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AND

5TH SCIENTIFIC AND PROFESSIONAL CONFERENCE –

„APPLICABLE RESEARCH IN JUDO”

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FOREWORD

The proceedings book of the 6th European Judo Science and Research Symposium and the 5th Scientific and Professional Conference on Judo: **„APPLICABLE RESEARCH IN JUDO"** is in front of you!

Dear readers of this proceedings book, we are happy to say that this is our fifth jubilee conference and the sixth symposium of the EJU and our fourth joint edition of the proceedings of scientific and professional papers on judo.

This is a demanding job for us - the organizers, but every time we see a new proceedings book and you, our participants at the conference / symposium, we have a smile on our faces.

As researchers and all those that are learning from research results, need to have published material, we started with publication of the book of abstracts and during the years we improved and now you can read Proceedings book in which every contributor wrote and present his/her research work/study according to scientific guidelines, making this publication worth of indexing in scientific data basis and therefore source of information for students and all those that would like to improve the knowledge on judo in specific fields.

Besides striving to scientific excellency, we are also trying to make the conference interesting for all our participants. We started with usual paper presentations but add practical presentations as well, that made our conference unique. With desire for innovations, for 2019. Conference we planned a Roundtable (third conference day) about the most relevant judo topics and those that are important for judokas in Europe as well as for those coming from the other continents.

We are also paying attention to invite keynote speakers that are recognized scholars or professionals in specific fields. This year at the opening of the conference the key-note speakers are: Yvet Cadot, a judo historian from France, Goran Vrgoč, physician of the Croatian judo team and Jožef Šimenko, judo expert from Slovenia (currently living and working in the UK) from Faculty of sport, University of Ljubljana.

Thank you for reading this book. We hope it will offer a lot of useful information.

Professional / scientific collaboration and symbiosis of the leadership of the European judo union, Croatian judo federation, and judo researchers can contribute to further improvements of judo in Europe and in the World.

Application of scientific knowledge and conclusions directly into the training process can improve the sport, sport achievements, the organization, popularity, and media attractiveness of judo.

Thank you for coming and contributing to the development of this conference by your presence, active participation in presenting your research results and expert knowledge, with just one common very worthy goal - to continuously improve the quality and value of our sport JUDO.

For the Organizing Committee:

Mrs. Jane Bridge – EJU Vice President – President of organizing committee

Full Prof. Hrvoje Sertić – Chairman of the Organizing Committee

Dr. Sanda Čorak – Vice-Chairman of the Organizing Committee

Assist. Prof. Ivan Segedi – Conference/Symposium Secretary

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WHAT IS JUDO? WHAT DOES IT HAVE TO SAY NOWADAYS?

Yves Cadot
University of Toulouse - Jean Jaurès (France)

INTRODUCTION

In 2017, the European Judo Union (EJU) makes its slogan of „Judo - more than a sport!". If, today, in 2019, this sentence has disappeared, the expression is still regularly repeated in the speeches, and we can question its relevance, on the coherence between acts and speeches, as on the historical veracity of this affirmation.

METHODS

The method consists in confronting Kanô Jigorô's writings with discourses as current practices, questioning both history and context.

JUDO, A SPORT

„Judo - more than sport!" Faced with such an assertion, we must then be interested in the terms of the statement and ask first what a sport is, and then, if judo falls into this category, and if, finally, this definition contains it entirely. Although there may be nuances of interpretation in the different languages, since the slogan of the EJU was in English, and we are expressing ourselves in this paper in this language, we have to ask ourselves what is the definition of „sport" in english:

- a game, competition, or activity needing physical effort and skill that is played or done according to rules, for enjoyment and/or as a job
- all types of physical activity that people do to keep healthy or for enjoyment[1]

We could multiply the examples in various dictionaries, the definitions would be similar and how not to recognize judo reading them? So, clearly, „Judo, a sport".

ANY SPORT IS MORE THAN SPORT

What can differentiate judo from other sport(s)? Judo has values? Gymnastics or rugby too (and, in French, for example, to own values comes within the definition of „sport"). Judo is conscientiously fulfilling a citizenship mission? Is there even a sport's federation that does not claim this? Judo is a way / philosophy of life? Surfing is, too.

Since it was the EJU slogan, we could expect to find on its site a development, a demonstration of what judo is more than sport, but, unless I'm mistaken, on that date[2], nothing. On the other hand, there is a section entitled „Judo. The art of living"[3], which features an eponymous documentary which, we are promised, „will be another proof of Judo being more than sport!" Now, it is the juxtaposition of moving stories of people who have (re) built themselves through judo. Any sport could do the same.

In fact, all physical activity, as long as it goes beyond the simple framework of the game, of the strict competition, is, potentially, „more than sport". This is the case of judo and, finally, if we limit ourselves to the English definition,

[1] Definition of „sport": Cambridge Dictionay. (May 209). Retrieved from https://dictionary.cambridge.org/dictionary/english/sport

[2] Website accessed from March 2017 to May 2019.

[3] Documentary: Judo ... The Art of Living (May 2019). Retrieved from http://www.eju.net/judo--the-art-of-living-4258?language=en

the assertion is true: judo is not only aimed at pleasure or recreation (although it can also be limited), so it is „more than sport". And besides, to say that „judo is more than sport" does not mean that it is not the case of other disciplines, it only affirms it implicitly. Should not we say, „Judo more than a sport"?

KANÔ AND SPORT

Compared to most disciplines, judo has the particularity to have a founder (but rugby or basketball[4], for example, too), so we should therefore be interested in the way he felt about his his discipline as well as about sports. On this last point, first, Kanô Jigorô, who was appointed a member of the International Olympic Committee in 1909 (and until his death in 1938), founded the Dai nihon taiiku kyokai (Physical Education Association of Great Japan), in 1911, to organize the selections to the Olympic Games and which later gave the Japanese Olympic Committee. Having become the Japan Sport Association, it now oversees the national and local sports federations. Kanô obtained the 1940 Games in Tokyo and also organized, in 1917, the Far East Games. So, Kanô, champion of the sports movement? Let him speak:

„I thought that [the Olympic adventure] was good for promoting physical activity. [...] However, if we can not consider that the physical education offered at the Games is the most ideal, I thought that encouraging the practice was not so bad and that was one of my goals in participating."[5]

„[...] sports are not designed for the purpose of physical education. Without concern for physical education, they pursue another objective, which is that of competition."[6]

Therefore, it seems obvious that, for Kanô, „Judo, something else than sport".

KANÔ AND JUDO

Judo was not created for recreational, competitive or even physical education purposes. And there, for once, we come to a distinctive point. Composed from the beginning of three „big stitches" that are „forging the body", „forming the spirit", „the practice of combat"[7], Kanô conceived it as the combination of three educations, but especially as a universal principle:

„Judo begins with a thorough study of warfare technique, extends to physical education, intellectual education, moral education and applies equally to clothing, food, habitat, social relations, the economy, and all areas of human life. [...] Judo consists in, whatever you want to do, to conceive the best objective and then to use the energy of the body and the heart most effectively. The best use of energy, the proper use of energy, are today's judo. This is why it is not a martial technique but the name of a basic principle of human behavior."[8]

What predominates in its creation and development is the spirit of formation of a man that Kanô does not envisage otherwise than in connection with others, with the other and where the purpose is „to complement ourselves" and „to contribute to society"[9] in order to achieve „mutual prosperity"[10] through the study and understanding of „good use of energy". So, clearly, „Judo, not a sport!"

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[4] Respectively William Webb Ellis (1806-1872), and James Naismith (1861-1939).

[5] Kanô, J. (1937, March). Orinpikku taikai Tōkyō shōchi ni itaru made no jijō ni tsuite oyobi dōtoku no gensoku ni tsuite (About the circumstances that led to Tokyo's hosting of the Olympic Games and moral principles). Chūtō Kyōiku.

