdōkan jūdō* [1,2]:

1. *Nage-no-kata* 投の形 [Forms of Throwing]: 10 techniques (1885), lost
2. *Katame-no-kata* 固の形 [Forms of Control]: 10 techniques (1885), lost
3. *Shōbu-no-kata* 勝負の形 [Forms of Contest]: 10-14 techniques (1887), lost, later *Shinken shōbu-no-kata* 真剣勝負の形
4. *Taisō-no-kata* 体操の形 [Forms of Calisthenics]: 10 techniques (1887), renamed *Jū-no-kata* 柔の形 [Forms of Non-resistance]; original in *Jū-shiki*
5. *Gōjū-no-kata* 剛柔の形 [Forms of Resistance & Non-resistance]: 10 techniques, (1884 ?), then split up and renamed *Gō-no-kata* 剛の形 [Forms of Proper Use of Force] (10 techniques) in 1887
6. *Itsutsu-no-kata* 五の形 [The Five Forms]: 5 techniques (1887 ?)
7. *Kitō-ryū-no-kata* 起倒流の形 [Forms from the *Kitō-ryū* School]: 21 techniques, imported from *Kitō-ryū jūjutsu's* Takenaka-ha branch(1887), renamed (1901) *Koshiki-no-kata* 古式の形 [The Antique Forms]

The purpose of this study was to provide a comprehensive study of *Kōdōkan's* sixth and most esoteric *kata*, the *itsutsu-no-kata*.

Our threefold research hypothesis postulates that *itsutsu-no-kata* is:

1. not an original creation by Kanō Jigorō
2. an abstract non-self-defense-oriented exercise of which common *Kōdōkan* explanations are historically flawed
3. impossible to properly teach or evaluate by current EJU scoring criteria

Methods

- Critical literature & heuristic analysis of original historic primary sources
- Critical analysis of historic film footage
- Personal interviews with senior Japanese *Kōdōkan jūdō* and *Tenjin Shin'yō-ryū jūjutsu* experts + Fukuda Keiko (1913-2013), granddaughter of Kanō's first *jūjutsu* teacher Fukuda Hachinosuke (1828-1879)
- Observation, conceptual and statistical analysis of *kata* contests
- Biomechanical analysis of movements
- Experimental composition & restoration of movements

Results

First occurrence of *Itsutsu-no-kata* in *Kōdōkan*

- May 11th, 1889: Lecture for the *Dai Nippon Kyōkukai*: "theory behind the *kata* of *Tenjin shin'yō-ryū* & *Kitō-ryū kata* is extremely complex" [3]
- May 20th, 1894: Demo opening new *Kōdōkan* at Shimotomisaka-chō



Figure 1. *Tenjin Shin'yō ryū densho* (left) containing the school's syllabus and *makimono* (right) identifying Inoue Keitarō as a crucial teacher to Kanō years after Kanō supposedly reached mastership [2]...

Tenjin Shin'yō-ryū Gokū'i Kuden Gohon Terminology (from [2])		Tenjin Shin'yō-ryū Names			
Kanji	Pronunciation	Kanji	Correct bungo pronunciation	Erroneous pronunciation*	English translation
□ 口伝一本目	<i>Kuden ippō me</i>	押返	<i>Tao-kudashi</i>	<i>Oshi-kaeshi</i>	Forcing back
□ 口伝二本目	<i>Kuden nihon me</i>	奥外	<i>Hiki-wazashi</i>	<i>Ei-ge</i>	Evasive pulling
□ 口伝三本目	<i>Kuden sanbon me</i>	巴分+丹分	<i>En-no-wakare</i>	<i>Tomoe-wakare</i>	Swirling separation
□ 口伝四本目	<i>Kuden yonhon me</i>	退前+渡引	<i>Do-jō</i>	<i>Rō'iri</i>	Withdrawing wave
□ 口伝五本目	<i>Kuden gohon me</i>	天地分+石火分	<i>Tenchi-no-wakare</i>	<i>Sekka-wakare</i>	Heaven/earth Instant separation

Authorship of *Itsutsu-no-kata* in *Kōdōkan*

- At supposed creation date of 1887 is Kanō only 27 years with <4 yrs *Tenjin Shin'yō-ryū* experience (1877-1881)
- Only original *kata*: *gō-no-kata* → primitive >> *itsutsu* = sophisticated
- No document of Kanō claiming authorship (*seitei* 制定 → 'to establish')
- Unthinkable Iso Masatomo, pupil of founder, would change *koryū* curriculum based on a 27-yr old with no qualifications
- Kanō did not teach it until 1897. Why ?
- 1933 visit to London: Kanō demonstrates only 3 forms of *itsutsu-no-kata* + admits he is struggling with it
- Taught to Kanō likely by his 2nd *jūjutsu* teacher, Iso Masatomo (3rd Head) & Inoue Keitarō

Origin of *Itsutsu-no-kata* in *Kōdōkan*

Itsutsu-no-kata pre-existed in *Tenjin Shin'yō-ryū jūjutsu* as *Goku'i kuden gohon* [5 orally transmitted essentials].

Original essence of *Itsutsu-no-kata*

- **Ki**: *Ki no atsukai & ryoku no atsukai, Ki to tai no imi, Ki o mitsuru (shi wa hitotsu te wa chi hon), Shi to ki to ryoku no kankei* in order to lead to *shiki ryoku-ai itsubujō no myō* [2]
- **Muga mushin no i** 無我無心の意 [the meaning of selflessness] [1,2]
- **Fudōshin** 不動心 [the immovable mind; imperturbability] [1,2]

Kōdōkan Itsutsu-no-kata Terminology (from [2] based on [4,5])						
1939	Pronunciation	English Translation	1956†	Pronunciation	>1971	Pronunciation
1	天体 <i>Ten-tai</i>	Heavenly body	第一の形 <i>Dai'ichi no kata</i>	一本目 <i>Ippon me</i>		
2	地体 <i>Chi-tai</i>	Earth body	第二の形 <i>Daini no kata</i>	二本目 <i>Nihon me</i>		
3	空体 <i>Kū-tai</i>	Air body	第三の形 <i>Daisan no kata</i>	三本目 <i>Sanbon me</i>		
4	風体 <i>Fū-tai</i>	Wind body	第四の形 <i>Daiyon no kata</i>	四本目 <i>Yonhon me</i>		
5	宇宙体 <i>Uchu-tai</i>	Cosmic body	第五の形 <i>Daigo no kata</i>	五本目 <i>Gohon me</i>		



Figure 2. Biomechanical differences between the original first form as performed in *Tenjin Shin'yō-ryū* (left) and the derived form as introduced to *Kōdōkan* by Kanō (below).

The first action with soles being pushed backwards could be expressed as:

$$F_{\mu} < F_2$$

Then, after some time when there is a stop, and the direction is reversed with soles now being forced to walk backwards, the second action could be expressed as:

$$F_{\mu} > F_2$$

The total force applied is then:

$$F_{\mu} = \sum_{i=1}^{n} F_i = F_1 + F_2 + F_3 + \dots + F_n$$

As we all see, this is distinctly different from the present day *Kōdōkan* convention, where the way the first form is performed rather according to the following equation:

$$F_1 > F_2$$

Little known expansion of the aim of *Jūdō* late in Kanō's life

1. *Jūdō taikū-hō* 柔道体育法 [Physical Education] (1889) [3]
 2. *Jūdō shōbu-hō* 柔道勝負法 [Fighting] (1889) [3]
 3. *Jūdō shūshin-hō* 柔道修身法 [Morality] (1889) [3]
- end 1920s:
4. + *Jūdō ishinhō* 慰心法 [Chin.: *wèixīnfǎ*; mental satisfaction] [2]

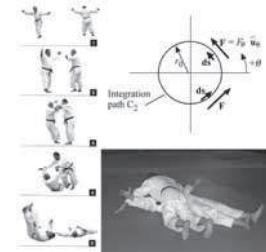


Figure 3. Mathematical expression of the hydrodynamic analysis of *Kōdōkan's* nonsensical "whirlpool explanation" showing how in a whirlpool the axial subject(s) would be forced towards the middle and downwards and not outwards. The real origin of the movements is an aerial fight between birds of prey such as eagles or ospreys.

Essence of *Itsutsu-no-kata* within *Kōdōkan*

- Symbolic presentation of *sei-ryoku zen'yō* in cosmic movements [5]
- *Ishinhō* achieved through *biteki kansei no kanyō* [cultivation of aesthetic sensitivity] [2]
- Highest aesthetic ideal is *nyūshin shim'yō* [extraordinary unworldly skill], a quality comparable to *yūgen* in *Nō* [2,5]
- Ideal: *Shu-ha-ri* 守破離 progress from rigid adherence to the mechanical form towards a free, natural & detached-from-the-formal way [2,3]



Conclusions

Itsutsu-no-kata is an unfinished metaphoric choreography not originally authored by Kanō & poorly understood by *kata* experts.

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We are indebted to Dr. Sc. A. Sacripanti for his expertise and kind assistance with the biomechanical analysis of *jūdō* techniques.



Presentation Title:

Anthropological status of judokas of different skill level

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Abstract

INTRODUCTION: Determination of anthropological status of judokas is crucial step in creating a specific training program for each sportsman. The level of abilities and knowledge's is determination factor between judokas.

MAIN GOAL of this research is to determine differences in anthropological status between judokas of different skill level.

SAMPLE OF SUBJECTS included 43 judokas (U17). 23 judokas that compete on international level and 20 judokas that compete only on national level (in categories up to 55kg, up to 60kg and up to 66kg).

SAMPLE OF VARIABLES: Forward bend (flexibility), Side steps (agility), Hand tap (hand speed endurance), Standing long jump (horizontal leg power), Static endurance in the position of "chin up" on judogi (arm and back static strength /endurance), Sit ups in 60 seconds (strength endurance of abdomen), Throw + 2 push-ups in 90 seconds (specific anaerobic endurance), Special judo fitness test (SJFT) (specific anaerobic endurance) – includes the number of throws for each series, heart rate immediately and one minute after the test and the overall test score.

METHODS OF PROCESSING DATA: One way ANOVA was used to determine the difference between two groups of judokas.

RESULTS showed generally statistically significant difference between the international and national level judokas ($p = 0.0042$). Univariate results for each variable showed that there were no differences in flexibility, agility, horizontal leg power, arm and back static strength /endurance and in heart rate immediately after the SJFT. Variables that differentiate judokas were hand speed endurance, strength endurance of abdomen, specific anaerobic endurance in both tests and the indicator of speed of recovery (heart rate one minute after the SJFT).

One can **CONCLUDE** that the most reliable tests for differentiate judokas of are specific tests, and the ability that discriminate them the most is endurance.

Keywords: flexibility, agility, leg power, strength, endurance



ANTHROPOLOGICAL STATUS OF JUDOKAS OF DIFFERENT SKILL LEVEL

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INTRODUCTION

Testing the anthropological status of judokas is crucial step in creating a specific training program for each sportsman. The level of abilities and knowledge's is determination factor between judokas. Diagnostic procedures in the sport offer the use of basic and specific battery of tests. Each of these procedures has its advantages and disadvantages. Benefits of basic tests are a large database and the possibility of comparison with a large number of athletes. Specific tests, however, provide insight into exactly those manifestation of abilities, which are characteristic for a particular sport. But the lack of specific tests in judo, especially in testing motor skills, continues to be a problem in the training procedure of judokas.

MAIN GOAL of this research is to determine differences in anthropological status between judokas of different skill level.

METHODS OF WORK

Sample of objects included 43 judokas (U17). 23 judokas that compete on international level and 20 judokas that compete only on national level (in categories up to 55kg, up to 60kg and up to 66kg).

SAMPLE OF VARIABLES: Forward bend (MPR)(flexibility), Side steps (KUS)(agility), Hand tap (TAP)(hand speed endurance), Standing long jump (MSD)(horizontal leg power), Static endurance in the position of "chin up" on judogi (IUV)(arm and back static strength /endurance), Sit ups in 60 seconds (MPT)(strength endurance of abdomen), Throw + 2 push-ups in 90 seconds (BAC2SKL)(specific anaerobic endurance), Special judo fitness test (SJFT) (specific anaerobic endurance) – includes the number of throws for each series (NK1, NK2, NK3), heart rate immediately (HR1) and one minute after the test (HR2) and the overall test score (SJFT).

METHODS OF PROCESSING DATA: One way ANOVA was used to determine the difference between two groups of judokas.

TABLE 1.

RESULTS OF ANOVA between two groups of judokas						
	Test	Value	F	Effect - df	Error - df	p
1 / 2	Wilks	0,408648	3,23	13	29	0,004219*

TABLE 2. Results of difference between two groups of judokas in each variable

	Mean - 1	Mean - 2	t-value	df	p
MPR	61,4348	63,8000	-0,63658	41	0,527934
MKUS	8,2278	8,5475	-1,78009	41	0,082473
MTAP	37,6087	34,4500	2,41807	41	0,020131*
MSD	232,8261	221,3500	1,98489	41	0,053875
IUV	0,0006	0,0005	1,89190	41	0,065581
MPT	57,0000	49,6000	2,78491	41	0,008067*
BAC2SKL	18,6957	16,3000	3,15385	41	0,003013*
NK1	5,4783	5,1500	2,14322	41	0,038078*
NK2	9,6087	9,0000	2,88843	41	0,006158*
NK3	9,0435	8,4000	2,31949	41	0,025428*
HR1	179,2174	185,9000	-1,42782	41	0,160918
HR2	140,9130	161,9000	-3,21091	41	0,002574*
SJFT	13,3360	15,5041	-3,84738	41	0,000409*

RESULTS AND DISCUSSION

The results showed generally statistically significant difference between the international and national level judokas ($p = 0.0042$).

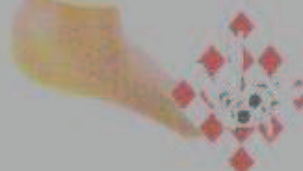
Univariate results for each variable showed that there were no differences in flexibility, agility, horizontal leg power, arm and back static strength /endurance and in heart rate immediately after the SJFT.

Variables that differentiate judokas were hand speed endurance, strength endurance of abdomen, specific anaerobic endurance in both tests and the indicator of speed of recovery (heart rate one minute after the SJFT).

Analyzing these results it can be concluded that the application of specific tests better distinguishes judoka and also that the ability that differentiate judokas the most is endurance - the ability that have a major role in judo fight. Abolishing limit of golden score this ability comes more to the fore. Although the heart rate after the test SJFT similar in both groups of athletes, judoka of international level, because of their better endurance, have a faster recovery and reduced heart rate after a minute of rest.

CONCLUSION

Awareness of the abilities that most differentiates judoka and insight into tests that assess this ability best, allows coaches to continuously monitor the progress of their athletes and that with great probability determine their current status in relation to judokas of higher qualitative rank



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Presentation Title:

Movement of uke from the aspects of judo bout tactics

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Abstract

One of the basic principles of Judo (Seiryoku Zenyo) implies usage of minimum energy for achieving maximum efficiency. Crucial moment in this principle "lies" in the movement of uke. One can determine five basic directions of movement of uke - forward, diagonally forward, sideward, backward and diagonally backward. The main goal of this paper was to determine, from the aspects of tactics in judo bout, which movements are more suitable for attack and which for defense. For that reason international team of eight judo experts analyzed the characteristics of 60 throwing techniques. The results of factorial analysis showed the existence of two superior types of motion (factors), extracted from five basic movement directions. First factor comprised movements: forward, diagonally forward and, surprisingly, sideward. Second factor comprised movements backward and diagonally backward. Further analyses of characteristics of throws during these two types of motion showed that during first type tori has wider range of throws that are suitable for attack that also have higher level of applicability. One can say that whenever center of gravity of uke's body doesn't move away from tori he has better chance to attack uke. During the second type of movement tori is limited to a fewer number of efficient throws. That fact together with the fact that center of gravity of uke's body is moving away from tori helps uke to defend him better. From the aspects of tactics of judo bout one can conclude that the movement of uke predominately forward is more suitable for attacking judo, movement predominately backward for more defensive judo. Simple acknowledgment of these judo principles can help coaches and sportsmen to create efficient judo bout tactics that is based on characteristics of ones tokui waza and also on concrete situation in judo bout.

Keywords: moving forward, moving backward, moving sideward, offence, defence



MOVEMENT OF UKE FROM THE ASPECTS OF JUDO BOUT TACTICS

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INTRODUCTION

One of the basic principles of Judo (Seiryoku Zenyo) implies usage of minimum energy for achieving maximum efficiency. Crucial moment in this principle "lies" in the movement of uke. Correct application Nage waza imply usage of each technique in right moment from the right movement (Ishikawa and Draeger, 1964.; Reay and Hobbs, 1992.; Elie, 2004.). One can determine five basic directions of movement of uke - forward, diagonally forward, sideward, backward and diagonally backward, and for each of that movement exists the best solution for a throwing attack. Knowing the best solution for attack will enable one to be more efficient in offense and also in the defence situations. This fact allows the coaches to create tactics for their contestants in every moment of the fight. The main goal of this paper was to determine, from the aspects of tactics in judo bout, which movements are more suitable for attack and which for defense.



METHODS OF WORK

For the purpose of this research a new measurement instrument was designed. The measurement instrument was in the form of questionnaire in which eight judo experts noted the applicability of 60 throwing techniques (divided in four groups. TE WAZA, ASHI WAZA, KOSHI WAZA and SUTEMI WAZA) in five basic directions of movement of uke - forward, diagonally forward, sideward, backward and diagonally backward. Team of eight international judo experts was recruited specially for this research (one expert from Basil, Italy and Poland; three experts from Japan; two experts from Croatia). All experts were familiar with research methodology. The experts gave their opinion on the applicability of each throwing technique in a way that they graded them from 1 to 5 (the grade 1 meant very little applicability while the grade 5 meant very great applicability of a throwing technique in a particular direction of movement). The description of methodology and data collection process was explained to the experts in the language they understood well and the questionnaires were translated onto the languages they understood well.

RESULTS

Table 1. Average grade of applicability of different NAGE WAZA groups in each direction of movement

MOVEMENT	ASHI WAZA	KOSHI WAZA	TE WAZA	SUTEMI WAZA
FORWARD	2,90	4,86	3,69	4,33
BACKWARD	3,48	2,56	2,73	2,57
DIAGONALLY FORWARD	2,91	4,26	3,40	3,98
DIAGONALLY BACKWARD	3,62	2,57	2,67	2,76
SIDEWARD	2,75	2,86	2,66	2,98

Analyzing table 1 one can get an insight into the general characteristics of each group throwing technique. It can be seen that the movement of uke forward and obliquely forward is the most common for koshi waza, and at least for ashi waza. Movement backward and oblique backward is the most applicable for techniques from the group of ashi waza, and at least for the group of koshi waza. When movement is sideward one can notice a very uniform distribution of the applicability of the groups of throwing techniques. Only a slight, almost inconsequential, dominance have sutemi waza techniques.

Table 3. Factor structure matrix for the variables of movement, the variances of each factor (Expl.Var), shares of the variance of factors in total variance (Prp.Totl) and communalities of the variables

MOVEMENT	FAKTOR 1	FAKTOR2	KOMUNALITET
FORWARD	-0,404	0,826	0,847
BACKWARD	0,923	-0,135	0,872
DIAGONALLY FORWARD	-0,340	0,908	0,941
DIAGONALLY BACKWARD	0,940	-0,152	0,908
SIDEWARD	0,370	0,736	0,679
Expl. Var	2,389	2,093	
Prp.Totl	0,398	0,348	

Table 2. Eigenvalues and proportion of the variance explained by the significant principal components for the variables of movement

PRINCIPAL COMPONENT	EIGENVALUE	% VARIANCE (Λ%)	CUMULATIVE % OF VARIANCE (Λkum %)
1	2,914	48,57	48,57
2	1,568	26,15	74,72

The results of factorial analysis showed the existence of **two superior types of motion (factors)**, extracted from five basic movement directions. **First factor** comprised movements: forward, diagonally forward and, surprisingly, sideward. **Second factor** comprised movements backward and diagonally backward. Table 1. as also the analyses of applicability grades of each throwing technique during these two types of motion showed that during first type tori has wider range of throws that are suitable for attack that also have higher level of applicability. One can say that whenever center of gravity of uke's body doesn't move away from tori he has better chance to attack uke. During the second type of movement tori is limited to a fewer number of efficient throws. That fact, together with the fact that center of gravity of uke's body is moving away from tori helps uke to defend him better.

CONCLUSION

From the aspects of tactics of judo bout one can conclude that the movement of uke forward, diagonally forward and sideward are more suitable for attacking judo, and movement predominately backward for more defensive judo. Simple acknowledgment of these judo principles can help coaches and sportsmen to create efficient judo bout tactics that is based on characteristics of ones tokui waza and also on concrete situation in judo bout.

LITERATURE

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Ishikawa, T., Draeger, F. (1964). Judo training methods. Charles E. Tuttle Company, Tokio.
Reay, T., Hobbs, G. (1992). The Judo Manual. Tiger Books International, London.



Presentation Title:

Learning to face uncertainties through Judo: a study of competitions without weight categories for children in Japan

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Abstract

We present a cultural study conducted in Japan during a study period of one year at Tokyo Gakugei University. We observed at Kan nai (prefecture of Yokohama - Japan) a tournament without weight categories for children in an atmosphere of total security. We present the statistical result of all the fights according to the weight of each of the children. And we ask ourselves: What is the meaning of this educational event? How the organizers manage to create an environment perfectly secure in a confrontational situation so difficult for the child?

Throughout the first half of the twentieth century, the attractiveness of Judo was accentuated by the ideology it conveyed that the little man could, with work, defeat the big one. The pioneers of judo were motivated by the hope of endless progress and, with it, that of being able to face up to any situation, even the most uncertain – regardless of one's social background. In 1960 however, with the development of this sport and the new organization of competitions now based on weight categories, such hope disappeared. A less idealized outlook on this activity replaced the philosophical dimension of judo. Today, categories is a given, and from our western point of view, competitions without weight categories, such as the Kan Nai competition for children, seem odd at all levels. Yet they are very meaningful in Japan and since 2012, the budô, including judô, are compulsory teachings in high schools. These teachings then lead to competitions without weight categories that are emblematic of the type of education Japan wishes to promote; an education meant to prepare youngsters to face the uncertainties of life.

It is the purpose of this paper to study such competitions in order to understand both their organization and their deep cultural relevance.

Keywords: judo, children, social sciences, education, uncertain

LEARNING TO FACE UNCERTAINTIES THROUGH JUDO :

A STUDY OF COMPETITIONS WITHOUT WEIGHT CATEGORIES FOR CHILDREN IN JAPAN

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INTRODUCTION

We present here the results of a cultural study conducted during a study stay at the University of Tokyo Gakugei, from September 2008 to July 2009.

April 12, 2009, we observed a tournament without weight categories for children in Kan nai (prefecture of Yokohama). Children 7 to 12 years competed by age category (first school year, 2nd school year ..., sixth school year), but without categories of sex and of weight. 623 participants, 604 fights. We present here the statistical results of all the fights specifying the weight of the fighters. Despite the risk of a fight without weight classes, child safety seems always fully guaranteed. This organization without weight categories is clearly a cultural singularity, for us today, difficult to understand.

At the beginnings of the judo jutsu ju in France: the smallest which throws most biggest.

In the first half of the 20th century, the development of the judo in France is facilitated by the representation of the smallest which throws most biggest and the hope of invincibility.

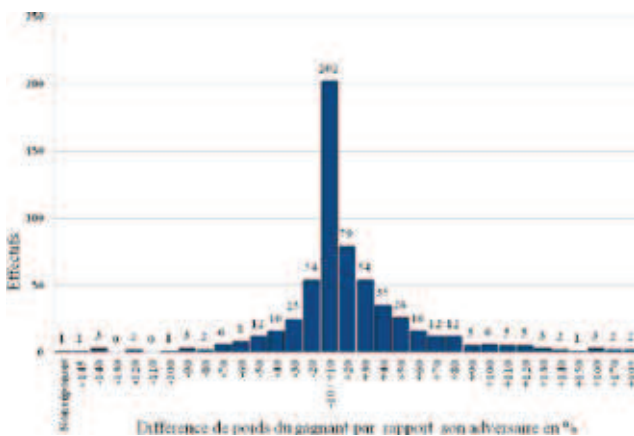
With the development of the sport, and the creation of weight categories, the faith of the smallest which can throw the biggest is an abandoned hope.

Nevertheless, in Japan for the adults and for the children this hope continues to exist today. At Kan nai, this day, the children are in confrontation without weight categories and continue to have this idea that it is allowed to hope to face any situation so uncertain it is. Antieducative in France, the competition without weight categories is in Japan exactly of the most formative.



Statistics:

The results of all the fights in considering the weight of each child



Example of interpretation: 25 children have won while their opponent was heavier. The difference in weight (- 30%) was between 21 and 30% by weight of the most light of the two children



Results of the statistics

- 133 fights are won by the lightest judoka (22 % of all fights).
- 202 fights are won by a judoka whose weight is approximately the same as that of his opponent (33.5%). (In this case, the difference in weight between the two fighters is between -10% and +10%)
- 268 fights are won by the heavier judoka (44.5%)

• The advantage of the weight seems to be confirmed. However, lighter judokas are a significant proportion who win their fights. For the small children this is a significant enough result to continue to hope throwing the biggest and to maintain the enthusiasm of the children. The child learns in this kind of event it is allowed to hope resolve any situation so insurmountable as it may seem.



How possible is this organization in Japan without fear for the safety and the motivation of children?

We observe many intensity in the fights without weight categories but never aggression. The Japanese style that allow such a confrontation seems to lie mainly in the following characteristics :

• The Japanese judo lesson

Between 7 and 9 years old, Japanese judokas children are training in average 2 times a week (1 time a week for the French). In Japan, between 10 and 12 years old, children are training in average 4 or 5 times a week (2 times a week for French) (Colin, 2010, PhD thesis). In the Japanese lesson, we observed many exercises of general physical preparation (jumping, running, ...) and the learning of falls repetition (*ukemi*) is important in each lesson. These exercises prepare the child to fight against an heavier opponent.

• The *reigi* (politeness, etiquette)

Fighting without weight categories is sometimes very intense. The Japanese salutation (*ritsurei*) of the opponent, that children apply religiously before and after the confrontation is like a moment of calm in the relationship.

• The *tadashii judo* (the right judo)

Respect for the Japanese salutation, the vulgar consideration of the use of force, the upright corporeal attitude, the grab (*kumi kata*) of the opponent who controls more than it submits, the victory with the use of a decisive technical judo (*ippon*) is the right judo in Japan (*tadashii judo*). These features allow to install the relation in the fight not on the principle of force, but rather the proper use of the power of the opponent. It therefore allows for the fighting without weight classes.

Conclusion

- The goal of the authors is not to judge whether the competitions without weight categories are good or bad, but simply to see a cultural reality and try to understand. The principles, values, customs, that the child learns to fight in a competition without weight categories are also those that will allow it to integrate into the Nippon society. Judo is an ethnomotricity, it conveys the dominant values of the culture in which it is practiced.
- Our collaboration with Japan is as a powerful inspiration and stimulation for educational innovation in teaching judo.
- Our project is to develop this study with teachers from other countries willing to cooperate in a cultural study
- For more details you can read the article: COLIN T., JONCHERAY H., ITEYA M., Learning to face uncertainties through Judo: a study of competitions without weight categories for children in Japan, STAPS, No. 99, January 2013 (into French).



Presentation Title:

Evaluation of a specific grip strength tests for judo players

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Abstract

Problem:

„The skills of gripping are the key to success“. These are the words in which Adams (1990) describes the outstanding function of the Kumi-kata in judo. In this sport, nearly every 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, and it has to be differentiated between Tsurite and Hikite (Weers, 1998; Morrell, 2004; 2006). As a consequence of a modified combat control not only coaching practice, but also sport science has been focusing on grip strength during the last few years (Crosby et al., 1994; Lee und Quan; 2004; Franchini et al., 2005; Bonitch-Gondora et al., 2011; Sánchez et al., 2011; Dias et al., 2012). However, most of the studies on combat sports are based on measuring the “hand squeezing strength”, e. g. by using the hydraulic hand dynamometer (Schmidt & Toews, 1970). By looking far ahead, Franchini et al. (2011) and da Silva et al. (2012) have decided to measure grip and hold strength on the sleeve of the kimono. Our measuring system is to measure the grip strength performance at the sleeve, too, and at the lapel of a judo jacket, without allowing the influence of other muscle groups. One of the first goals is to examine the reliability of the test.

Procedure:

The test person's upper arm is fixed and he grabs a tightened judo sleeve or lapel by sleeve or lapel grip. The grip devices are pulled continuously in horizontal direction by a tension spindle, which is operated by an electric motor. A power sensor between the tension spindle and the sleeve/lapel measures the effective power. Via a measurement box with a registration frequency of 100 Hz (quasi static measurement procedure) the amplified measurement signal is transmitted to a PC. In April 2013, the first tests with 5 national men's teams will be carried out. Then, test retest reliability studies are of immediate importance for maximum grip strength of the right and the left sleeve of lapel grip.

Results:

The results will be discussed according to dependence of grip/hold strength on body weight, grip position, type of grip (sleeve, lapel), and hand dominance.