[6] Kanô, J. (1937, November). Jūdō no konpongi ni tsuite (About the fundamental meaning of judo) , Jūdō.

[7] Kanô, J. (1915, February). Kōdōkan jūdō gaisetsu (dai-ikkai) (General explanation of Kôdôkan jûdô), Jūdō, fév.

[8] Kanô, J. (1938). Jūdō no konpon seishin (The fundamental spirit of judo). Dai nihon jūdō-shi.

[9] Kanô, J. (1915, February). Kōdōkan jūdō gaisetsu (dai-ikkai). op. cit.

[10] Kanô, J. (1925, January). Michi chikashi to iedomo yukazareba itarazu (The path is close but if we do not go there, we do not reach it). Sakkō.

JUDO AND COMPÉTITION

However, judo competition already existed in Kanô's time. But it is important to distinguish different models. Matches with referee was set up by Kanô himself, through *tsuki nami shôbu* („monthly matches", from 1883) and *kôhaku shiai* („meetings of reds against whites", as early as 1884) but not in a sporting idea: the idea being, compared to the daily exercise of the *randori*, based on trial and error, to reserve a time to test its technical efficiency in a closed situation. The referee is only there to make the experience objective, to validate the action from the outside. On the other hand, from the beginning of school judo, and in a context of development of activities as well of Western ideas, inter-school competitions developed to the great displeasure of Kanô and his idea of judo, causing him to often take the pen to condemn them and multiply the warnings. Yet, he has been involved in the organization of the first championships of Japan, in 1930, warning however: „while recognizing that driving judo in the manner of a sport is a requirement of today's trend, one has to never forget, even for a moment, what is the specificity of judo"[11]. „Judo, also of sport".

Nevertheless, as we said, the judo that we know today, the Olympic discipline judo, is clearly a sport. And even, essentially a sport. The rules of competition govern the practice of *randori* in any dojo. Let's prohibit leg attacks and an entire part of the technical heritage disappears in a few months! Sport requires equality, and therefore we come to think only in categories of sex, age and weight when the situations of life to which judo ought to prepare us do not have to deal with.

It is important to face reality: the very need to assert the opposite represents an admission of the fact that, today, „Judo, nothing but a sport". How did it happen?

JUDO AND BUDO

Even in Japan, judo is so confused with sport that few adults practice and most young people stop after university. Why and how did Japan itself forget that judo is no sport and made it something like „an entirely sport activity"? To understand this, one must look at the historical process.

When Kanô invented judo, he did two things: he proposed a rational synthesis of what existed, the jûjutsu, and emphasized to concentrate not on the practical object but on the underlying principle, which must allow the man to build oneself, individually as socially. He invented what was about to become budo, in the modern sense: a way of building the individual through the study of martial technique.

From 1895, the Dai nihon butoku kai („Greater Japan Martial Virtue Society", hereinafter Butokukai) undertook this same work of synthesis from other methods of combat, including the saber, which will give, at the dawn of the 1920s, kendo, while at the same time the term budo is used to refer to these new disciplines emerging from ancient practices. However, the Butokukai had branches in all prefectures along with, since 1905, a teacher training school, and therefore a huge potential of dissemination of its methods and designs.

At the same time, Nitobe Inazô (1862-1933) published *Bushido, the soul of Japan* (1899), describing the specifically Japanese value system, then declining compared to that imported from the West, and based on the code of conduct of the ancient warriors, precisely those who practiced the warlike arts from which budo came from. With the military successes of Japan, the territorial gains, the rise of nationalism, the practitioners of budo - and especially through the Butokukai - will be the apologists of the Bushido, the custodians of the old values, perceived as a specifically Japanese way of success in the modern world, an alternative to assert and defend to the Western model.

[11] Kanô, J. (1929, November). Jūdō no kyōgi undō (judo as a competition discipline). Sakkō.

In the 1930s and the years of war, Butokukai was very close to militarist circles. This is why, after the defeat, while Japan is occupied by the allies, the Supreme Commander of the Allied Powers will forbid budo in schools. In order to be able to find their way back to school, budo had to demonstrate that they do not pretend to train the mind, but simply propose a sporting dimension, like any other physical activity. And they focused so much on this sporting aspect, that they came to deny, then to forget, any other ambition. In the end, wearing its sporting garments, judo returned to schools in 1951, and kendo in 1956.

SPORT AND SOCIETY

If Japan is, historically speaking, a special case in its relationship between budo and sports, what is striking at the global level, it is our inability to think the physical activity otherwise than through the sporting prism, and more in relation to the competition. To return to judo, which claims to be „more than sport", even the documentary of the EJU, mentioned above, is constantly referring to it, out of which, decidedly, no way, no judo and, even, no judoka. The French Judo Federation, explains that if you are not good in competition, you can always become referee or club manager... And, why not, just judoka? Because out of the performance, no salvation! Sport does not only accommodate the capitalist model, it is its school, its spearhead, its showcase.

In judo, we even turned the *kata* into competition! That is, we have moved from a research of principles to a search for expression, to be judged from outside on the appearance. The general trend is such that the term „physical education" which has so much occupied debates between pedagogues from the mid-nineteenth century to much of the twentieth century disappears in favor of „sport". Again, take the example of Japan and Kanô: the latter creates the Dai nihon taiiku kyokai (Physical Education Association of Greater Japan) in 1911, which became the Nihon taiiku kyokai (Japan Physical Education Association) in 1948 to become the Nihon supôtsu kyokai (Japan Sport Association)[12]. This modification highlights the general and international confusion between sport and physical education.

CONCLUSION: JUDO, THINK OUT THE BOX

Thus, sport - competition - occupies the entire space of physical activity. Yet what judo has to offer us is different. The most glaring proof is before our eyes: the degree, the *dan*. *Dan* is not a ranking, it shows that in judo, it is not about being stronger than the other, but to build ourselves. What we learn is to get back on our feet, to come back again and again, to keep trying and doing our best, for a better understanding of the mechanisms that manage our lives, our social relations.

Judo is a craft. He transforms us into a craftsman of ourselves, and each into a small workshop of collective realization, of society building. And that is applicable in every life, for each of us, it does not depend on any level at all, it's just about working to be better than we were the day before, and since we have progressed, so goes the world, even infinitely.

To make, for no other purpose than to carve each time a little more, a little better, our stone, not so that it is more beautiful than that of the others, but so that it perfectly fits to the common building and take its place, both indistinct and indispensable. Judo appeals to our thirst not for perfection but for improvement. So, the problem is not that it's nothing / more / less than sport, it's about taking the idea of sport out of the question and thinking about judo with no reference to it. What judo has to say is: just work, in the dojo, our workshop, to be better than you were the day before, to make the society better and stronger than it was yesterday. And do not bother nor worry about any result nor sport or competition achievement.

Then, no need for a performative utterance when a single word is enough: „Judo", that's all!

[12] In its official name in English, the word „sport" replaced the word „Athletic" as early as 1960.

IS BILATERAL THROW EXECUTION ESSENTIAL FOR A COMPETITION SUCCESS?