Keywords: judo, grip strength, strength measurement, Kumi-kata

Development and evaluation of a specific judo grip-strength-test

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Problem

„The skills of gripping are the key to success“. These are the words in which Neil Adams (1990) describes the outstanding function of the Kumi-kata in judo. In this sport, nearly every 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, and it has to be differentiated between *Tsurite* and *Hikite* (Weers, 1998; Morrell, 2004; see Fig. 1). As a consequence of a modified combat control not only coaching practice, but also sport science has been focusing on grip strength during the last few years such as Crosby et al. (1994); Lee und Quan (2004), Franchini et al. (2005), Bonitch-Gondora et al. (2011), Sánchez et al. (2011) Dias et al. (2012) and Detanicio et al. (2012). However, most of the studies on combat sports are based on measuring the “hand squeezing strength”, e. g. by using the hydraulic hand dynamometer (Schmidt & Toews, 1970). By looking far ahead, Franchini et al. (2011) and da Silva et al. (2012) have decided to measure grip and hold strength on the sleeve of the kimono. Our measuring system is to measure the grip strength performance at the sleeve too (fig. 2), and at the lapel of a judo jacket (fig. 3), without allowing the influence of other muscle groups. Thus a higher validity of our measuring methods is aimed at. The focus of our analyses with the new testing device is put on three questions: (1) Checking the reliability of the testing procedure. (2) Are there age and performance related differences in the level of grip strength? (3) Are there differences between the two basic grip positions (lapel and sleeve)?

Procedure

The test person's upper arm is fixed by a cushioned vertical board and he grabs a tightened judo sleeve or lapel by sleeve (fig. 3) or lapel grip (fig. 4). 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. Therefore the grip strength is measured eccentrically. A force sensor (KAZ of A.S.T. Dresden) between the threaded 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 was carried out for a period of 7 s using a pulling speed of 1.3 m/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. The best value of two attempts right and left was recorded.

- (1) 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 the 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, among them nine athletes have already been internationally successful at men respectively juniors ECh or WCh, additional three have already participated in these events) were examined twice (with two days between the measurements).
- (2) The grip strength (sleeve grip) 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, five of these athletes have already been internationally successful at ECCa or ECh, additional six have already participated in these tournaments).
- (3) Within the junior group the comparison included the maximal grip strength at sleeve and lapel.

Results and discussion

- (1) In the test-retest study for the sleeve grip a significant correlation on the level of $p < 0.01$ was found ($r = 0.78$). Thus the reliability of the test is confirmed. The analyses showed that a further improvement of the test quality is possible by the better description of the grip position (no multi-folding of the sleeve), by a high pre-tension of the sleeve before starting the threaded spindle and by the application of magnesia on the hands (to prevent wet hands).
- (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 to the junior males ($M = 881.7 \pm 154.9$ N vs. 781.6 ± 102.6 N, Fig. 5). Taking the quality of the subject samples into account (highly trained athletes, Rhea, 2004) the practical impact is found in the mean difference ($t_{27} = 2.23$, $p = 0.03$, $d = 0.78$, $1-\beta = 0.65$). International scientific studies indicate 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 (Dias et al., 2011). Franchini et al. (2011) also found that the dynamic grip strength endurance is a discriminate variable between judo athletes and non-judo subjects. In addition our study indicates a significantly higher maximum grip strength performance of highly qualified judo players depending on age. It also stresses its importance with regard to increasing competition needs.
- (3) The grip strength performance in the sleeve grip is significantly higher than in the lapel grip ($M_{\text{sleeve}} = 1502 \pm 744.9$ N vs. $M_{\text{lapel}} = 178.1 \pm 127$ N; comp. fig. 6). The great practical impact of the differences ($t_{133} = 12.3$, $p < 0.000$, $d = 3.29$, $1-\beta = 1.00$) is based on the differing load of the hands. While in the sleeve grip the hand is kept closed and only has to act against the friction resistance (fig. 3) in the lapel grip the fingers are more or less “opened” (fig. 4).

Practical implications

The maximum grip strength is a performance determining element in judo when attacking. Its conscious development for Hikite and Tsurite should be focused with training practical interventions. The testing device offers opportunities for a differentiated control of the level of performance. The next steps in the further development of the testing procedure should include a validity check and its application in the diagnosis of grip strength endurance.



Fig. 1. Sleeve and lapel grip in judo (Adams, 1990)



Fig. 2. Representation of the simulated sleeve grip in test procedure and the force sensor



Fig. 3. Simulated lapel grip in test procedure

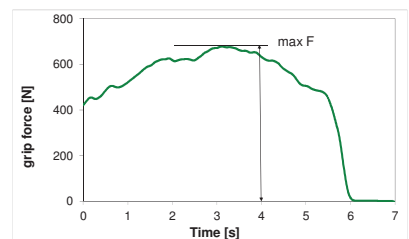


Fig. 4. Representation of the typical force-time parameter

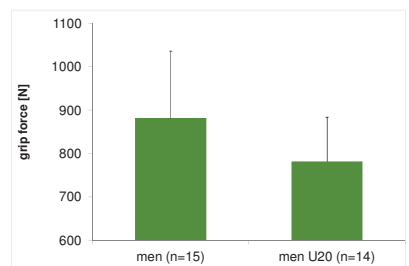


Fig. 5. Comparison of the maximum grip-force-strength level (sleeve grip) in male senior (n=15) and junior judo players (n=14)

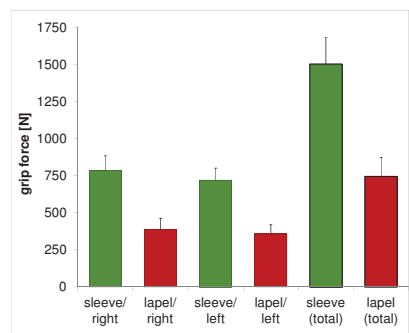


Fig. 6. Comparison of the maximal grip-force-strength level at sleeve and lapel grip (n=14)



Presentation Title:

Special Judo Fitness Test Classificatory Table for Female Judo Athletes

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Abstract

Introduction. Conflicting results were documented in Special Judo Fitness Test (SJFT) for mean parameters of performance and gender of judo athletes matched by age and sports level. Therefore, it is disputable whether SJFT classificatory table, prepared for males, should be also used for females. The goal of the study was to prepare the original standards to allow coaches and researchers to control and evaluate training effects in female judokas.

Material and Methods. The scientific studies were used to collect the research material containing information on female judo athletes who were tested in SJFT. The results were derived from international databases which are available in the Internet. Statistical analysis included the results obtained from 11 relevant studies published between 1997 and 2012. Combined means and standard deviations were computed based on reports concerning 198 individual results in SJFT. A five-degree scale was adopted as follows: Excellent = highest 5%, Good = next highest 15%, Regular = middle 60%, Poor = next lowest 15%, Very poor = lowest 5% .

Results. The study presents the Special Judo Fitness Test Classification Table for female judokas. The normative data included Heart Rate registered immediately after the test, Heart Rate obtained 1 minute after test, Number of Throws completed during the test and Index in SJFT. As an example, the effect of the phases in the menstrual cycle on SJFT results was evaluated using the mean results obtained for female athletes. The evaluation was conducted according to the normative data.

Conclusion. Interactions between the results of testing judo-specific fitness and menstrual patterns response in athletes can be considered during their evaluation using a new classificatory table. With this careful diagnosis, training loads and fighting tactics during competition should be individually modeled.

Keywords: judo, fitness, test, sex factor

Special Judo Fitness Test Classificatory Table for Female Judo Athletes

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1. Introduction

More than a decade has passed since the time of publishing the first study concerning the evaluation of the sport-specific fitness in men using Special Judo Fitness Test (SJFT) [1]. The references confirm that after confirmation of its reliability, the tool was used for both diagnosis and motor preparation of judokas at different competitive levels [1-4] and in scientific experiments [5-9]. In Poland, the Ministry of Sport and Tourism [10] recommended in 2010 the Special Judo Fitness Test. Regular participation in SJFT is obligatory since it ensures the control of training progress in athletes and competitors in the Polish Judo Association [10].

This test is also used in the Judo Federation in Australia [11] and other countries affiliated to the International Judo Federation. Individual results collected in SJFT test for athletes at different competitive level allowed for development of the classificatory table for male judokas [12]. The first studies that characterized fitness level measured in SJFT in women were published in Poland [13] and Brazil [14].

Few publications have analyzed the results obtained in SJFT in women and men at the same judo skill level [11,13,15]. The results of comparisons are not consistent. Some of them show significant relationships between SJFT results and gender [13] while other did not confirm this notion [11,15]. Therefore the evaluation of special fitness in women using a classificatory table [12] created based on the results obtained by men does not seem to be fully justified.

2. Objective

Undoubtedly, the need arises for preparation of original standards to allow coaches and researchers to control and evaluate training effects in female judokas. Therefore, the principal goal of the present study is to develop SJFT standards for female athletes.

3. Material and Methods

The research Keywords such as "judo", "special fitness" "SJFT", "SFJT", "female" were used in a web search query in the international databases of Medline, Scopus, Academic Search Premiere, Sport Discuss, International Judo Federation, International Martial Arts and Combat Sports Scientific Society, International Association of Judo Researchers and Google Scholar. A feedback was obtained concerning 15 documents containing information on the women studied and results of SJFT Index, with its lower values indicating better scores [12,16]:

$$\text{Index} = \frac{\text{Final HR (bpm)} + \text{HR 1 min (bpm)}}{\text{Throws (N)}}$$

4. Statistics

The author continuously updated means and standard deviations (SD) for Throws performed in SJFT, final HR (bpm), HR 1-min after the test (bpm) and Index in SJFT by deriving combined means and standard deviations from more than one group. As an example, the combined means and standard deviations for two only groups were calculated according to the equations recommended by Kirkendall et al. [17]:

$$\text{Combined means} = \frac{(1 \cdot N_1) + (2 \cdot N_2)}{(N_1 + N_2)}$$

$$\text{Combined SD} = \sqrt{\frac{(N_1 \cdot SD_1^2) + (N_2 \cdot SD_2^2)}{(N_1 + N_2)}}$$

A five-degree scale was adopted as follows: A (Excellent) = highest 5%, B (Good) = next highest 15%, C (Regular) = middle 60%, D (Poor) = next lowest 15%, F (Very poor) = lowest 5% and used as a basis for preparation of the normative data for female judo athletes. The SJFT classificatory table for females was generated from the official data published. Hence, there was no need for obtaining the consent from subjects, coaches or ethical committee. Individual data were not presented.

5. Results and Discussion

198 results of performing SJFT by female athletes taking part in various competitive levels were analyzed for age categories of junior (N=51) and senior (N=147) and presented in the five-grades classificatory table.

Special Judo Fitness Test Classificatory Table for Female Athletes

Classification/ Variables	Number of Throws	HRafter (bpm)	HR1min (bpm)	Index
A. Excellent	≥ 30	≤ 166	≤ 126	≤ 10.69
B. Good	28-29	167-173	128-137	10.70-11.68
C. Regular	25-27	174-187	138-155	11.69-13.75
D. Poor	23-24	188-194	156-164	13.76-14.74
F. Very poor	≤ 22	≥ 195	≥ 165	≥ 14.75

— Premenstrual phase — Menstrual phase
Case study of Female National Team in Ukraine (results adapted from [18])

There are views [19], that regularly menstruating female athletes in strength-specific sports do not need menstrual cycle adjustment to maximize their competitive abilities. But it is disputable in the light of the findings presented for such complex sports as judo. A recent study of Gordon et al. [20] demonstrated that 'oestrogen receptors have been shown in skeletal muscle suggesting that oestrogen could have a direct effect on force production'. It can be also associated with the increased availability of ATP and PCr which are the substrates that generate the highest power. Torque production in knee extensors and flexors (measured on the isokinetic device) were lower during menstrual than pre-menstrual phase in judokas from the University of Cambridge team. Similar phenomenon was observed in the results obtained in the Female Ukrainian Team in SJFT by Shahlina and Czistiakova [18].

In conclusion, interactions between the results of testing judo-specific fitness and menstrual patterns response in athletes can be considered during their evaluation using a new SJFT classificatory table. With this careful diagnosis, training loads and fighting tactics during competition should be individually modeled.



Presentation Title:

The preparation's technique of non-oriental made judo contestants' of preschool age

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Abstract

Judo – not only an oriental sport, but also a way of formation of oriental made persons' physical culture. So, it is necessary to consider features of the cultural distinctions between the oriental made and the non-oriental made countries and to spend the adequate correction at judo's studying in the non-oriental made countries by development and realization of the judo's techniques for adequate comprehension of the judo's content.

In the present work the version of a training's judo's technique for the non-oriental made preschool kids is presented.

The adaptability of the preparation's judo's technique of the non-oriental made preschool kids (further – Technique), which is considered by us as its flexibility, is:

– firstly, the property, allowing preschool kids to master the judo's technique conjugatedly with the orientalization's stimulation of their attitude to judo's employment and by a life as a whole;

– secondly, the function providing to the coach a possibility to apply Technique in the various circumstances, both for carrying out the educational and training, the educational and upbringing, as well as the developing studies.

According to the primary both the pedagogical goals and the theory and the technique of the physical culture, Technique includes three theoretically proved components: the educational (which is presented by the technology of judo's teaching expedients), the upbringing and the developing. In view of the age features and an educational Technique's orientation as a whole with a view of the time's economization the educational and the developing problems are solved in this case conjugatedly, that allows to allocate in Technique the fourth component – the integrated (both the upbringing and the developing) component and to receive the sufficient for a considered contingent training effect.

The three-year pedagogical experiment has confirmed expediency (efficiency) of Technique's application.

Keywords: judo, technique, orientalization, preschool kids

THE PREPARATION'S TECHNIQUE OF NON-ORIENTAL MADE JUDO CONTESTANTS' OF PRESCHOOL AGE

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ABSTRACT

Judo – not only an oriental sport, but also a way of formation of oriental made persons physical culture. Its feature, as however the feature of the vast majority of oriental combat sports, consists not only in the skill of the judo's technique's using with achievement's objective of the physical superiority over the opponent and a symbolical psychological victory over him (the *first judo's component*), but also, first of all, in the purchase of an intuitive and flexible skill of the most effectively overcoming his own imperfection in the management of any vital situation (the reception at the most positive result at a minimum of expenses of time and forces; the *second judo's component*). It is logical to assume, that representatives of the non-oriental made countries are more likely inclined to master extensively the *first judo's component*, that does not allow them to master all variety of the judo's world, on the one hand, and to practise judo with advantage, on the other hand. Thus, it is necessary to consider features of the cultural distinctions between the oriental made and the non-oriental made countries and to spend the adequate connection at judo's studying in the non-oriental made countries by development and realization of the judo's techniques for adequate comprehension of the judo's content.

KEYWORDS

JUDO TECHNIQUE, ORIENTALIZATION, PRESCHOOL KIDS

INTRODUCTION

The reproducibility and accordingly, the possibility of perfection of the judo's techniques' traditionally represents the certain practical complexity in connection with that not all of the coaches are capable to state an essence of all methodical expedients, which they apply, in words (to explain in details); sometimes the methodical expedients are applied only at an intuitive level, and furthermore – in scientific terms and concepts.