Jožef Šimenko
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INTRODUCTION

Symmetrically executed movement actions are considered as an element of versatility which enlarges competitors' technical and tactical capacities (Adam, Laskovski & Smaruj, 2012). Asymmetrical execution of movements usually limits this capacity and may also lead to overstrains of one side of the body and cause the occurrence of injuries (Starosta, 2008). Judokas training should be focused from early years to develop movement patterns to dominant and nondominant body sides (Šimenko, 2012) with regular use of both left and right fighting stances (Adam, Laskovski & Smaruj, 2012). To increase the athlete's effectiveness and to enable them to win by taking the opponent by surprise, the movement technique needs a transformation from one side of the body to the other (Sterkowicz, Lech, & Blecharz, 2010)especially in ball games or combat sports. High level of skills in ath- and Study Aim: letes with left-side dominance allows them to have a tactical advantage over the opponents and to increase their chances of success. The awareness of this advantage boosts athlete's self-confidence in fighting. The purpose of this study was to determine: (a. Research shows that lateral preference of execution of judo techniques in judo combat can be modulated and influenced through training in early phases of learning (Iglesias-Soler et al., 2018). Success in judo depends on factors as s gripping variability, versatility, and technical variation and throwing directions of such techniques (Mayo, Dopico-Calvo, & Iglesias-Soler, 2019). Also, importance in throw execution to the nondominant side was reported to be in connection with competition success (Šimenko, Segedi & Sertić, 2018). Therefore, this study aimed to examine the quality of throw execution to the dominant and nondominant side and the possible association to competitive success.

METHODS

Participants

The sample included ten male judokas. Participants of the study were 18.13 ± 3.89 years old, their height was 171.73 ± 6.04 cm, their weight was 66.82 ± 10.16 kg. Eight of them were right-hand dominant, while two of them were left hand dominant. They have been training judo on an average of 10.5 ± 4.72 years.

Data collection

Competition performance was collected from the final points and standings (*Points*) of selected judo athletes from the 2016 competition year on the freely accessible web page of Slovenian Judo Federation at their cup ranking list (*https://judoslo.si/ranking/individual/male/27/0/2016*).

The quality of 12 Judo throws (Tai otoshi, Ipon seoi nage, O goshi, Harai goshi, O soto gari, O uchi gari, Uchi mata, Tomoe nage, Sumi gaeshi, Ura nage, Tani otoshi, and Yoko guruma) was evaluated. Throws were recorded with the Panasonic FZ200 camera from the distance of 5m in the clubs of participants in the dominant and non-dominant side. Video recordings were assessed by three judo experts with minimum 5 DAN belt degree that are involved in the elite level of judo. They have graded the throw execution on a 6-grade scale from 0 – 5 (Sertić, Segedi & Žvan, 2007).

***Statistical analysis**:* Data were analyzed using the SPSS 25.0 software for Windows. We used descriptive statistics to analyze the variables. Shapiro-Wilks test was used for the test of normality. The agreement between raters was

evaluated by Kendal coefficient of Concordance (*W*) and interpreted as follows: $W \leq 0,3$ weak agreement, $0,3 < W \leq 0,5$ moderate agreement, $0,5 < W \leq 0,7$ good compliance and $W > 0,7$ strong agreement (Cafiso, Di Graziano & Pappalardo, 2013). Spearman's correlation coefficient was used to determine the association between selected variables (statistical significance was set at $p \leq 0.05$).

RESULTS

Table 1. Descriptive statistics of throws scores with Kendal coefficient of concordance *W*

Technique	DOMINANT	NONDOMINANT	AVERAGE SCORE	*W*
Tai-Otoshi	4.77 ± 0.39	4.50 ± 0.50	4.63 ± 0.38	0.64
Ippon Seoi Nage	4.83 ± 0.24	4.87 ± 0.32	4.85 ± 0.26	0.64
O-Goshi	4.93 ± 0.14	5.00 ± 0	4.97 ± 0.07	0.44
Harai-goshi	4.57 ± 0.32	4.43 ± 0.55	4.50 ± 0.21	0.51
Osoto-gari	4.63 ± 0.46	4.43 ± 0.63	4.53 ± 0.32	0.55
Ouchi-gari	4.83 ± 0.32	4.37 ± 0.56	4.60 ± 0.32	0.48
Uchi-mata	4.43 ± 0.52	4.20 ± 0.63	4.32 ± 0.43	0.70
Tomoe-nage	4.07 ± 0.14	4.16 ± 0.32	4.12 ± 0.18	0.26
Sumi-gaeshi	4.17 ± 0.42	3.93 ± 0.66	4.05 ± 0.48	0.49
Ura-nage	3.67 ± 0.74	3.70 ± 1.17	3.68 ± 0.88	0.69
Tani-Otoshi	4.27 ± 0.62	4.10 ± 0.75	4.18 ± 0.57	0.38
Yoko-guruma	4.10 ± 0.39	4.27 ± 0.59	4.18 ± 0.46	0.56
Total average score	4.44	4.33	4.38	***0.53***

Table 2: Correlations between selected variables

VARIABLES	CORRELATIONS = *r* COMPETITION SUCCESS
Ippon Seoi Nage D	.687*
Ippon Seoi Nage ND	.701*
Ippon Seoi Nage A	.720*
Uchi-mata ND	.762*
Uchi-mata A	.782**
Sumi-gaeshi D	.673*
Sumi-gaeshi ND	.790**
Sumi-gaeshi A	.826**

Legend: ** - *Correlation is significant at the 0.01 level,* *** -** *Correlation is significant at the 0.05 level,* ***D –*** *dominant side,* ***ND –*** *non-dominant side,* ***A*** *– average score of D and ND side.*

In Table 1, we can see that the overall agreement between the three raters was *W*=0.53, which indicates a good agreement between raters. It is also noted that the total score of the throws is higher on the dominant side when compared to nondominant (4.44 vs. 4.33). The lowest average scores were attained in the execution of the Ura-nage (3.68 ± 0.88), and Sumi-gaeshi (4.05 ± 0.48) throws while the highest scores were attained in O-goshi (4.97 ± 0.07) and Ippon Seoi Nage (4.85 ± 0.26). In table 2 the results present that Competition success correlates strongly with the quality of Ippon Seoi Nage throw execution to the dominant side ($p \leq 0.05$, $r = 0.687$), non-dominant side ($p \leq 0.05$, $r = 0.701$) and average score from dominant and non-dominant side ($p \leq 0.05$, $r = 0.720$). A strong correlation is also noted in Uchi-mata throw execution to the non-dominant side ($p \leq 0.05$, $r = 0.762$) and average score from Uchi-Mata throw execution to dominant and non-dominant side ($p \leq 0.01$, $r = 0.782$). A strong correlation has also been shown in the execution of the Sumi-gaeshi throw score in the dominant side ($p \leq 0.01$, $r = 0.673$), non-dominant side ($p \leq 0.01$, $r = 0.790$) and a very strong correlation was noted in the average score of the Sumi-gaeshi throw ($p \leq 0.01$, $r = 0.826$). The other throws did not show any statistically significant correlations with competition success.

DISCUSSION

Our findings demonstrate that competition success is associated with the quality of Ippon Seoi Nage, Uchi-mata, and Sumi-gaeshi throw execution. The most important part presents that the quality in throw execution to the non-dominant body side and an average score of throw execution to both body sides is of great importance in overall competition success. These findings emphasize the significance of bilateral performance of throwing techniques and that judokas should rely only on the throws on their dominant side. The research shows that handedness and footedness are significantly correlated with the choice of preferred attack sides during judo combat (Sterkowicz et al., 2010)especially in ball games or combat sports. High level of skills in ath- and Study Aim: letes with left-side dominance allows them to have a tactical advantage over the opponents and to increase their chances of success. The awareness of this advantage boosts athlete's self-confidence in fighting. The purpose of this study was to determine: (a. For right-handed judokas fighting against right-hand dominant judokas in the right stance versus right stance represents a ''natural'' environment where they feel comfortable, and their chances for success are high. But this situation quickly changes when those athelets are facing the left-hand dominant judokas (or left stance oponents) as research shows that they have a significant advantage during fights or aggressive interactions since they benefit from unfamiliarity in combat and can throw from unexpected directions and at different angles in comparison with right-handers (Mayo, Iglesias-Soler & Dopico-Calvo, 2019). Also, left grip laterality and throwing side preference results in higher scores in comparison with the right side (Kajmovic & Radjo, 2014). Aforementioned would force right-handers to change and adapt their usual strategies when facing left-handers (Grouios et al., 2000; Tirp et al., 2014). That has forced some coaches to try to develop left-handed techniques in righthanded judoka due to a potential frequency-dependent strategic advantage during competitions (Mayo, Iglesias-Soler & Dopico-Calvo, 2019).