In turn, presence of similar practical complexity causes an indispensability of the decision of two following scientific problems:

- 1) the problem of the development of such effective program of additional coaches' formation of by means of which it would be possible to generate motivation to the integrated (scientifically-focused and creatively-focused) attitude to professional work in deadlines;
- 2) the problem of the most harmonic compositions of the universal (integrated structural) training's techniques in each sport, including all scientifically-proved volume of the information, allowing to reach such great pedagogical effect as may be possible on the considered instant in time and, consequently, the maximal results on the sports' arena, and also to improve these techniques effectively.

In the present work the version of a training's judo's technique for the non-oriental made preschool kids is presented.

The content of studies with an educational orientation.

Component of a problem of the absence of the provisional program for judo's studies with a contingent of preschool kids during the present period in the Russian Federation assumes a possibility of various versions of its content's composition, including a choice of an individual composition of exercises of the basic part for each of them.

Components of the decision's technology:

1. The basic part includes judo's exercises; judo's techniques' studying and approbation of their application in contests; the judo's perception as a complex of the both the psychic and the carnal exercises is basic.
2. The program of the judo's techniques' teaching should include only safe ones for preschool kids which should be studied in the safe sequence: from less dangerous – to the more dangerous besides that judo's technique, which basis is fixed, can be considered as the safe for performance by such a preschool kid, including its using for a victory in contests; at the same time, the judo's techniques' material should be interesting to preschool kids; available and complex at the same time, that is realized in parallel studying of the judo's technique both the standing and the ground ones (as an example in figure 3 the version of the safe judo's technique's classification and in the safe teaching sequence is presented).
3. That the majority of preschool kids, being engaged in judo's studies even some years at a time, cannot thoroughly remember the sequence of movements in this or that judo's technique is important, therefore the structure of judo's techniques specified in figure 3 and the sequence of their studying concern all process of training; the considered version assumes, that preschool kids of all years of training are engaged together; preschool kids of the first year of training master a basis of judo's techniques, preschool kids of the second year of training shape the skills to carry out the same judo's techniques, preschool kids of the third year and of next years' training improve the skills of performance of judo's techniques and the capacity to apply them in contests;
4. The program of training includes the mandatory studying a basis of the technique of each of the cores ukemi and somefalls (in the basic part of the study), as well as the further formation of skills (in the basic part of the study) and perfection of their executions' skills (in a preparatory part of the study);
5. In case of the division of the engaging the educational process on the age groups and at use of a version of the content's composition of the technique including the both the psychic and the carnal exercises so it is expediently to include exercises of the ushu syansintyuan' in the basic part of judo's studies in the age group until 4 years olds.

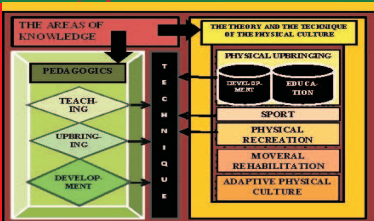


Fig. 1. Technique in a context of both the pedagogical and the theory and the technique of the physical culture's partitions

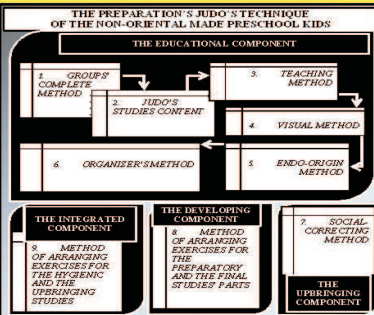


Fig. 2. The preparation's judo's technique of the non-oriental made preschool kids

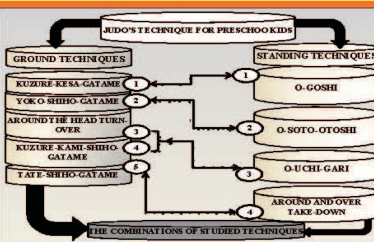


Fig. 3. The version of the safe judo's technique's classification and the safe teaching sequence of them for preschool kids

Table 1
The analysis of the application's possibilities of methods of person's physical culture's formation of preschool kids by means of judo

METHOD	USING		THE STUDY'S PART	
	YES	NO	PREPARATORY	FINAL
STORY	+	-	+	+
CONVERSATION	+	-	+	+
ANALYSE	+	-	+	+
DESCRIPTION	+	-	+	+
CHARACTERISTIC	+	-	+	+
EXPLANATION	+	-	+	+
ACCOMPANYING	+	-	+	+
ACCIDENTATION	+	-	+	+
INTERESTING	+	-	+	+
DIRECTION	+	-	+	+
COMMAND	+	-	+	+
COACHING	+	-	+	+
INSTRUCTION	+	-	+	+
ORDER	+	-	+	+
APPRECIAL	+	-	+	+
EVALUATION IN POINTS, MARKS OR SPOTS	+	-	+	+
VERBAL SELF-REPORT	+	-	+	+
SELF-EVALUATION	+	-	+	+
APPROVAL	+	-	+	+
PRaise	+	-	+	+
SELF-CORRECTING	+	-	+	+
IDEA-MOVING TRAINING	+	-	+	+
VERBAL SELF-REGULATION	+	-	+	+
WORK WITH PRINTED INFORMATION	+	-	+	+
NATURAL SHOWING BY PEDAGOGUE (COACH)	+	-	+	+
NATURAL SHOWING BY LEARNER	+	-	+	+
DEMONSTRATION	+	-	+	+
DIRECTED SEENING OF MOVEMENTS	+	-	+	+
URGENT INFORMATION	+	-	+	+
METHOD OF THE OPEN FORMATION'S EXERCISE	+	-	+	+
METHOD OF THE UNITED EXERCISE	+	-	+	+
UNIFORM METHOD	+	-	+	+
VARIABLE METHOD	+	-	+	+
REPEATED METHOD	+	-	+	+
INTERVAL METHOD	+	-	+	+
GAMING METHOD	+	-	+	+
COMBINATION'S METHOD	+	-	+	+
CIRCULAR METHOD	+	-	+	+

OBJECT

The educational and training's process of the non-oriental made preschool kids' judo's preparation.

SUBJECT

The preparation's judo's technique of the non-oriental made preschool kids.

METHODS

The adaptability of the preparation's judo's technique of the non-oriental made preschool kids (further – *Technique*), which is considered by us as its flexibility, is – firstly, the property, allowing preschool kids to master the judo's technique conjugately with the orientalization's stimulation of their attitude to judo's employment and by a life as a whole, – secondly, the function providing to the coach a possibility to apply *Technique* in the various circumstances, both for carrying out the educational and training, the educational and upbringing, as well as the developing studies.

According to the primary both the pedagogical goals and the theory and the technique of the physical culture, *Technique* includes three theoretically proved components: the educational (which is presented by the technology of judo's teaching expedients), the upbringing and the developing. In view of the age features and an educational *Technique's* orientation as a whole with a view of the time's economization the educational and the developing problems are solved in this case conjugately, that allows to allocate in *Technique* the fourth component – the integrated (both the upbringing and the developing) component and to receive the sufficient for a considered contingent training effect (*that, in turn, the research proves to be true results of comparison of carnal reductions' frequency of preschool kids before and after the educational and training, the educational and upbringing, the developing judo's studies*). The theoretical and the methodological background of *Technique* generalizably is presented in figure 1.

From our point of view, the main component in the judo's preparation of the non-oriental made preschool kids is the technology of the decision of a problem of effective judo's technique teaching. This circumstance causes the selection of methods of person's physical culture's formation from their traditional range and a specific character of their application for carrying out of the employment with preschool kids (tab). In aggregate applied methods form a structure of *Technique*. The structure of *Technique* is presented in figure 2.

DISCUSSION ASPECTS OF THE SCIENTIFIC PROBLEM

It is impossible to overlook a string of reasoning that success of judo's practice is caused in many respects by a degree of progress at the adherent of the capacity to the effective adaptation for the variation of circumstances. In this context there is a following circuit of reflections:

- it is necessary to consider the primary area of judo's adherent studying – sports (as an example) or a life (as the whole) during formation of its individual route of self-improvement;
- a basis of the effective adherent's judo's studying is a degree of the formation at his creative capacities [capacities to produce new ideas; capacities to realize new ideas in practice; capacities to transform the traditional decision of a problem in innovative (non-standard); capacities to see in a problem situation an element which bears in itself a possibility to become a basis for the optimum decision; capacities to find in any social emergency a way of the non-conflict its decisions or of its negative influence's minimizing]; as well as other creative capacities];
- it is expediently to begin adherent's judo's studying at preschool age – the sensitive period of creative capacities' progress.

CONCLUSIONS

FIRSTLY, THE THREE-YEAR PEDAGOGICAL EXPERIMENT HAS CONFIRMED EXPEDIENTY (EFFICIENCY) OF *TECHNIQUE'S* APPLICATION. SECONDLY, *TECHNIQUE* REPRESENTS A COMPLEX OF REGULARLY USED METHODS OF THE PROVED PLANNING, THE CONTROL AND AN ASSESSMENT OF ALL OPERATIONS IN PROCESSES OF TRAINING, EDUCATION, UPBRINGING, DEVELOPMENT.

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Presentation Title:

Lactate concentration after final team judo matches

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Abstract

Blood lactate has been usually examined during the training or in laboratory conditions. Purpose of this study was to investigate lactate concentration after warming up before competition, as well as after final matches on Serbian team championship for male judokas. Research was conducted on two groups of five judokas divided in five weight category. Blood samples were collected from the ear lobe in order to measure lactate concentration before and after two final matches. Based on the obtained results statistical significance differences were noted between first and second final matches in lactate concentration in both groups of male judokas. After second match both group of judokas had higher value of lactate concentration, which indicates a need for improvement of anaerobic capacity. High value of lactate concentration after second match increase muscle acidity, which causes an increase in fatigue. It can be concluded that Serbian male judokas need to improve anaerobic capacity in order to sustain more matches during the competition. This research points out the need to design strategies in training program that clears blood lactate after high intensity matches which enables a faster recovery during the competition.

Keywords: competition, male judokas, anaerobic capacity

LACTATE CONCENTRATION AFTER FINAL TEAM JUDO MATCHES

F=4.51 P=0.00

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ABSTRACT

Blood lactate has been usually examined during the training or in laboratory conditions. Purpose of this study was to investigate lactate concentration after warming up before competition, as well as after final matches on Serbian team championship for male judokas. Research was conducted on two groups of five judokas divided in five weight category. Blood samples were collected from the ear lobe in order to measure lactate concentration before and after two final matches. Based on the obtained results statistical significance differences were noted between first and second final matches in lactate concentration in both groups of male judokas. After second match both group of judokas had higher value of lactate concentration, which indicates a need for improvement of anaerobic capacity. High value of lactate concentration after second match increase muscle acidity, which causes an increase in fatigue. It can be concluded that Serbian male judokas need to improve anaerobic capacity in order to sustain more matches during the competition. This research points out the need to design strategies in training program that clears blood lactate after high intensity matches which enables a faster recovery during the competition.

Key words: competition, male judokas, anaerobic capacity.

INTRODUCTION

Baron Jons Jakob Berzelius swedish chemist, for the first time linked accumulation of lactate with physical exercise (Gladden, 2008). Judo is a sport of high intensity activity that comprises whole body. As a result of recent rules changes, modern judo takes more the anaerobic energy system, elevates heart rates to maximal level and accumulates moderate to high lactate concentrations (10-19 mmol L⁻¹) following competition (Obmiński et al., 2010). As the lactate is a by-product of anaerobic glycolysis and it is produced during cellular respiration as glucose is broken down, higher increase in blood lactate concentration in judokas indicates that they utilize more anaerobic glycolysis reserves in respect to the aerobic and PCr reserves (Wilmore et al., 2008). Up to date, level of lactate in athletes during intense training or competition has been used for assessing level of acidosis and muscle fatigue. The primary source of energy during a judo match is the anaerobic lactic system. According to Wasserman et al., (1981), the anaerobic threshold is a term that refers to the O₂ consumption during exercise, above which the rate of lactate production exceeds the rate at which it can be catabolized, thus causing lactate increase. In order to obtain an understanding of the physiological capacity that underlies judo performance, the analysis of blood lactate concentration in specific situations of judo has been reported (Franchini et al., 2011; Bonitch-Domínguez et al., 2010). In addition, the lactate measurement allows for the clarification of important points. First, it allows for the analysis of the athlete's aerobic capacity to determine the appropriate exercise intensity for training and scientific investigation (Faude et al., 2009). Second, information about the athlete's lactate provides insight into the stress exerted on the muscles during a workout (Beneke et al., 2011). The aim of this study was to investigate differences in blood lactate concentration between two final matches on two group of Serbian male judokas during team championship.

METHOD

Subjects

Study was conducted on two groups of five male judokas from Serbian national team divided in five weight category. Participants from each group were from same judo team, divided in five weight category. None of the subjects was taking drugs, medication, or illegal supplements. None had any endocrine or other medical problems that would confound the results. All were informed about the risks of the research before giving their written consent.

Measurements and tests

All measurements were taken before warming up and after final bouts during team championship of Serbia. Blood samples for lactate control were collected by experienced medical technicians at three intervals: before the first round (after warm-up) after the end of a first match, and after second final match. Samples were collected each time from a different ear. Lactate concentrations were determined using Lactate Pro Blood test meter (Arkray, Inc.).

Data analysis

All data are reported as descriptive statistics including mean values and standard deviation. T-test were used for analyzing differences between final matches. All data were analyzed using IBM SPSS Statistics (version 19.0) program for Windows.

RESULTS

Table 1. present physical characteristics of male judokas, from Serbian national team.

Table 1. Physical characteristics of male Judokas. Data are presented as mean (±SD).

VARIABLES	GROUP 1 (N=5)	GROUP 2 (N=5)
Age (years)	22.6±2.07	24.12±1.64
Body height (m)	183.4±10.03	181.00±12.40
Body mass (kg)	85.2±23.09	86.00±23.09
BMI (kg m ⁻²)	24.97±2.77	25.75±3.68
Training experience (years)	13.60±1.51	13.75±2.71

*Significant difference at P< 0.01. BMI: Body Mass Index;

The variables describing physical characteristic of two groups of Serbian male judokas are listed in Table 1. Based on the obtained results no statistical significance differences were found in analyzed parameters between groups.

Table 2. Lactate concentration of Serbian male judokas before and after two final matches.

	Lactate before the fight (after warm-up)	Lactate after the end of the first fight	Lactate after the end of the second fight
	Mean±SD	Mean±SD (Min-Max)	Mean±SD (Min-Max)
GROUP 1 (N=5)	2.5±0.35	10.76±1.75 (8-12.70) **	16.98±3.24 (13.5-21.50) ***
GROUP 2 (N=5)	2.61±0.20	8.06±2.35 (5.70-11.70) **	15.55±4.05 [†] (10.80-21.50) ***

*Significant difference at P< 0.01 between lactate before and after first and second match; [†]Significant difference at P< 0.05 group 2 vs. group 1; **Significant difference at P< 0.05 between first and second match.