High frequency of lateral-asymmetrical execution of throws in training and the dependence on them in competitions is not only a hindering success in judo, but may also lead to numerous injuries [Stradijot, Pittorru, & Pinna, 2012), due to overstrains of one side of the body (Starosta, 2008). Asymmetrical loading was shown in Polish and Belgian judokas, where muscles responsible for spinal rotation were stronger on the right side (Wałowski, Poliszczuk, & Poliszczuk, 2016). Muscular asymmetries were also shown in research by Iwai et al. (2016) on a sample of 50 wrestlers and 101 judokas, where they researched asymmetry of the left and right sides of the trunk muscles and the prevalence of Lumbar intervertebral disc degeneration (LDD). Combat sports athletes with the LDD showed significant asymmetries in cross-sectional area between the left and right sides of obliques ($p = 0.040$), quadratus lumborum: ($p < 0.001$) and total area ($p = 0.007$) in favor of the muscles on the left side. This two study give us contrary results, but none of the studies report the handles of athletes, but they clearly

show that muscular asymmetries are present in judo. Consequences of extended lateral judo training are also shown in morphological traits. Research by Šimenko et al. (2017)age: 17.28 ± 1.46 years; height: 177.53 ± 3.71 cm; weight: 73.86 ± 3.01 kg showed that judokas in the under 73kg were asymmetrical in elbow girth ($p = 0.003$), forearm girth ($p = 0.019$), thigh girth ($p = 0.004$), mid-thigh girth ($p = 0.000$) and calf girth ($p = 0.037$). Even a slight asymmetry can contribute to a decrease in the ability of the comprehensive performance of judo techniques, making the competitor less effective (Hassman et al., 2010). From this point of view, the importance of bilateral throw execution not only in competition but also in training increases dramatically. To help motor programs in better execution of throwing techniques to the non-dominant body, we can start with bilateral strength training that emphasizes nondominant body parts as this can increase the athlete's effectiveness and strength (Abazović, Kovačević, Kovač, & Bradić, 2015; Sung, Park, Kim, Kwon, & Lim, 2016).

CONCLUSION

The study presents associations between competition performance and quality of throw execution in the dominant and nondominant body side. It highlights the importance of bilateral technique development that can benefit judokas in competitions and also in healthy morphological development that can reduce the occurrence of injuries and give a technical-tactical advantage against asymmetrical stance opponents.

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WHAT TO DO AFTER ACL RUPTURE IN PROFESSIONAL JUDOKA?

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INTRODUCTION

Injuries in professional sport are a common part of the sport. They can remove professional athlete for a longer period of time from training and competition. In some cases injury can jeopardize athletes health. Injuries can also represent high financial losses for athletes and clubs. So, it's very important to have early and exact diagnose and to start injury treatment as soon as possible. Earl reaction is important for injury time reduction and returning to the same level of competitive sports.

Judo is one of the most popular martial arts sports in the world. (1) There is little data published about injury frequency, type of injury, lost time from training and the level of performance after returning to judo.

Anterior cruciate ligament (ACL) rupture is the most serious injury in judo with high percentage of reduced sport performance after returning to judo.

TYPE OF INJURIES IN JUDO

Recent epidemiological studies are showing that number of injuries in judo are equal or even higher than in team sports like soccer, volleyball and basketball (2, 3, 4).

Results conducted on 4659 judo athletes showed injuries of upper extremity in 39% and lower extremity in 41%. From this percentage, the most common were shoulder injuries in 23% and knee injuries in 23%. Other injuries in judo included spine and pelvis injuries in 8%, thorax and abdomen injuries in 8% and head injuries in 5% (5). Most of the research studies showed that knee is the most injured part od the body in judo athletes (2, 6, 7). In his research Kujala et al. reported that knee injuries in judo athletes represent 20% of all injuries of knee and shoulder injuries in judo are consequence of throwing or being thrown (2, 7, 8).

Judo competitors have more injuries and longer period of time without training in comparison with recreational-level athletes (5).

French Judo Federation conducted a study on 150 067 judo fights, where they collected data on sustained injuries. Shoulder injuries were affected in 28%, the elbow in 13.5% and the knee in 12% (9). Mostly shoulder injuries happened during fall on the outstretched arm while avoiding falling on the back. Very often this kind of fall can cause glenohumeral dislocation (10, 11). But if athlete falls down directly on the shoulder it can cause acromioclavicular or sternoclavicular dislocation or in rare cases clavicle fracture (12).

ACL RUPTURE IN JUDO

Woman in judo had more ACL ruptures than man (5). Higher rate of ACL rupture is detected in athletes who do competitive judo than those who do recreationally judo (5). Results are showing that bigger number of competitive than recreational athletes return to the same level as before ACL rupture. One of the possible explanations we can find in the huge motivation and better medical support for returning to the same level after serious injury (5).

Data from Summer Olympic Games (SOG) 2008 in Beijing and 2012 in London showed 11.2-12.3% risk of injury in judoka during SOG (13, 14). Almost 85% of injuries in judo happen during stand-up fight and reason for it is longer time period spent in standing position. During standing position judoka must grip each other before proceeding to attack. (15, 16) Poor throwing technique in judo can result with an injury (17). During four year follow up in Korea National Olympic level judo athletes it was noted that 95% of their injuries occurred during training and only 5% at the competitions. Number of injuries were the same for lightweight and heavyweight athletes. Also, there were no differences between males and females in number of injuries. Results showed 4.0 injuries per year in male elite judo athletes (4.5 in lightweight and 3.5 heavyweight judo athletes) and 4.2 injuries per year in women elite judo athletes (4.5 in lightweight and 4 heavyweight judo athletes). Study showed that the injury rate in elite judo athletes was 4.2 injuries in 1000 training hours per athlete, if we know that average number of training hours per year is 975. The same study showed that half of all injuries (47.5%) caused 1-3 days absence from training, 28.6% injuries caused 4-7 days absence from training and 24.4% injuries caused more than 8 days absence from training. It was shown that female elite judo athletes in heavyweight category have more severe injuries than in lightweight category (18).

ACL and medial collateral ligament (MCL) are the most usually injured structures in the knee joint of judo athletes (19). Studies found valgus forces to be responsible mechanism for ACL and MCL injuries in judo athletes (20, 6).

ACL injury in judo is in most cases contact injury (6).

Research showed the highest risk of long periods without training in judo caused by injury is in athletes at the age between 20 – 24 years. Reason for this specific age group can be in high intensity of training and large number of competitions at this time period (2).

Research study from 2010. analized possible mechanisms in judo that could be the cause of ACL injury. Study showed that during the attack from adversary with osoto-gari, kosoto-gari and harai-goshi can inflict injury of ACL. Most ACL injuries happened during attack from adversary and not from counterattacked or from trying to attack (6).

RETURN TO SPORT

After the injury, time period without judo training can be very long. Athletes with ACL rupture were without training > 6 months in 64%, > 9 months in 32%, > 12 months in 13% of cases. Athletes after sustaining prolapsed disc were without training > 6 months in 23% and > 12 months in 13% of cases. Shoulder dislocation is very often injury of the upper extremity with > 6 months without judo training in 20% of cases (5).

According to studies only 32% of judo athletes after ACL rupture return to the pre-injury level of sport activities. In the same study, 24% of athletes rated their performance as lower level comparing with their abilities before ACL rupture. In 5% of cases after ACL rupture and in 8% of cases after prolapsed disc athletes stopped with judo (5).