Results of lactate concentrations obtained before fight suggest that both groups of judokas had almost equally effective warm-up routine (Table 2). After the first fight and second match in both groups of judokas statistically significance increase in lactate concentration were noted in compared with lactate value after warming up. The results showed somewhat higher value of lactate concentration in group 1 after first and second match in compared with group 2, but without statistically significance differences. In both groups fight induced statistically significance differences in higher value of lactate concentration after the second match in compared with first match.

DISCUSSION

The physical demand during single judo match is high, and typically judokas perform five to seven matches at international tournament. Depending of the scores, match can last from few seconds to 8 minutes. According to Robergs et al. (2004), increased lactate production coincides with cellular acidosis and remains a good indirect marker for cell metabolic conditions that induce metabolic acidosis. Although the importance of monitoring blood lactate is always being debated, it is recognized that elevated levels of skeletal muscle and blood lactate are associated with impaired muscle function and exercise performance (Gladden, 2004). Even though the cause-effect relationship between lactate and fatigue remains unclear (Menziés et al., 2010), it is understood that the accumulation of lactate may at least indirectly contribute to reduced performance.

Based on the obtained results (Table 2), it can be seen statistically significance increased after first and second match in lactate concentration in compared with lactate value after warming up during the team Serbian championship. Also, it can be seen that both groups had similarly results in lactate value after both fight. This fact indicates that groups have had almost equally effective warm-up routine and similar workload during the matches.

Lactate concentration observed after second match in both groups were statistically significance higher in compared with value of lactate after first match, which indicate that both groups were unable to sustain level of activity from the previous bouts. In the past years Serbian judokas usually los their fights during the international tournament in second or in third match, probably because they are not physically well prepared as European elite judokas and cannot sustain more matches.

Lactate removal in highly trained judo athletes has been reported to improve with active recovery (Franchini et al., 2009), so Serbian athletes should implement during the competition active recovery in order to sustain effectively more fights. Also they should improve anaerobic capacity and endurance performance. Good endurance performance has been marked by decreases in lactate measurements because of the improved blood clearance. Increased transportation of lactate by way of the monocarboxylate (MCT 1 and 4) transporters through the sarcolemma membrane helps to defer the fatiguing component (Azevedo et al., 2007).

In the present study, we used lactate concentration to estimate the intensity of the effort developed in competition in addition to the perceived effort. Lactate values obtained by our subjects were a higher than those found after just one judo combat (Sanchis et al. 1991). As a result, it is relevant to design strategies that clears blood lactate after high intensity exercise bouts, as this enables a faster recovery.

CONCLUSION

High value of lactate concentration after second match increase muscle acidity, which causes an increase in fatigue. It can be concluded that Serbian male judokas need to improve anaerobic capacity in order to sustain more matches during the competition. In recognition of the fact that an athlete can perform more than 5 matches on the same day with an interval of 10 min between two consecutive matches, an adequate recovery is crucial to success in competition. Of course, it is important to state that additional studies are necessary to clarify the role of blood lactate and muscle recovery in Serbian male judokas.



Presentation Title:

The level of general motor performance of young judokas in Slovakia

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Abstract

The trend of lower physical performance, may however limit the performance of young judo competitors. Therefore in our studies, we tried to look into the general physical performance of young judo competitors, and compare it with data from before the year 1990.

The aim of our work was to diagnose the level of conditioning skills using four variables, in 88 selected judo competitors - boys aged 14 to 16 years who were members of the center for talented youth in Slovakia. The results we had obtained were compared with the standards valid in the same age group until 1990. The Slovak Republic was at the time still part of Czechoslovakia. We present the differences in motor performance in the transparent graphs. We came to the conclusion that: in the medicine ball throw test subjects achieved better results in an average of 81 cm than in the past, in the test under-grip pull-ups on bar they were worse on average of 6 reps, in the depth of forward bend test in a standing position we also recorded worse performance by an average of 4.5 cm, in the rope climbing test they achieved better results on average by 0.5 seconds.

In the two variables studied our group showed worse performances compared to the standards in the past. We see the cause especially in neglecting stretching exercises after the session, neglecting general physical training, as well as premature specialization in Judo. In contrast, in the two remaining variables they achieved better performance compared to the standards in the past. They show higher levels of speed and explosive strength of upper extremities and back muscles. The main reason for better performance of our group is that the training focused on the specific muscles as well as the specificity of judo training.

Keywords: motor performance, motor tests, judo, the norms

THE LEVEL OF GENERAL MOTOR PERFORMANCE OF YOUNG JUDOKAS IN SLOVAKIA

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Abstract

Presently, we do not meet with serious health complications of people involved in sport, caused by hypokinesia, but we can observe relatively lower level of physical performance, in comparison with people involved in sports before the year 1990.

The trend of lower physical performance, may however limit the performance of young judo competitors. Therefore in our studies, we tried to look into the general physical performance of young judo competitors, and compare it with data from before the year 1990.

The aim of our work was to diagnose the level of conditioning skills using four variables, in 88 selected judo competitors - boys aged 14 to 16 years who were members of the center for talented youth in Slovakia. The results we had obtained were compared with the standards valid in the same age group until 1990. The Slovak Republic was at the time still part of Czechoslovakia. To elaborate collected data, we used basic statistical methods such as: arithmetic mean, standard deviation, minimum, maximum, variance, median and mode.

We present the differences in motor performance in the transparent graphs. We came to the conclusion that in the medicine ball throw test subjects achieved better results in an average of 81 cm than in the past, in the test under-grip pull-ups on bar they were worse on average of 6 reps, in the depth of forward bend test in a standing position we also recorded worse performance by an average of 4.41 cm, in the rope climbing test they achieved better results on average by 0.52 seconds. In the two variables studied our group showed worse performances compared to the standards in the past. We see the cause especially in neglecting stretching exercises after the session, neglecting general physical training, as well as premature specialization in Judo. In contrast, in the two remaining variables our judokas achieved better performance compared to the standards in the past. They show higher levels of speed and explosive strength of upper extremities and back muscles. The main reason for better performance of our group is that the training focused on the specific muscles as well as the specificity of judo training.

Introduction

Motor tests are tools for motor skills assessment. They are used for the examination of conditions and the control of dynamic changes in physical activities performed by people participated in sport and people not participated in sport. The basic objectives of sport diagnosis are focused on: assessing the level of motor skills in sports, evaluation of training effect, objectification of training load, improve the training process, as well as the prevention of accidents and health problems (BELEJ – JUNGER, 2006).

General tests should affect the general level of the athlete's readiness. The general tests in judo are held at the beginning and the end of the preparation period during the examination of changes in the level and the assessment of the training loads during this period. The battery of motor tests in judo for children and young judokas in Slovakia usually contains running at 50 m, 12 min. run, shuttle run 10 x 5 m, the triple jump, medicine ball two-handed throw, depth forward bending, split, multiple pull-ups on the horizontal bar, sit-ups in 1 - 2 min, raising legs to the bar, rope climbing, standing on one leg duration (ŠTEFANOVSÝ, 2009).

The aim

The aim of this research was to diagnose the level of the conditioning skills over five years (2008 - 2012) using four observed variables. The results were evaluated and consequently compared with the standards valid prior to 1990 for the same age group.

Methods

The examined set included 88 male judokas, with an average age of 15.6 (± 1.9) years, average body weight of 64.6 (± 6.3) kg and height of 164.7 (± 9.7). The participants have been regular member of the Slovak Union of Judo with a valid license and also members of the center for talented youth in Bratislava. They were holders of the 4th, 3rd and 2 degree of technical complexity (Kyu). All the participants confirmed by a written declaration that they agree with release of the test results.

Testing was conducted over five years (2008 - 2012), always at the beginning of the calendar year. The tests were held in Bratislava, during judo training camps always under standard conditions. The participants completed proper warm up and stretching warm up first, followed by exact explanation and demonstration of each test. Test battery consisted of several tests: we included four selected independent variables in our research: 1. medicine ball throw [cm], 2. under-grip pull-ups [n], 3. standing bend-over position [cm], 4. the 5 m rope climbing [s]. The first test had three test trials; the remaining tests were limited to one measured attempt. The results we had obtained were compared with the standards valid prior to 1990 in the same age group (ŠTEPÁNEK et al, 1990). These were standards valid for judo competitors of the former Czechoslovakia. We assumed the results of the judo competitors from the center for talented youth would not reach the level of the norms before 1990.

Conclusions

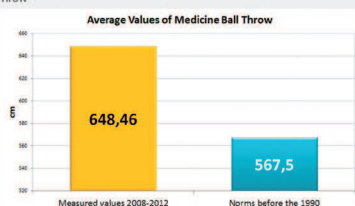
Based on lower flexibility level of the judo competitors we recommend more intense specification of training units on development of this skill and stop overlooking the compensation and stretching exercises. Stretching should be part of every training unit during warm up (dynamic stretching) and cool down (static stretching) and controlled by the coach (ŠTEFANOVSÝ et al, 2012). The coaches should draw attention of their athletes to the importance of the exercises. We recommend the creation of a handbook or DVD for coaches, which would graphically show the important muscles group for judo competitors (in term of shortening and weakening) and compensation exercises related to them. We further recommend drawing the attention to the basics multi-joint exercises, such as pull-ups on horizontal bar, and despite unpopularity of these exercises among the participants we recommend not to substitute them for easier variants. Important part of the coaches' work is to emphasize the need for other physical activities outside the training sessions for this age category with regard to general motor skills development and active regeneration.

Results and discussion

Table 1: Comparison of average measured data and the norms for 14 – 16 year old judokas.

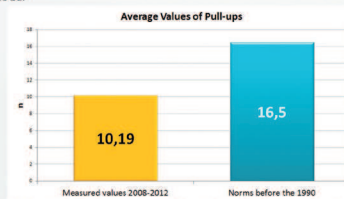
	MEDICINE BALL THROW [cm]	MEDICINE BALL THROW [cm]	PULL-UPS [n]	PULL-UPS [n]	STANDING BEND-OVER [cm]	STANDING BEND-OVER [cm]	ROPE CLIMBING [s]	ROPE CLIMBING [s]
	Measured values 2008-2012	Norms before the year 1990	Measured values 2008-2012	Norms before the year 1990	Measured values 2008-2012	Norms before the year 1990	Measured values 2008-2012	Norms before the year 1990
ave. val.	648,64	567,50	10,19	16,50	7,09	11,50	7,75	8,27
stan. dev.	148,96		6,53		7,96		5,30	
median	615		10		9		8,25	
min.	400		0		21		0	
max.	1110		26		18		20,5	
var.	710		26		39		20,5	

Picture 1: Comparison of the average measured values and the norms for Medicine Ball Throw



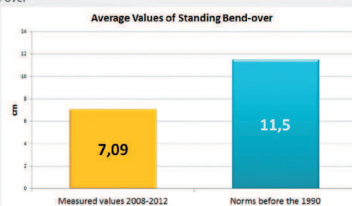
In the medicine ball throw test the subjects gained better results in an average of 81 cm in comparison with the standards of the 1990 (picture 1). We assume that the effect of the contemporary and specialized judo training based on the latest scientific research, which is focused on the strength of the upper limbs, abdominal and back muscles, resulted in better outcomes as standards of 1990. Abdominal and back muscles along with the muscles of the upper extremities are the dominant for judokas' performance and many trainers draw their attention to the development of these muscle groups in conditioning training.

Picture 2: Comparison of the average measured values and the norms for Pull-ups on the bar



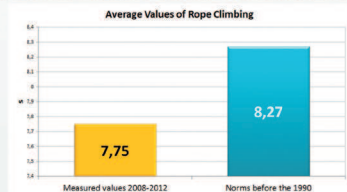
Our participants achieved worse results in under-grip pull-ups on horizontal bar compared to pre-1990 standards on an average of 6 reps (picture 2). Pull-ups on the bar are not popular in the training of young judo competitors, mainly because of their energy consumption and high level of requirements for endurance strength of the upper extremities. Unpopularity and conditioning intensity of this exercise might be the main cause of the lower level of our subjects compared to standards before 1990.

Picture 3: Comparison of the average measured values and the norms for Standing Bend-over



In the standing bend-over test, we experienced worsening of 4.41 cm compared to 1990 (picture 3). This test is focused on knee flexor (biceps femoris, semitendinosus, semimembranosus). These muscle groups with spinal extensors (erector spinae) tend to shorten. We believe that the worsening in the monitored group occurred as a result of compensation and stretching exercises negligence, these should be applied after strengthening part or at the end of the training. Compensation exercises are often performed very superficially, often unsupervised by coach in the final part of the training unit. Furthermore, we believe that the actual compensation and stretching exercises are very unpopular among young judo competitors in Slovakia.

Picture 4: Comparison of the average measured values and the norms for 5 m Rope Climbing



Our monitored group achieved in the 5 m climbing rope test on average of 0.52 s better results than the standards before 1990 defined. In this test, the good fitness level of dominant groups of muscles for judo (muscles of the upper limb and trunk muscles) was shown. At the same time we can say that the rope climbing is often included in the current trainings of judokas since the youngest category.

When comparing the subjects with the standards valid prior to 1990, we can conclude that in the two observed tests (medicine ball throw, climbing to 5 m rope) our group reached better results, as the standards in 1990 defined. In contrast, in the other two observed variables (pull-ups on horizontal bar, standing bend-over) we experienced worsening of the condition.

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Acknowledgements

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Presentation Title:

Actual status and proposed development of Global Judo

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Abstract

An analysis of the traditional judo training is made identifying some factors that we believe are not helping judo to thrive globally as it could. These comprise learning by the method of repetition and traditional strength training altogether based on the final aim of competition. This old focus when applied in a general way and taking into account that more than 90% of judo practitioners are non-competitors, produces a wide-spread un-motivation, increases the probability of injuries and as a result, a low economic return for Federations due to the loss of judo players.

Assuming that the competition is a basic pillar of judo, we propose two main ways of action to boost the quality of judo, therefore the number of judoka and finally the resources obtained.

First, Coach Training as the way to improve the effectiveness of the coach when teaching, motivating more efficiently using new proved training methodologies that will minimise injuries and will keep judoka longer. This is, making judo a healthier sport.

Second, Judo Promotion as the key area to 'explain' what is judo, that it is a sport for physical and psychological development and that it can be seen as a way of life. The potential for judo is overwhelming.

In our opinion, if resources are dedicated more equally to these three lines (competition, coach training and promotion) the return in form of more judoka practising judo, for longer (less injuries) and with more motivation will definitely pay off as federations will receive more resources to invest in more judo projects and activities and will depend less on public funding and support from third parties.

We have a great opportunity. Let's make use of it!

Keywords: judo, promotion, coach training, values, traditional, modern



Presentation Title:

Fun, conflict and persistence in the practice of judo adolescents: Differences between sex and age

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Abstract

Several studies have indicated that the interest, use of mastery goals and Intrinsic Motivation of students decline with age. In terms of gender mixed results have emerged; while some studies report higher levels of intrinsic motivation, perceived competence and enjoyment for boys, others suggest that females Perceived higher levels of more self-determined types of motivation. The objective of this study was to analyse the existence of significant sex and age differences un the fun, conflict perception and intention to continue practicing judo in the future. The sample included 444 judokas, 319 boys and 125 girls, aged between 9 and 15 in two age groups. We used the scale translated into Spanish SSI (Sport Interest and Satisfaction Scale). Results indicated that judokas from 9 to 12 years have more fun during judo classes and although rates of perception of conflict are higher than the 13 to 15 years, intention to continue practicing judo is also higher. Regarding gender differences, girls are more fun and are more motivated to practice judo that boys in the future.

Keywords: judo intentions, self-determination theory, age differences, sex differences, fun, conflict



“Fun, conflict and persistence in the practice of judo adolescents: Differences between sex and age”

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Introduction

A further postulation of Self-determination Theory (SDT) is that the innate needs are universal to all cultures, across gender, and throughout all developmental periods (Ryan & Deci, 2002). Several studies have indicated that the interest, use of mastery goals and Intrinsic Motivation of students decline with age. In terms of gender mixed results have emerged; while some studies report higher levels of intrinsic motivation (Jaakkola & Sepponen, 1997), perceived competence and enjoyment (Carroll & Loudimis, 2001) for boys, others suggest that females Perceived higher levels of more self-determined types of motivation (Vallerand & Bisonette, 1992; Fortier, Vallerand, Briere, & Provencher, 1995). In the present study we analysed the fun, conflict and intention of practice as predictors of adherence to the practice of judo.

Objectives

The aim of this study was to analyse the existence of gender and age differences in the fun, conflict and persistence in the practice of judo adolescent athletes.

Materials & Methods

Participants.

The sample included 444 judokas, 319 boys and 125 girls, between 9 and 15. Specifically, two age-group (9-12 year old and 13-15 years old) and two sex-group (boys and girl group) were considered.

Instruments.

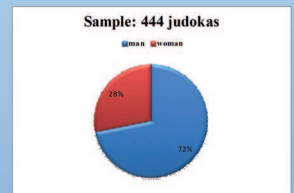
We used the scale translated SSI (Sport Interest and Satisfaction Scale) of Baena-Extremera et al., 2012.

Results

Descriptive analysis was performed by estimating the basic statistics, mean, standard deviation and number of subjects.

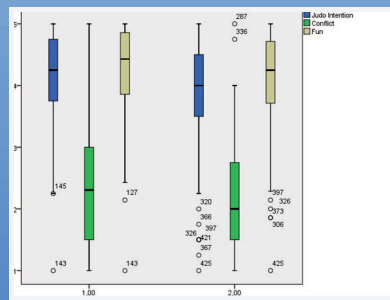
Descriptive Statistics					
	Age Group	Sex	Mean	DT	N
Fun	9 to 12	Woman	4,3811	,55519	68
		Man	4,2090	,71110	178
		Total	4,2566	,67495	246
	13 to 15	Woman	4,2805	,55809	57
		Man	4,0490	,76573	141
		Total	4,1157	,71852	198
Total	Woman	4,3352	,55653	125	
	Man	4,1383	,73887	319	
	Total	4,1937	,69745	444	
Judo intention	9 to 12	Woman	4,2232	,70348	68
		Man	4,1391	,77748	178
		Total	4,1623	,75727	246
	13 to 15	Woman	4,2366	,71842	57
		Man	3,8699	,83620	141
		Total	3,9755	,81935	198
Total	Woman	4,2293	,70748	125	
	Man	4,0201	,81377	319	
	Total	4,0790	,79015	444	
Conflict	9 to 12	Woman	2,4572	,94668	68
		Man	2,3620	1,03616	178
		Total	2,3883	1,01121	246
	13 to 15	Woman	2,0574	,86172	57
		Man	2,1476	,85690	141
		Total	2,1217	,85708	198
Total	Woman	2,2749	,92712	125	
	Man	2,2672	,96552	319	
	Total	2,2694	,95383	444	

Table 1. Descriptive Statistics.

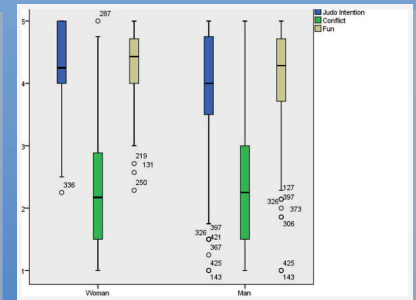


A reading of mean scores of the descriptive table (table 1), we note that fun, women obtained an average score of 4'3352, and men a score of 4'1383. Regarding intentions to continue practicing judo in the future, women get a score of 4'2366 and 4'0201 men. In both variables the women obtain higher score than men. Women also had higher mean scores in all age groups in fun and intention of practice, less perceived conflict in the group of 13 to 15 years, where the average score was higher for men.

On the other hand, a reading of mean scores of the age group (table 1), we note that fun, conflict and intentions to continue practicing judo in the future average score was higher in 9 to 12 years group than 13 to 15.



Graphic 1. Differences between age groups. 1 (9 to 12 year-old), 2 (13 to 15 year-old).



Graphic 2. Differences between sex.

Conclusions

The results indicate that the judokas from 9 to 12 years have more fun during judo classes and although rates of perception of conflict are higher than the group of 13 to 15 years, the intention to continue practicing judo is also higher. Furthermore, the results indicate that gender girls have more fun, and the intention to continue practicing judo in the future is greater, with the perception of conflict practically the same in both groups.

According to this model, the fun and perception of conflict of individuals affect their levels of self-determination for the sport, and thus affects the intention of sport in the future. Therefore, an increasing satisfaction of psychological needs through judo, will cause greater self-determination and hence higher sports practice intentions.



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Presentation Title:

Judo: a new alternative to the spinal injured psycho-physic rehabilitation

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Abstract

We started our work under an investigation-action structure with the objective of giving a group of patients with spinal cord injuries the opportunity to take part in a sporting activity involving physical contact. The patients had done Judo before their accidents and were in the hospital for spinal injuries in Toledo for rehabilitation. After a study of clinical viability done by the rehabilitation team at the hospital, we started to develop the project "Judo for people with spinal cord injuries".

OBJECTIVES: Initially the prime objective of the investigation was to see if there was clinical evidence to support the suggestion of using Judo as an additional method for both the physical and social rehabilitation of people with spinal injuries rather than a scientific objective. Others objectives were as follows:

- The integration of the physically handicapped by participating and enjoying physical combat sports.
- Improve the self-esteem of the participant.
- Help in the process of physical and social rehabilitation of the patient.
- Satisfy the demand of the patients to take part in a contact sport.

These objectives were seen to be fulfilled from the first session as affirmed by the rehabilitation services at the hospital for spinal injuries in Toledo. Just under two months from the beginning of the project, Judo was introduced as an alternative activity in the leisure time set aside for the patients.

With the objective of collaborating the subjective results seen during the work sessions, an evaluative strength test was done using the Isocontrol system, evaluating aspects relating to strength resistance, maximum dynamic strength and the production of strength.

In conclusion, we will summaries the different aspects that made Judo part of the programme of alternative sports in the Hospital for spinal cord injuries in Toledo.

-Physical condition.- There was a notable improvement in strength resistance, maximum dynamic strength and the production of strength in the Judo group in relation to a control group. (This evaluation was done with the Isocontrol system 6.0)

An improvement of aerobic resistance was also noted.

Fundamentally, a significant improvement was noted in general dynamic co-ordination, evaluated using actions in the wheel-chair.

...SOME OF THEM COMMENTED THAT "DOING JUDO WAS THE BEST THING THAT HAD HAPPENED TO THEM SINCE THEIR ACCIDENT"

Keywords: judo, Spinal cord injury; rehabilitation



JUDO: A NEW ALTERNATIVE TO THE SPINAL INJURED PSYCHO-PHYSIC REHABILITATION

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INTRODUCTION

We started our work under an investigation-action structure with the objective of giving a group of patients with spinal injuries the opportunity to take part in a sporting activity involving physical contact. The patients had done Judo before their accidents and were in the hospital for spinal injuries in Toledo for rehabilitation. After a study of clinical viability done by the rehabilitation team at the hospital, we started to develop the project “Judo for people with spinal injuries”.

OBJECTIVES

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CONCLUSION

In conclusion, we will summarise the different aspects that made Judo part of the programme of alternative sports in the Hospital for spinal injuries in Toledo.

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An improvement of aerobic resistance was also noted.

Fundamentally, a significant improvement was noted in general dynamic co-ordination, evaluated using actions in the wheelchair.

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BUDAPEST APRIL 2013



Presentation Title:

Finite element analysis of the judo mat systems in terms of head injury safety

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Abstract

Ukemi is the main precaution of the uke against the body injury during a regular judo throw. Since there exists numbers of judo technique which finalizes in different throwing routes, there also exists a number corresponding ukemis almost for each tachi-waza technique. In all type of the ukemis, the common point is to keep the head closer to the chest as much as possible in order to protect it against an undesired shocking impact considering the flexible nature of human neck. It is scientifically reported that, there is a risk of concussion or minor head injury when the force on the head exceeds 10 kN which is equal to 1 tons. This force can easily be reached in a judo throw at the time of the head impact on the tatami resulting from an uncontrolled ukemi. In order to avoid head injuries which may end up with serious results, the material properties and supporting conditions of the judo mat becomes of greater importance. In this study the shock absorption characteristics of judo mats are investigated considering three different support conditions. Finite Element Analysis (FEA) is carried out on judo mat model by using computer software SAP2000. The results show that, providing a timber platform base under the judo mat improves shock absorption capacity of the mat system and therefore decreases the probability of head injury considerably when compared to that of rigid concrete base. The main precaution against the head injury can be stated either to realize a regular ukemi; or to place timber platform under the tatami. In this poster; theoretical background of the problem, details of the FEA modelling and evaluation of the analysis results are presented.

Keywords: head injury, ukemi, judo mat, shock absorption, finite element analysis (FEA)

FINITE ELEMENT ANALYSIS (FEA) OF THE JUDO MAT SYSTEMS IN TERMS OF HEAD INJURY SAFETY

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ABSTRACT

Ukemi is the main precaution of the uke against the body injury during a regular judo throw. Since there exists numbers of judo technique which finalizes in different throwing routes, there also exists a number corresponding ukemis almost for each tachi-uke technique. In all type of the ukemis, the common point is to keep the head closer to the chest as much as possible in order to protect it against an undesired shocking impact considering the flexibility of human neck. It is scientifically reported that there is a risk of concussion or minor head injury when the force on the head exceeds 10 kN which is equal to 1 tons. This force can easily be reached in a judo throw at the time of the head impact on the tatami resulting from an uncontrolled ukemi. In order to avoid head injuries which may end up with serious results, the material properties and supporting conditions of the judo mat becomes of greater importance. In this study the shock absorption characteristics of judo mats are investigated considering three different support conditions. Finite Element Analysis (FEA) is carried out on judo mat model by using computer software SAP2000. The results show that, providing a timber platform base under the judo mat improves shock absorption capacity of the mat system and therefore decreases the probability of head injury considerably when compared to that of rigid concrete base. The main precaution against the head injury can be stated either to realize a regular ukemi, or to place timber platform under the tatami. In this poster, theoretical background of the problem, details of the FEA modelling and evaluation of the analysis results are presented.

INTRODUCTION

Judo is a sport discipline which coincides well with the fundamentals of biomechanics. Results and observations of the biomechanical research on judo techniques direct the coach/athlete through the right trainings and sportive successes. However, this is not the only benefit of the biomechanical research for the judo related people. It can also help to improve the judo material quality and safety of judo trainings/competitions. Judo throws of tachi-uke techniques can easily be overcome by the uke almost with no pain or injury. If a proper ukemi is realized. However, during severe trainings or at the time of competition uncontrolled ukemis may be realized such that the head of the uke hit the mat first. This may be dangerous for the health and safety of the head when the force on the head reaches beyond 10 kN (1 tons). Unfortunately, there exist some traumatic examples for head injury realized in judo practice some of which even ended up with serious results like permanent amnesia. In order to avoid the head injury in unintended impacts of the head to the judo mat, judo mat material and the mat resisting system become of great importance.

In this study, Finite Element Analysis (FEA) is carried out on 40mm, 50mm, 60mm thick judo mats (as stated in IJF Tatami Regulation, 2011) resisted by three different floor bases in order to investigate the head injury safety. The details of the analytical study, computer modelling and theoretical background are presented hereby poster.

KINEMATICS AND BIOMECHANICS OF THE HEAD IMPACT

In a judo throw if the proper ukemi is realized by the uke, the outstretched arms or the legs and torso, hit the mat first, the head accelerations will be much less. However, a worse case scenario must be considered for the safety of the practicing/competing judoka, when the head hits the mat first. Although the body mass (50 to 100 kg) is much greater than the head mass (4 to 6 kg), the flexibility of the human neck allows the effective separation, on the short time scale of the head impact, and the head and neck motion. Even in the unlikely event of the body being in line with the head, and the impact being direct on the crown of the head, the neck will buckle. Gilchrist and Mills (1996) showed, using dummies with realistically flexible necks, the impact force, F , on the head was related to the head acceleration, a , and mass, m , by Newton's Second Law: $F=ma$ (Eq. 1)

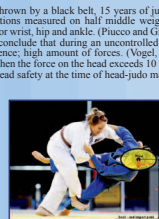


Figure 1. Kinematics of Uke's Head During a Judo Throw (photo: www.mokurenjudo.com)

In the experimental study ukies thrown by a black belt, 15 years of judo experienced tori through ippon-uke; the maximum accelerations measured on half middle weight judoka of 74 kg were 351,94g, 13,51g and 242,20g, respectively for wrist, hip and ankle. (Puccio and Giovanna dos Santos, 2011) Therefore, referring to these results one can conclude that during an uncontrolled throw and ukemi the head may be subjected to high accelerations; hence, high amount of forces. (Vogel, 2003) states that, there is a risk of concussion or minor head injury while the force on the head exceeds 10 kN (1 tons) In this study, the maximum dynamic force limit for the head safety at the time of head-impact injury is assumed to be 10 kN.