Shoulder dislocation and meniscus injuries offer much better results in returning to judo after sustaining this injuries. According to study 85% of athletes return to the same level or close to it (5).

This data are showing us that the most common injuries in judo are preventing professional athletes from training for a longer period of time.

INJURY PREVENTION

Injury prevention programs should be obligatory in judo training, especially after ACL injury. Prevention programs for all judo athletes should include proprioceptive and core exercises. For elite judo athlete preventive programs need to be made individually for every athlete.

ACL reconstruction in judo athletes is only halfway to full health after injury. Croatian Judo Federation Medical Team has developed a special program for rehabilitation after ACL reconstruction. It is a concept of knowledge from orthopaedics, physical medicine and kinesiotherapy focused on specificity of the judo.

DISCUSSION

For such widespread and so popular sport like judo there is only a small number of scientific papers about injuries in judo. This is poorly investigated topic with huge scientific research potential.

Injuries in judo can be very serious and can result with long-lasting break from training. Also, injuries in small percent of athletes can make them permanently withdraw from judo.

The most common injury of the upper extremity is shoulder dislocation and of the lower extremity is ACL rupture in judo. The most serious injury in judo is ACL rupture and the second one is prolapsed disc (5).

If we compare two studies from Korea (1996.-2000. vs 2010.-2013.) we can notice decrease in knee injuries (24.6% to 10.2%) (18). This phenomenon is explained by changes in training program and introduction of prevention programs for judo athletes.

We can notice that is higher incidence of injuries in lightweight than in heavyweight judo athletes, both man and woman. Athletes in lightweight category had more injuries but there were minor injuries with 1 to 3 days without of training (18).

Injuries can jeopardise athlete career so we need to take them very seriously, especially ACL rupture. After this injury there is lot of things to think about. ACL rupture needs fast diagnosis and early orthopaedic treatment. After ACL reconstruction it is necessary to have rehabilitation protocol for professional athletes with specific exercises for judo. All three (diagnosis, surgical treatment and rehabilitation) are essential to create conditions for successful return to the same level of competition as before the injury.

There is urgent need for introducing education in prevention programs to decrease rate of injuries in judo. Education programs need to be focused on athletes, coaches, supervisors, referees, club directors and national team directors.

For diagnosis it is crucial to have orthopaedic clinical exam as soon as possible. After clinical exam we can do magnetic resonance imaging (MRI) of the knee for confirmation and to check concomitant knee injuries.

Professional athletes have more chance to continue their career in judo if they undergo surgical procedure for ACL reconstruction. This arises the questions: „Which surgical technique to choose? and „What graft to choose for ACL reconstruction?".

Author preferences for ACL reconstruction in professional athletes are ACL and anterolateral ligament (ALL) reconstruction with semitendinosus and gracilis graft harvest from the injured side. This surgical technique from Santy (Lyon, France) was described in 2015. (21).

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MONITORING TRAINING LOADS IN JUDO SESSIONS

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INTRODUCTION

The control of training loads (TL) during judo training sessions is a highly important matter for coaches and physical trainers that seek to plan training and achieve training peaks at the appropriate time of the season.

To date, there have been many attempts to establish a control of the training loads (TL) in judo, starting with the result of the session rating of perceived exertion (RPE) (Agostinho et al., 2015; Branco et al., 2013; Bromley, Drew, McIntosh, & Talpey, 2018). Moving beyond this approach, methods to quantify training loads based on heart rate (HR) have also been used. Among those that have been utilised the Edwards method (Edwards, 1993), employed above all to validate the results of RPE. In any case, there are studies showing that HR-based methods are not appropriate for use in the context of judo. Detanico, Dal Pupo, Franchini, & dos Santos (2012) signalled that HR is not a good indicator of the effort carried out in judo because it does not correlate significantly with aerobic capacity during *randori*. Furthermore, Franchini, Artioli, & Brito (2013) showed that the HR is not sensitive to respond to changes in the pause/work ratio in different judo-specific training tasks.

Methods also exist to quantify the training load in specific judo sessions based on maximum time until exhaustion (Morales et al., 2016). This method presents some problems, including carrying out maximum tests to calculate the time before exhaustion in the execution of the *randori*. Athletes are reluctant to participate in these tests owing the high physiological demands, and the tests only allow for the quantification of training sessions based on *standing randori*. However, there are also some advantages to this approach, such as the possibility of calculating the training load in advance before a session, as it accounts for the individual capacity of each athlete in the execution of the *randori*.

One of the main challenges in planning training sessions is adapting the training load in advance. Traditionally, judo coaches have based these decisions on their past experiences and intuitions, but training methods are currently more individualised, with athletes treated in different ways during the same session. In many cases, the effect of the load may be different than anticipated, generating a higher or lower load than expected. The specificity of judo and the different training modalities makes it difficult to adjust the effect of a specific training session with accuracy.

According to Franchini, Brito, Fukuda, & Artioli (2014), judo sessions include many training modalities, but one can detect certain stable structures that recur in most cases. The majority of judo training sessions include *uchi-komi* (repetitive technical training without throws), *nage-komi* (repetitive throwing training), *randori* (simulated combat practice), and the combination of these modalities in a circuit that includes higher and lower levels of opposition and variations in the density of the work/recovery ratio. Another variable that can influence the training load is the difficulty of the opponents in the *randori* (simulated combat), as a rival from a higher weight class or with greater skills will increase the intensity of the load.

In this context, it is interesting to analyse the different methods for quantifying training loads in judo. External loads provide information prior to the development of training sessions, while monitoring the internal load offers information about the effect that is produced by the previously programmed external load. The relationship between the values of both loads provides information about the coherence of the training program. Therefore, the objective of this study is to describe the values of the internal and external load during a training period of two

weeks. During these two weeks, the study shows the value of the external load before the judo training sessions, as well as the value of the internal load immediately upon completion of the training and on the day after the training, and analyses the relationship between these figures.

METHODS

This is a descriptive study of a unique case that describes the relationship between the programmed external load during a period of two weeks and the internal load monitored *a posteriori*.

A 25-year-old female judo athlete with 15 years of experience, of which seven years were at the international level, volunteered to participate in this study. She has regularly competed in top-class tournaments that contribute to the entry criteria for the Olympics and World Championships.

Measurements

The study measured the following values over a period of two weeks: the planned external TL, the resulting internal TL after each session, and the evolution and modulation of the autonomic nervous system (ANS) on the day following each session. The first week corresponded to club training and the second week to participation in the Olympic Training Camp organized by the International Judo Federation.

External training load (external TL): Calculated through quantitative parameters based on the time engaged in the different judo-specific training modalities. Each modality is weighted based on a number of variables such as intensity or the density of the stimulus. This weighting was created based on subjective criteria, training experience and evidence gathered in the literature (Franchini et al., 2014; Slimani, Davis, Franchini, & Moalla, 2017)

-*Standing randori*. The value of the weighting is 1 as long as the work/rest ratio is 1:1. If the ratio is greater, the weighting factor is 0.9. If the *randoris* are carried out consecutively, with the ratio being lower than 1:1, the weighting factor is 1.1. It is also possible to program the *randoris* by seeking rivals with a higher or lower level or weight, which would cause the weighting to be modified by ± 0.1, depending on the case.

-*Ne waza randori*: If the bouts are consecutive, the weighting factor is 0.6. If there is a ratio of 1:1 or greater, the factor is 0.5. This can also be modified by the level or weight of the opponents.

-*Uchi-komi*: The weighting of an *uchi-komi* series depends on the work/rest ratio: ratio 1:2 factor 0.7; ratio > 1:2 factor 0.6; ratio < 1:2 factor 0.8. From these levels, a corrective factor is incorporated to represent three levels of intensity: high (+0.1), medium (0) and low (-0.1).