MAXIMUM DYNAMIC FORCE ON THE HEAD AND DECELERATION

In the worse case scenario in which the uke's head hit the mat first before the rest of the body, the impact energy at the time of head-impact is the product of the mass of the head, the drop height and the gravitational acceleration. The maximum head acceleration a_{max} is related to the peak force F_{max} on the head by the equation of Newton's Second Law. At the maximum foam deflection Δ_{max} , the impacting head is momentarily stopped; and so its initial kinetic energy KE is converted into strain energy of the foam. The area under the linear part of the force-deflection curve (Figure 2) is given by;

$$KE = \int_0^{\Delta_{max}} F_{max} dx = \frac{1}{2} k \Delta_{max}^2 \quad (Eq. 2)$$

Where k is the foam loading stiffness which is also defined by means of modulus of elasticity of judo mat material. Hence, the maximum deflection is given by;

$$\Delta_{max} = \sqrt{\frac{2KE}{k}} \quad (Eq. 3)$$

In addition to (Popov, 1998) investigates the mechanics of a falling body which is finally stopped by an elastic system. This is analogous with the head-impact of a severe / uncontrolled judo throw. The following equations may be derived for the case where a weight W is moving horizontally with a velocity v and is suddenly stopped by an elastic body. For this purpose it is necessary to replace the external work done by the falling weight in the preceding work by the kinetic energy of a moving body, using a consistent system of units. Therefore, since the kinetic energy of a moving body is $Wv^2/2g$, where g is the acceleration of gravity, it can be shown that;

$$P_{dyn} = W \sqrt{\frac{v^2}{g \Delta_{max}}} \quad \text{and} \quad \Delta_{max} = \Delta_{st} \sqrt{\frac{v^2}{g \Delta_{st}}} \quad (Eq. 4)$$

where;

- Δ_{st} is the static deflection caused by W acting in the horizontal direction.
- P_{dyn} is the dynamic force experienced by the elastic system.
- W is the weight of the falling body.

Since every elastic system may be treated as an equivalent spring, the elastic spring constant, or in other words initial loading stiffness, of the elastic system (hereby tatami) is;

$$k = \frac{W}{\Delta_{st}} \quad (Eq. 5)$$

where;

- k is a mechanical quantity for tatami material.

At the instant the spring deflects its maximum amount, all energy of the falling weight is transformed into the strain energy of the spring.

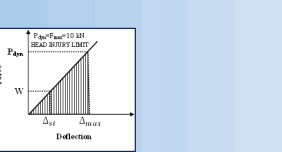


Figure 2. Force - Deflection Relationship for the Head-Mat Impact at the Time of Impact

This means that, the judo mat must vertically deflect at the head-impact point at least with the amount of Δ_{st} to dissipate the impact energy, KE , and provide the safety for head. The energy absorbed by the foam is equal to the area under the loading graph above. If thicker mats are used for high kinetic energy impacts, the loading stiffness must be reduced by reducing foam density, in order to keep the peak force lower than the injury level.

ENGINEERING MODELLING OF IMPACTS

Judo mats are commonly produced by the polyurethane (PU) foam material which is non-homogenous and isotropic material. Besides, the viscoelastic properties of the PU foams are also challenging issues for the material researchers and mat producers. Hence, there are no simple approaches (for example, assuming uniform strain) for the analysis of head impacts on PU (polyurethane) foam safety (judo) mat. The foams are non-linear with rate dependent and viscoelastic properties, so some approximations must be made. The approach is to

1. Carry out Finite Element Analysis (FEA) of head impacts on mats using approximation that the foam is a non-linear elastic (hyper elastic) material materials behave elastically, and no dissipation of energy takes place at the point of impact or at the supports due to local inelastic deformation of materials. The large changes in mat geometry, as the impact proceeds, can only be considered by using FEA.
2. The inertia of a system resisting an impact may be neglected. The mat resisting system may be idealized by means of elastic springs.
3. The lateral friction in between judo mat and the resisting base system for both lateral perpendicular directions (x, z) can be modelled by elastic springs considering the corresponding friction coefficients.
4. The deflection of a system is directly proportional to the magnitude of the applied force whereas the force is dynamically or statically applied. Materials behave elastically, and no dissipation of energy takes place at the point of impact or at the supports due to local inelastic deformation of materials.
5. Leave consideration of material viscoelasticity to later.
6. Ignore the dynamic vibrations of the system.

IJF TATAMI REGLEMENTATION

IJF has a tatami regulation for judo mat producers in order to get an IJF approval for their judo mat products according to the regulation, the mats can be in the thickness of 40mm, 50mm, 60mm and the dimensions of either 1m x 1m or 1m x 2 m to be used in IJF organized judo competitions. Besides, the mat specimen should be subjected to some material and mechanical tests in order to investigate its convenience with the regulation. Laboratory tests mainly related to shock absorption which is obliged to be realized in accordance with European Standard NF EN 12593-3: IJF, (2011)

According to the above stated standard, an indenter is applied to a mat under a specified mass and the deflection of the mat normalised to the deflection at a set distance for the point of installation is measured. Means of applying a load of (50 ± 0.5) kg through an indenter vertically onto the mat and a means of measuring the difference between the deflection under the centre of the indenter and the deflection at a diameter of (160 ± 1) mm. The indenter shall be 78 mm diameter and as specified in EN 12593-4:2001. (IJF, 2011)

The deflection of the mat is conveniently measured in millimetres by means of a scale attached to the indenter and a circular aluminium or rigid plastic plate 160 mm diameter with a central hole 80 mm diameter. The test piece shall be the complete mat. The fall heights for the indenter is 200, 400 and 600 mm.

Potential Energy = Kinetic Energy
 $mgh = \frac{1}{2}mv^2$; hence $v = \sqrt{2gh}$ (Eq. 6)

Therefore, the velocity of a moving body subjected to free fall is proportional to the fall height h , and gravitational acceleration, g .

According to IJF Tatami Regulation, during the shock absorption tests the moving indenter which represents the body any part of body of the uke reaches to the following velocities at the time of mat contact

Table 1. Velocity of the Indentor at the Time of Mat Impact

Fall Height (m)	Velocity at the Time of Impact (m/s)
0,20	1,98
0,40	2,80
0,60	3,43

Considering the velocity predictions of IJF Tatami Regulation, it can be stated that the maximum velocity that a part of the body can reach at the time of mat impact is estimated to be 3.43 m/sec. Let's make a comparative test with this number! The maximum velocity of an out-of-control skier's head on practice slope is 10ms. As climbing walls are rarely higher than 5 metres, the head velocity of a falling climber is unlikely to exceed 10ms. (Vogel, 2003) One can end up with that the velocity of 3.43 m/sec is a conservative approximation to be reached in a judo throw and therefore the shock absorption test procedure of IJF Tatami Regulation can be stated to be reasonable.

Using the velocity values defined in Table 1 and Eq.4, the maximum deflection of elastic system (hereby judo mat) is calculated regardless of mat material properties. This allows the researcher to investigate the material properties which coincide well with the IJF requirements. Since the mass of human head is stated to be in between 4-6 kg by (Vogel, 2003), Δ_{st} is to be calculated for 4 kg, 5 kg and 6 kg of masses. It should be underlined that, at the time of impact, the contact point of head on the mat should vertically deflect at least with the amount of Δ_{st} for the head safety and successive shock absorption of mat material. Therefore, the tabulated Δ_{st} in Table 2 constitutes the vertical deflections limits for further FEA analysis of judo mat systems. In the evaluation of FEA analysis results, the worse case Δ_{st} value for $m = 6$ kg mass is considered to be the injury limit.

Table 2. Deflection Values for Varying Head Mass and Velocities

P_{dyn} (kN) or (kgf)	v (m/s)	Δ_{st} (mm) - 4 kg	Δ_{st} (mm) - 5 kg	Δ_{st} (mm) - 6 kg
10	4	1,98	2,80	3,43
10	4	2,80	3,71	4,58
10	4	3,43	4,6	5,68

FINITE ELEMENT COMPUTER MODEL OF JUDO MAT SYSTEM

In order to investigate the safety of judo mat against head injuries at the force limit of 10 kN, a computer model of 1x1 m of judo mat is created in SAP2000 finite element analysis software. This product is mainly preferred by structural engineers for analysis and design of the structural systems. From structural engineering point of view, a judo mat located on a resisting floor system can be idealized a structural system that should mainly resist the impact forces of judo throws.

Model Geometry and Material

1x1m of a single judo mat is modelled with the software using solid elements. The analysis is carried out for the varying mat thickness of 40 mm, 50 mm, 60 mm as the specified thickness in IJF Tatami Regulation. (IJF, 2011)

Judo mats are commonly produced from polyurethane (PU) foam material. The modulus of elasticity of the PU foam materials used in this study is estimated to be in between 10 - 100 MPa which directly depends on the foam density. As the foam density increases so does the modulus of elasticity. In the analysis, four different foam material with the modulus of elasticity of 25 MPa, 50 MPa, 75 MPa and 100 MPa are considered together with their corresponding unit weights. A general view of computer model is presented in Figure 3.

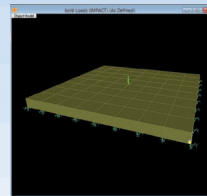


Figure 3. General View of Judo Mat FEA Computer Model

Support Conditions Under Judo Mat

The support conditions of judo mat is one of the main parameters of this study. The effect of the load resisting system under judo mat is estimated to effect the shock absorption capacity of the judo mat in terms of head injury safety. In the meantime, there exists commonly three type of load resisting floor types for judo mats as follows;

1. Judo mat is layered directly onto the concrete floor base. (Figure 4-a; <http://grongar.com/2006/02/>)
2. Judo mat is layered onto a secondary layer consisting of old rubber vehicle tires (Figure 4-b; www.judoamerica.com)
3. Judo mat is layered onto a timber platform (Figure 4-c; www.judoinfo.com)



Figure 4. Commonly Used Resisting Floor Systems for Judo Mat Layers

All three types of resisting system was considered in the FEA computer model separately. In the model, the support conditions are idealized as provided in Figure 5. The concrete base is assumed to be rigid and vertical displacement is constrained. Rubber tire and timber platform resisting systems are idealized by linear springs with appropriate spring stiffnesses. Moreover, the lateral resisting effects under the judo mat is simulated by springs as well. The mentioned spring stiffness values are assigned considering the corresponding friction coefficients in between judo mat and base system material.

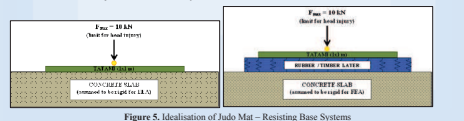


Figure 5. Idealisation of Judo Mat - Resisting Base Systems

Loading on the Judo Mat

Head injury limit of 10 kN is applied to the judo mat at the center point of the mat model as a single concentrated load. When the dimensions of the human head is considered, it is thought that the application of concentrated load as a preference to distributed surface load does not create big errors in the analysis results and stress distribution on the mat. A close view of point loading that simulated the head injury level is provided in Figure 6.

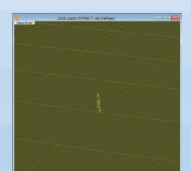


Figure 6. Impact Load on Judo Mat (the number is for N unit)

ANALYSIS RESULTS

Finite element analysis of judo mat system are carried out for different PU foam materials, mat thickness and supporting base systems. In all analysis, the vertical deflection of judo mat at the loading point is recorded. This value is compared with the head injury displacement limit of 6.9 mm. All results are tabulated in Table 3. Besides, the vertical compressive stresses (S33) at the loading point is also recorded and used for investigations.

Table 3. FEA Analysis Results

CONCRETE BASE	40mm THICK R.I.D.O.M.M			50mm THICK R.I.D.O.M.M			60mm THICK R.I.D.O.M.M		
	E (MPa)	U (mm)	S (N/mm²)	E (MPa)	U (mm)	S (N/mm²)	E (MPa)	U (mm)	S (N/mm²)
25	1,10	1,73	1,10	1,10	1,73	1,10	1,10	1,73	1,10
50	1,90	2,00	1,90	1,90	2,00	1,90	1,90	2,00	1,90
75	2,10	2,00	2,10	2,10	2,00	2,10	2,10	2,00	2,10
100	2,10	2,50	2,10	2,10	2,50	2,10	2,10	2,50	2,10

The test results are also presented in graphical format for an easier and visual evaluation. In Figure 7 and Figure 8, graphical representation of analysis results are presented. Also, vertical and horizontal stress distribution of 40 mm thick mat with 75 MPa of modulus of elasticity is presented in Figure 9 as an example for stress distribution.

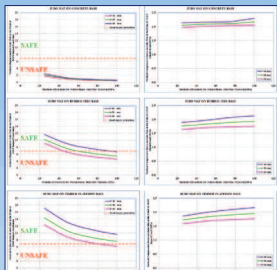


Figure 7. Effect of Mat Thickness on Head Injury Safety

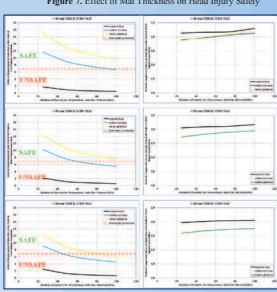


Figure 8. Effect of Supporting Base system on Head Injury Safety

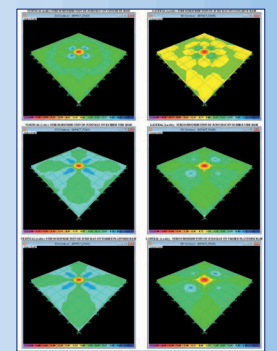


Figure 9. Stress Distributions for 40mm Thick Mat at the Time of Impact Loading

EVALUATION OF ANALYSIS RESULTS

Analysis results are mainly evaluated by means of vertical displacement of impact load point on the mat. Since, the head injury displacement limit is stated to be 6.9 mm and less, the obtained results are compared with this number. In case of 40 mm thick mat, concrete supporting base does not provide the safety against head injury while the others are enough for head safety. In case of 50 mm thick mat, similarly the concrete base seems to be inappropriate for head injury protection, rubber tire base is not sufficient for the mats made of foam having a modulus of elasticity to be higher than 60 MPa and timber platform is good enough for safety of head injury. In case of 60 mm thick mat, concrete base is still unsafe by means of head protection. Rubber base provides danger for head injury if the mat is made of material having a modulus of elasticity to be higher than 40 MPa, while the situation is the same for timber platform base as for mat material having a modulus of elasticity higher than 80 MPa. As can be predicted, when the vertical displacement increases so does the compressive stress at that point. This is obvious since the foam material deflects, this means that the porous structure of the material compresses. Therefore, the compressive stress results coincides well with the material behaviour. This may be taken as an indicator of the reliability of the model and analysis.

By another point of view, concrete base provides unsafe solutions for all thickness of mats. Rubber tire base is fine for 40 mm thick mat and not good enough for other thicknesses of mats having modulus of elasticity to be higher than 45-50 MPa. Timber platform base does not provide head injury safety for the 60 mm thick mat made of material having modulus of elasticity higher than 80 MPa. The modulus of elasticity can be assumed as an indicator of hardness of the mat for non-technical people. Therefore, if the thickness of the mat increases the softer mat material should be preferred.

Figure 8 provides the stress distributions of 40 mm thick mat. It is observed that, at the point of impact load of 10 kN, the vertical and horizontal stresses are all in compression at reach their maximum value relying in the range of 1.8 - 2.2 MPa. As the rubber tire base becomes flexible, the stress distribution on the mat upper surface turns into tensile stresses. This should be considered in case of material selection for mat surface cover to provide enough bearing strength in order to avoid any tears on the mat surface due to tensile stresses.

CONCLUDING REMARKS

- Life safety and health is the most important issue in human life. Judo is a dynamic sport and philosophy which basically targets not to injure the opponent. Besides, the necessary precautions must be undertaken during judo practice and competitions. This study is carried out for evaluation of the mat properties by means of head injury at the time of unintended head-impacts. The following concluding remarks related to head injury protection during a judo practice can be stated considering the analysis results.
- Layering judo mat directly onto the concrete floor base should be avoided as possible as it can.
- Rubber tires can be used as a base level under the judo mat considering the hardness of the mat material.
- Timber platform base seems to provide the best solution for the safety of head injuries. IJF requires timber platform for IJF events as a very good precaution for head injuries. This can be enlarged even for smaller scale competitions.
- If the mat is to be layered onto a timber platform, the tearing strength of the mat covering material becomes of greater importance. This should be taken into consideration during mat selection.
- Finally, it can be mentioned that judo has the best precaution against head injuries by ukemis! So, during the teaching phase of ukemi special attention must be given.

ACKNOWLEDGEMENT

Special thanks to Ms. Benedicte ROUBY for her guidance and patience during hereby poster submission phase.

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Presentation Title:

Common techniques of judo and wrestling

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Abstract

This study is aimed at doing a comparative technical research to present the very similar-even the same techniques of judo and wrestling. Judo is an important sport for Turkish Olympic Sport History such that the first Olympic medal won by the Turkish women athletes came from judo, the first Olympic gold medal other than wrestling and weightlifting is also from judo. On the other hand, wrestling is one of the most popular and favorite individual sports in Turkey. Turkey has remarkable success in Olympic wrestling. Both sports have philosophy which is very similar to each other. However, this is not the unique similarity of both sports. There exist a number of common techniques of judo and wrestling. These common points of both sports have been creating sympathy and attention in between the practitioners and spectators of both sports in Turkey. In a lot of Turkish families, it is common to observe competitive judoka and wrestler sisters/brothers who have been oriented to both sports; generally due to initial traditional wrestling interest of parents. This is a sociological sportive phenomenon to be further investigated. Brief information about the common techniques of judo and wrestling are given and some of these techniques are hereby presented.

Keywords: judo, wrestling, common techniques

Physiological and Metabolic Responses to Special Judo Fitness Test: A Case Study

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1. Introduction

Training principles can be tailored to the needs of verification of the effects of contemporary training that typically occurs in three blocks (accumulation, transmutation and realization [1,2], in which competitive readiness might be signalled by the results recorded during fitness tests [3]. Temporal test structure [4,5] and typical technique used in judo-specific test reminds that of competitive fighting [6,7]. Therefore, the researchers considered Special Judo Fitness Test (SJFT) for their experiments as an evaluation instrument, without neglecting metabolic responses to judo-specific effort [8-15]. Sikorski [16] argued that „Because of intermittent effort of high intensity, anaerobic glycolysis is mostly observed in judo elite athletes engaged in a contest”.

2. Objective

An answer to the following question: How will modification of throwing method affect changes in SJFT results, heart rate and lactic metabolic response in athlete?

3. Material and Methods

The project was positively approved by the Research Bioethics Commission at the Regional Medical Chamber. The judoka at international competitive level and his coach were familiarized with the aim of the tests. SJFT tests were carried out according to the instruction [5] in competitive period. On the first day, the SJFT protocol focused on performing one-shoulder throw Ippon-seoi-nage technique in repetitive throwing practice (subscript RT) in which receivers are actually thrown, while on the second day, the solo practice Tandoku-renchu (subscript TR) was performed. Both performances were videotaped and the throws performed were counted. Index value of SJFT was calculated according to the following equation:

$$\frac{\text{Final HR (bpm)} + \text{HR 1 - min after the test (bpm)}}{\text{Number of throws}}$$

4. Statistics

Heart rate (HR) during and after SJFT was monitored by the portable Meta Max 3B device (made in Germany). This device produces acceptably stable and reliable results [17]. The decay in HR during passive recovery time was determined from the data recorded after SJFT. Lactate (La) was measured in blood arterialized from earlobe before, directly before the exercise and next after the end of SJFT (1st minute), in 4th and 8th minutes of recovery. Blood samples were processed by reagents made by EKF Diagnostics (EKF, Germany) and the Biosen S-line lactate analyser (EKF Germany) to determine blood lactate concentrations. A case study of HR decay and La concentration was presented in consideration of modelling of the HR decay line during recovery after SJFT. A monoexponential model was used.

$$y = y_0 + A_1 e^{-(x-x_0)/t_1}$$

Meanings: y_0 = offset, x_0 = center, A_1 = amplitude, t_1 = decay constant
Origin® 9.0 Pro Data Analysis and Graphing Software was employed.

5. Results and Discussion

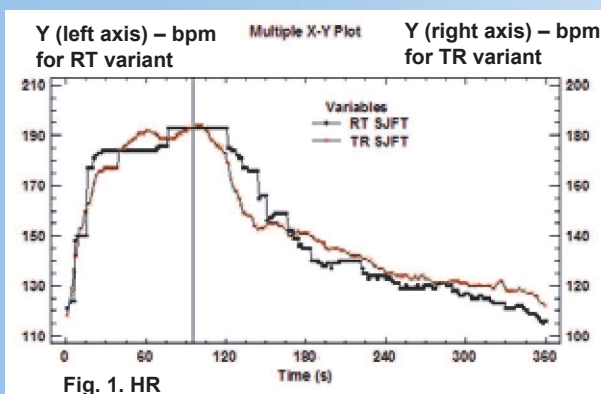


Fig. 1. HR responses

Testee judo athlete (66 kg, 180 cm, international competitive level) performed 6+12+10 versus 8+13+13 throws in consecutive periods of SJFT variants RT vs. TR, respectively. His Index in both SJFT variants was 12.5 vs. 10.2, respectively. A typical HR (bpm) response kinetics for both RT and TR SJFT variants performed by this judoka is represented by a multiple X-Y plots (Fig. 1). During an exercise performed by this person for both test variants in the segment A of SJFT (1-15 s) heart rate was 150 bpm, whereas in the first interval (15-25 s) HR rose to 184 bpm (in RT variant) and 162 bpm (in TR variant). In segment B (25-55 s), HR in RT variant was maintained at the level of 184 bpm and, in variant TR, it increased from 163 to 184 bpm. During the second interval (55-65 s) the HR in both test variants remained at the same level (184 bpm). In segment C, HR rose to 193 bpm for RT variant and to 184 bpm for TR variant. In this case, HR measured directly after the exercise was higher after RT variant compared to TR (see vertical line on Fig.1). After one minute of rest, HR value decreased to 158 and 144 bpm, respectively. The fast-phase of recovery was shorter in TR variant (45 sec) than in RT variant (90 sec) of SJFT. At the time of completion of the fast phase, HR reached 148 bpm for TR variant and 140 bpm for RT variant. Furthermore, La levels measured in 1st, 4th and 8th minute of the recovery was changed in RT variant vs. TR, reaching 11.11, 11.72, 14.01 mmol·l⁻¹ vs. 12.15, 12.43, 11.63 mmol·l⁻¹, respectively.

Conclusions:

(1) Changes in the throwing method in Ippon Seoi-nage improved the performance in Tandoku-renchu method SJFT variant. The athlete performed the majority of work during this variant using their lower limbs, whereas the throws, although with higher number, were repeated without the resistance caused by Uke in RT SJFT; (2) Performing the throws with Uke from lower weight categories might promote development of the speed.

Fig. 2. HR decay after SJFT Repetitive Throws variant

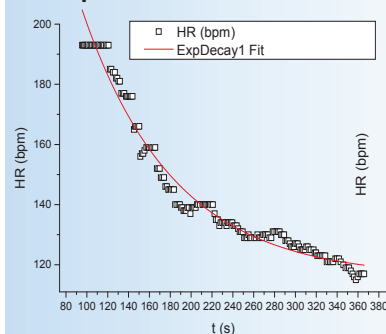
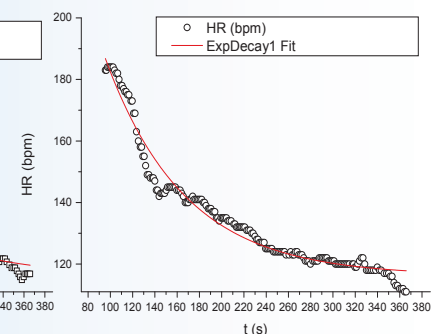


Fig. 3. HR decay after SJFT Tandoku-renchu variant





Poster presentation rules

April 25th 2013

Budapest, Hungary



4th POSTER EXHIBITION OF RESEARCH

All sessions will consist of presentations of scholarly works related to any aspect of judo. Such areas may include, but are not limited to, topics related to the sport aspect of judo, including exercise physiology, strength and conditioning, sport psychology, injury rehabilitation, rest and recovery, nutrition, and the like. Topics may also include any area of judo history, philosophy, culture, or values as well.

The audience will be mixed and include academics, coaches, officials and the wider judo family. Presenters, please bear this in mind when communicating your research.

Proposals for the Poster presentation will be considered for inclusion in the program if they are received by the date specified below. The final schedule shall include proposals accepted for presentation.

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Posters will be selected for display in the competition venue at the European Championships on the following days, at the EJU Congress and during the Education Seminar.

The participants also accept to give to the EJU the rights to publish their posters on the EJU web-site and in the poster book.

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2. Only authors from EJU countries will be admitted to the prize competition.
3. Scientific Posters by groups (minimum three authors) with only one author outside EJU countries will be admitted to EJU Prize competition.
4. Only one poster per author or group will be admitted to the prize competition.
5. If more than one poster is presented by the same author or group, the extra posters will be exhibited outside prize competition. (In this case, the author should identify which poster will be exhibited for the prize competition).
6. Every author or Group must send to the EJU Commission one Abstract of 300 words, a PDF copy of the poster for the Presentation Journal.
7. All the participants from EJU countries will be awarded an EJU participation certificate.
8. If the work of a Group or researcher outside EJU, are worthy of attention, they could be awarded a special distinction diploma by the EJU Commission.

These Participation Rules will be published (for the authors' information) on the EJU site before the exhibition.

The Prize money will be awarded to develop future research or to buy scientific instrumentations for future research in the Judo Knowledge fields.

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The Awards for the three winners will be remitted to the manager of each project:

1st place: 1500€

2nd place: 1000€

3rd place: 500€

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The European Judo Union Education Commission informs you that in 2013 there will be no poster presentation by the researchers on the spot of the exhibition.

To be considered, participating researchers have to submit for presentation, before the 16th of March 2013:

Poster Presentation Proposal Cover Sheet and Individual Presentation Abstract (300 words), using the attached form only.

Poster in PDF in 60x80cm, High Definition format

Submission Instructions

Abstracts should be submitted in English. This will be the official language for all posters. Information must be input directly into the forms provided and sent, by the specified deadline, via email attachment to

headoffice@eju.net and **international@ffjudo.com**

or by post to the address of the EJU Head office.

Evaluation Criteria

Elements of Poster Composition - Assessment Continuum (high to low)

I Quality

Please score each item on a 1 - 3 scale, with 1 = marginally adequate, and 3 = excellent

Quality	
Low (1)	High (3)
Legibility (adequate font size, quality of printing, etc.)	1 2 3
Materials (materials create a polished presentation)	1 2 3
Overall visual appeal (layout of text & figures)	1 2 3

II. Technical Content

Please score each item as indicated [1 - 5 scale, with 1 = marginally adequate, and 5 = excellent; or select Yes/No for items thusly rated].

Technical Content	
Low (1)	High (5)
Title (Effectively highlights the poster's subject matter)	No = 0, Yes = 1
Topic Relevance (Research relevance for Judo world)	1 2 3 4 5
Originality (Innovation in judo Teaching or Coaching area)	1 2 3 4 5
Scientific Methodology (Clear outline of procedures: Original / best Practice)	1 2 3 4 5
Results (Adequate summary of findings)	No = 0, Yes = 1
Transferability (How will be the research applied to Teaching or Coaching area)	1 2 3 4 5
Tables & Figures (Effectively communicate key facts)	1 2 3 4 5
Conclusions/Future Directions (Adequate findings and interesting future evolution)	1 2 3 4 5

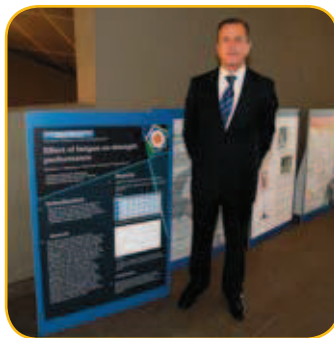
These Evaluation Criteria would be published (for the authors knowledge) on the EJU site before the exhibition.



**4th European Science of Judo Symposium
25 April 2013, Hungary, Budapest**



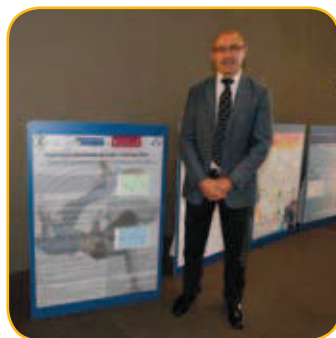
Mr. Ivan Segedi, Croatia



Mr. Luis Monteiro, Portugal



Mr. Hrvoje Sertic, Croatia



**Mr. Vicente Carratala Deval,
Spain**



**Dr. Hans Dieter Heinisch,
Germany**



Previous years laureates

2012 Laureates

1st place

Infrared thermography-calorimetric quantitation of energy expenditure in biomechanically different types of judo throwing techniques

Carl De Créé, Italy

2nd place

Analysis of the differences in explosive strength, power and resistance of explosive strength indicators, in senior and junior judokas

Luís Monteiro, Portugal

3rd place

Personality traits of coaches, referees and judokas vs. accuracy of evaluation of selected judo actions based on video analysis

Jan Supinski, Poland

2011 Laureates

1st place

Analysis of differences in tensiomyographic (TMG) indicator variation in high-performance judoists, as influenced by the presence or absence of pre-competition dehydration

Dr. Garcia Garcia, Jose M., Spain

2nd place

Development and implementation of new methods for the analysis of technical-tactical actions in judo

Roland Oswald, Hans-Dieter Heinisch, Jens Heinrich, Germany

3rd place

Effect of coordination motor abilities on fighting method and sport level in cadet judo contestants

Grzegorz Lech, Stanisław Sterkowicz, Janusz Jaworski, Robert Krawczyk, Poland

2010 Laureates

1st place

The acute effect of exercise on oxidative stress biomarkers

TRIVIC Tatjana, Serbia

2nd place

Causes and types of injuries during Ippon-Seoi-Nage throw

RUKASZ Wojciech, Poland

3rd place

Lateralization effect on technical and tactical behavior considering results of judo fights

STERKOWICZ Stanislaw, Poland





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