-*Nage-komi*: The weighting of a *nage-komi* series depends on the work/rest ratio: ratio 1:2 factor 0.8; ratio > 1:2 factor 0.7; ratio < 1:2 factor 0.9. From these levels, a corrective factor is incorporated to represent three levels of intensity: high (+0.1), medium (0) and low (-0.1).

-Technical-tactical workouts: This modality is based on circuits that include different technical-tactical actions. The weighting factor depends on the duration of the circuit, the work/rest ratio and the intensity: duration < 60 seconds factor 0.7; duration 60-180 seconds factor 0.8; duration > 180 seconds factor 0.7. From these levels, a corrective factor is incorporated to represent three levels of intensity: high (+0.1), medium (0) and low (-0.1). If the work/rest ratio is < 1:2, a value of 0.1 is added to the corresponding weighting factor.

Internal training load (internal TL): The internal TL was calculated using two methods (session RPE and Edwards) immediately following each training session. In the morning of the following day, heart rate variability (HRV) was monitored to observe the modulation of the autonomic nervous system (ANS).

RPEsession: In this method proposed by Foster et al. (2001), the subjects are asked to rate the intensity of the training 30 minutes after the end of the session using Borg's Category Ratio–10 (CR-10) RPE scale. TL was calculated by multiplying the duration of the exercise by the perceived exertion session-RPE score.

Edwards Method: The Edwards Method is based on time accumulated in five HR zones and is calculated analyzing each one (zone 1: 50-60% of HRmax; zone 2: 60-70% of HRmax; zone 3: 70-80% of HRmax; zone 4: 80-90% of HRmax; zone 5: 90-100% of HRmax). The calculation is made from the sum of the minutes of each zone multiplied by the zone number. The HRmax of each individual was taken from the MIT, and registers under 50% of HR were discarded.

HRV: HRV refers to variations between beat intervals. Various studies have used HRV to better understand the status of the autonomic nervous system (ANS) and stress induced by TLs (Flatt, Esco, & Nakamura, 2017; Morales et al., 2014){„id":„ITEM-2", „itemData": {„DOI":„10.1519/JSC.0000000000000328",„ISSN":„15334295",„abstract":„The main objective of this study was to examine the effect of different judo training loads on heart rate variability (HRV. This stress can be observed from the sympathetic-parasympathetic balance.

Instruments

To record the HR and HRV, a Polar H7 cardio-tachometer and coded transmitter (Polar Electro Oy, Kempele, Finland) were used to record the RR signal (beat to beat). This series of heart rate monitors has been validated for HRV recordings (Cheatham, Kolber, & Ernst, 2015).

The acquisition of HR data was carried out using the Polar Beat app (Polar Electro Oy, Kempele, Finland) for Android smartphones, and HRV data was acquired using the EliteHRV app (Elite HRV LLC, Asherville, North Carolina, United States). The HRV measurement was taken each morning at approximately 8 a.m. in „morning readiness" mode, at rest with in supine decubitus, remaining quiet, trying to stabilise a lowest possible breathing frequency, without speaking or making any movements during two minutes. The variables utilised were the natural logarithm of the square root mean of the sum of the squared differences between adjacent normal R–R intervals (lnRMSSD) and the readiness index (0-10) provided by the EliteHRV app.

Statistical analysis

All of the data collected was exported to a spreadsheet and subsequently analysed by the statistical package SPSS v.22 statistical software (SPSS Inc., Chicago, Illinois, United States) to calculate descriptive statistics (mean and standard deviation) and the Pearson correlation between all variables.

RESULTS

Figure 1 shows the evolution of all variables during the two weeks of monitoring.

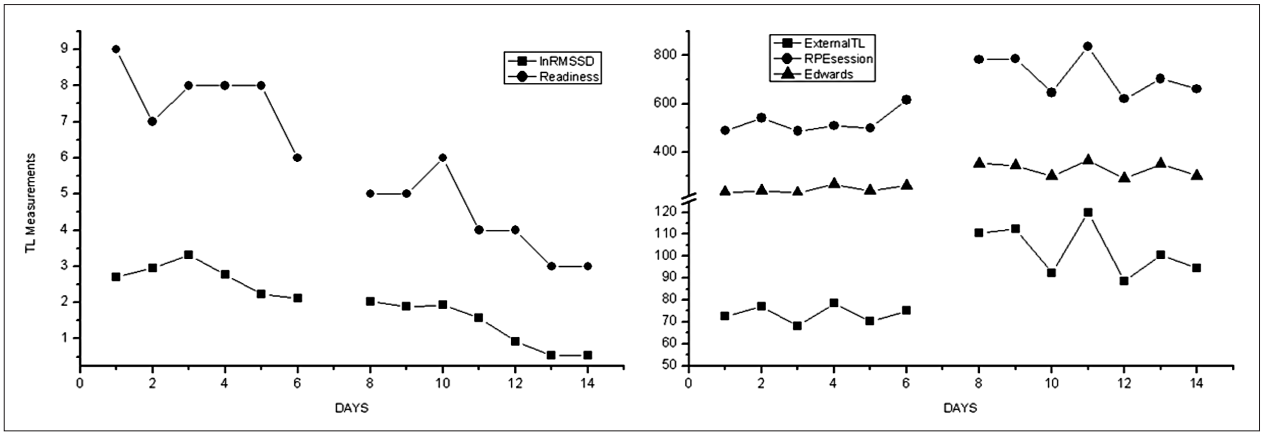

Figure 1. Comparisons of estimation Training Loads (TL) using different methods. (lnRMSSD= natural logarithm of the square root mean of the sum of the squared differences between adjacent normal R–R intervals; session RPE= session rating of perceived exertion; Edwars=Edwards method)

The correlation matrix (table 1) shows the Pearson *r* value between each pairing of variables. One can observe that the programmed external TL and the session RPE show the highest correlation among all the variables. The indicators that provide information about HRV indicate that lnRMSSD shows a higher inverse correlation with the rest of the variables than the readiness index.

Table 1. Pearson correlations between the different methods for estimating training. (lnRMSSD= natural logarithm of the square root mean of the sum of the squared differences between adjacent normal R–R intervals; session RPE= session rating of perceived exertion; Edwars=Edwards method)

	External TL	Session RPE	Edwards	lnRMSSD
Session RPE	0.911	—		
Edwards	0.780	0.765	—	
lnRMSSD	-0.583	-0.589	-0.609	—
Readiness	-0.176	-0.165	-0.205	0.450

DISCUSSION

The results obtained in the study indicate that session RPE is the variable that most closely matches the programmed load, in line with previous studies that pointed to session RPE, although it is a subjective method that must be adapted to meet the needs of a sport with a high technical component like judo (Bromley et al., 2018). The method based on the use of HR to quantify the training load shows lower correlation values than RPE, confirming affirmations in previous studies that HR-based methods are not adequate in the environment of judo (Detanico et al., 2012; Franchini et al., 2013). One can also observe that the parameters that provide information on the ANS do not equally correspond to the dynamic of the training load, with lnRMSSD showing a greater correlation than the value provided by the smartphone app. This is in line with the results indicated by Perrotta, Jeklin, Hives, Meanwell, & Warburton (2017), which found that the app had problems with reliability compared with specific software for analysing HRV.

It is necessary to keep in mind that this study has a number of important limitations. Given that this is only a case study, future research is required that incorporates a larger number of participants. It is also important to highlight another limitation, which is the lack of validation for the system of quantifying the external TL. This system was proposed based on intuition and experience, but in the immediate future, it will be subject to a validation process to legitimise its application in scientific studies. Finally, the system of quantifying external TL does not account for the activity of the participant in the role of „*uke*," as collaborating with a partner as a passive subject that falls and gets back up after each throw implies a physical load that has not been taken into consideration.

CONCLUSION

The value of the weighting of time engaged in the different judo-specific training modalities could be a good indicator for planning of training loads in judo. The key is to adjust the weighting factor in each modality.

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INJURIES DURING SUWARI SEOI NAGE IN ITALIAN JUDO ATHLETES

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INTRODUCTION

Judo is a Japanese Martial Art and Olympic Combat Sport, which became very popular also as activity for health and fitness. The International Judo Federation (IJF) has estimated 40 million practitioners in more than 200 member countries (IJF 2019). Participation in sport is not free from risks. Although the benefits of regular physical activity are undisputed, sport injuries are identified as a major public health problem in developed countries (Cierna et al. 2017). The safety of the athletes has to be a priority for every sport organization and coaches. Because of the nature of martial arts, injuries are not uncommon. Judo is a grappling combat sport, where athletes fight in standing situation using throwing techniques, or in ground fight, where they can use blocking, choking or arm locking techniques. In Judo the injuries occur during competition and training, the more traumatized anatomical site is the knee, shoulder and fingers, whereas sprains, contusions and strains were the most frequent type of injury (Pocecco et al. 2013). The injuries occur more frequently in standing fight and this mainly due to the major quantity of time spent in this situation (Pocecco et al. 2013), and the successive movements involving body rotation and the blocking process during throwing techniques (Pocecco et al. 2013). Despite the wide range of attacks possibilities in Judo, very few are the most used techniques in competition, with super-elite athletes males using 10 ($\pm$3) and super-elite females 9 ($\pm$4) different throwing techniques (Franchini et al. 2008). One of the most successful and frequently used technique is the Seoi Nage, the „shoulder throw" and this technique could be executed in many different ways (Adams et al. 2011, Sterkowicz et al. 2013). One modern version is the Suwari Seoi Nage, the throw type where the attacker fall on both knees during the action, instead of standing on both feet like in the classical type. This very effective style seems to have a bad reputation because too many injuries are supposed to occur during its execution. Two main reasons have been presented to explain this association: a poor execution – resulting in acute trauma – normally conducted by young or novice judo athletes and a repeated impact of the knees resulting in chronic injuries, normally more frequent in experienced judo athletes (Sacripanti et al. 2018). To avoid the cause of injury, some national Judo federations prohibited its use by young Judo athletes. However, we didn't find any investigation about the impact of the use of Suwari Seoi Nage on acute injury in Judo athletes. Thus, this pilot study was conducted with a sample of Italian judokas. The aim was to identify the risk factor injury events that can occur to who performs this technique, in order to suggest possible preventive strategies in future.

METHODS

Sample

The reference population for this study consisted of Italian adult female and male judo athletes, graded as 1st kyu (brown belt) or above (1st- 7th dan). 110 judokas filled in the form, those who did not have the quality requested

(age ≥18 year or belt degree ≥ 1stKyu), were excluded. The final sample consisted of 94 subjects, 32 females (34%) and 62 males (66%) (tab.1 and tab.2), who filled out correctly the questionnaire between February and May 2018.

Table 1. Subjects demography and anthropometric characteristics

Variable	All (n= 94)	Female (n= 32)	Male (n= 62)
Age (yr)	36 ± 12	33 ± 10	38 ± 12
Height (cm)	173± 8	165 ± 6	176 ± 7
Training Weight (kg)	73 ± 14	62 ± 8	79 ± 13

Table 2. Judo characteristics of the 94 subjects

Variable	No. (%)
Belt rank	
Brown (1st Kyu)	9 (10)
1st Dan	19 (20)
2nd Dan	16 (17)
3rd Dan	24 (26)
4th Dan	8 (9)
5th Dan	11 (12)
6th Dan	6 (6)
7th Dan	1 (1)
Competition Level	
Local	16 (17)
National	57 (61)
International	21 (22)

Procedure

In the present study we considered acute injuries caused by a specific situation. Acute injury was definite as any physical complaint sustained by an athlete caused by a sudden event during the Suwari Seoi Nage execution, in training or competition, which determined a forced rest (Pocecco et al. 2013, Pocecco and Burtsher 2013). All the information was collected through an online survey with 25 questions directed to collect data on the judo athlete, the practice of the Suwari Seoi Nage and possible related trauma. The validation process was done previously on a group of six judo players, in order to verify the presence of ambiguous or unclear questions. Every judo athlete has been informed on the aim of this study through the letter with the invitation to fill in the questionnaire and a consent form with the description of the purposes and procedure of the study. The present study was approved by the Ethical Commission of the University of Genoa.

RESULTS

Seventy one participants (76%) answered that they used or still use Suwari Seoi Nage as technique to attack the opponent in standing fight (tab.3). The average age in which the judo players started to learn this technique was

16±6 years (Females 17±8, Males 15±8), and the average age that they started to use it in competition was 17±7 years (Females 18±8, Males 17±8). Eighteen of them (19% of the total sample), 6 females and 12 males, reported that they had an acute injury during the execution of this technique (tab.3).

Table 3. Suwari Seoi Nage utilization and Injury absolute and relative data

Variable	Tot N. (%)	F. No. (%)	M. No. (%)
Suwari Seoi Nage utilization:			
No	23 (24)	6 (19)	17 (27)
Yes	71 (76)	26 (81)	45 (73)
Injury related to Suwari Seoi Nage:			
No	50 (70)	17 (68)	33 (72)
Yes	18 (25)	6 (24)	12 (26)
I don't know	3 (4)	2 (8)	1 (2)

In table 4 the characteristics of the injury and therapy occurred in the 18 interviewed subjects are reported.

Table 4. Suwari Seoi Nage Injury and therapy characteristics frequency in the 18 subjects

Variable	No.
How many times?	
One time	8
Two times	6
Three times	1
Four times and more	2
Situation:	
Training	9
Competition	4
Both	4
I don't remember	1
Body area:	
Knee	9
Toes	3
Shoulder	2
Ankle	2
Elbow	2
Hip	1

Variable	No.
Have you seen a doctor?	
Yes	11
No	6
No answer	1
Exam:	
MRI	4
X-ray	2
Only medical examination	2
Ultrasound	2
Diagnosis	
Sprain	4
Contusion	3
Ligament strain or rupture	3
Damaged cartilage	2
Damaged bone	1
No answer	1
Therapy:	
Rest	7
Drugs	4
Physio	3

Causes:		
	Wrong execution	8
	Defense from the opponent	5
	Improper tatami	1
	Other	1
	I don't remember	3

	Specific training	3
	Cooling	2
	Surgery	1
Back to training:		
	one week or less	4
	two weeks - one month	5
	three months	1
	I don't remember	1

DISCUSSION

The injury connected to the execution of Suwari Seoi Nage occurred to 18 athletes, the 25% of the total sample if we consider only who uses this tachi waza attack. It means that one judo player every four Suwari seoi nage specialists had an injury experience associated to the use of this technique. This happened to women as men (F 23%, M 27%). The injuries occurred, above all, during training (13 times, 72%), perhaps because of the unequal proportion of time spent in training compared to the competition (Pocecco et al. 2013). Indeed the duration ratio competition / training is about 1% (Calmet, 2002). The most common injured anatomical region was the knee (47%), the same body area reported in other studies on Judo injuries (Barsottini 2006, Souza 2006, Rukasz 2011, Del Vecchio 2018). In our study the main injury causes related to this technique application was the wrong execution, (8 times, 44% of the episodes). Eleven athletes of the eighteen (61%) had to go to the doctor after the hurt. The most frequent diagnosis was sprain, one of the most common injury type in Judo (Pocecco 2013) and the rest was the most frequent therapy used to recover. The majority of the athletes came back to the training in a week. We must also take into account the evolution of Judo. For the first Suwari Seoi Nage, Tori knelt on the ground while falling. Nowadays, Tori falls to the ground and pushes to throw Uke, knees bend and stretch, and toes are solicited. The form has been translated in different languages and we are collecting data around the world. We need more data to understand better the causes of injuries during the application of this successful technique in order to develop effective guidelines for teaching and training this technique in a safety way. We also have to find out the injury characteristics of the person who is thrown by the Suwari Seoi Nage. Indeed being thrown seems to be the most frequent situation leading Judo injuries (Pocecco et al. 2013). The most important limitations of this study seem to be the quite low number of subjects (indeed, it is a pilot study), the subjective evaluation of some factors related to the injuries (e.g., causes of injuries), possible recall bias, and the lack of a control group (i.e., who did not perform Suwari Seoi Nage) related to judo injuries and especially to traumas to the knees. However, this seems to be the first research which assessed risk factors associated to Suawari Seoi Nage.

CONCLUSION

The survey assessed to 94 adult athletes, females and males, brown and black belts, with different judo abilities and training experiences, find out that the injuries during the execution of this technique happened to one judo player every four, mainly to the knees, mostly because of a wrong execution and secondly because of a bad defense from the opponent.

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THE ETHICS OF INCLUSIVE JUDO IN SLOVENIA

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INTRODUCTION

Sport is an important segment through which people with diverse abilities can equally involve themselves in society and gain social recognition. Inclusion is a process that opens the door to equal opportunities for all people, regardless of their physical and mental abilities. Inclusion in sport furthermore means opening the door to sports organizations. Athletes with diverse abilities can be equivalent to other athletes who do not have special mental and physical barriers and choose programs and activities between different offers in the market and freely decide which sports program or sports club suits them best from the point of being able to choose the selected sports or logistics capability (proximity of residence) or find appropriate financial capabilities. The ability to choose is, therefore, a basic condition for inclusion.

By involving members of the segregated groups into sports clubs, we are increasing the possibilities for their inclusion in the wider society. In the guidelines for sport and recreation for people with disabilities (Mihorko, Štrumbelj, Čander, Cimerman Sitar, 2014) we find that the involvement of athletes with a disability in the society helps to overcome prejudices and fears prior to this population, which are primarily the result of ignorance of the life of persons with disabilities due to their social isolation, which applies to both children as well as adults. It also promotes interactions and meetings in clubs events, which means full socialization. For the provider of sports and recreation programs, this ultimately means a better image in the local community. In Slovenian Judo Federation inclusive judo is developed in regular judo clubs all over the country for last quarter of a century.

ABILITY VS DISABILITY

We proceed from the position that we all have certain specific needs and a variety of psycho-physical abilities. These personal qualities and physical condition may be upgraded in a supportive environment through interaction with others and suitable politics. To underscore the power and abilities of inclusive judo athletes we are going to use phrases that are increasingly being enforced in the world (Diverse Abilities, 2018). In literature, we find the phrase like „athletes with additional needs" (KidsMatter, 2017). Instead of people with disabilities, handicapped (the word comes from a person who begs with a cap in a hand), persons with special needs, etc., we will use the phrase that is rather encouraging. According to the principles of normalization (Brandon, 1990), we should expose a disease or condition of an athlete only when this is an obstacle to further participation. Čačinovič-Vogrinčič (2008) stresses the importance of the use of language and points out that we need a word that goes beyond the distinction between „us" and „them", a concept that captures the specificity of involvement.

SLOVENIAN NATIONAL SPORTS PROGRAM 2014-2023

The main objectives of the National Sports Program of the Republic of Slovenia from 2014 to 2023 on the integration of children and youth with special needs and persons with disabilities are (2014): improving links between schools, sports and other associations which carry out programs for children and youth with special needs; improving the link between sports associations and charitable associations that carry out programs for the disabled; setting up a sport for people with disabilities at the local level; increasing the number of persons with disabilities involved in active sports and sports programs in the field of sports recreation and competitive sport for 200%.

INCLUSIVE JUDO IN THE LIGHT OF JUDO ETHICS

For a full inclusion, it is necessary to create environments where all the actors (individuals, families, systems, policy) operate in the direction of an equivalent integration. Rutar (2010:168) even thinks inclusion should not be a national program for people with disabilities, for people with disabilities already are included in social life. To talk about inclusion we must have excluded someone firs. Šuc, Bukovec, and Karpljuk (2017) indicate that the cooperation between the various experts in the field of persons with special needs should be strengthened if we want to fully implement inclusion, which will require significant organizational, cultural and also personal transformation.

Ethics of martial arts sports is based on values such as respect, honesty, trust, order, discipline, reciprocity, modesty, patience and requires serenity, focus, and perseverance. Ethical principles of judo are the rules of good behavior, based on mutual respect and cooperation, and thereby strengthen the interpersonal relationships and human values (Stavrev, Videmšek and Karpljuk, 2014). The principles of judo such as mutual prosperity and the use of the minimum power for maximum effect (Murata, 2005) is not woven only into judo practice, but in all areas: formal (study, work) and non-formal (family, friends, etc.).

INCLUSIVE JUDO IN SLOVENIA

In 1994, practitioners with diverse abilities began training in Koper and Portorož (Meško, Marošek, and Očko, 2007). A so-called G-judo seminar was organized as part of an International Inclusive Judo Competition in 2004. Some Slovenian judges then got the license for a G-judo Judge.

Within the Slovenian Judo Federation (SJF) the special Inclusive Judo Commission operates more than a decade now and supports professional development. An important document called the *Code of Ethics and Judo Practice: Involving Vulnerable Groups in the judo* was confirmed and accepted in 2017. The vulnerable groups of residents in Slovene judo clubs are included in training in organized, inclusive sections. It is about a gradual process of building an inclusive sport environment. These individuals are being included on the basis of equal rights like any other member, with all the rights and duties arising from the membership. The training can have recreational, therapeutic or competitive character. The training athletes are not being characterized, labeled but they are being dealt with in terms of equality. SJF supports and develops inclusion since the values of inclusion are the values of society, judo values as well as values of sport in general. It is about including people, not discriminating them, it is not about segregation but normalization. SJF inclusive judo respects and promotes all competition results in terms of equality. Topmost competitor judo sport and inclusive judo are the paradigms that coexist and support each other (by organizational, professional and promotional aspects). SJF collaborates with specialized sports organizations, exchanges expertize knowledge and organizational potential in the direction of achieving the biggest possible sport (social) inclusion of an individual athlete or group and ensures equivalent and linked treatment in all sectors of work for all vulnerable groups (Šomen and Pečnikar, 2017).

In 2017, the SJF carried out the first inclusive judo National Championship called *1st Judo for all Festival Jože Škraba* for judokas who due to different psycho-physical handicaps practice judo but cannot compete on other Judo National Championships and on Slovene cup matches. Mr. Jože Škraba, a doyen of Slovene judo, a holder of 8th DAN master's belt took the sponsorship over this event with which the SJF demonstrated inclusive orientation of the organization. In 2018, under the auspices of the festival, two National Championships for Veterans and Inclusive judo were organized together which further strengthened the inclusion process.

SJF also confirmed the scoring system in an equivalent manner. This official recognition opened the door to regular competition systems and funding at a higher level such as the Olympic Committee of Slovenia - Association of Sports Federations and the Association for Sport of Persons with Disabilities of Slovenia - the Paralympic Committee.

CONCLUSION

Through an overview of the history of sports for disabled people, it is noticeable that the type and degree of disability and the psycho-physical state of an individual is the one that allows or closes the path to specific sports disciplines. For example, Paralympic sports include physically hindered athletes. The Special Olympics only includes athletes with mental disorders, distinguishing four levels (mild, moderate, severe and profound). In Special Olympic Slovenia athletes with a mild disorder cannot compete in their judo tournaments. So certain athletes with diverse abilities do not belong to any category. Such are also athletes after a head injury, athletes with mental health problems, and others with certain diseases and conditions, such as paralysis. In SJF Inclusive judo Championship, therefore, all judokas are able to participate. In judo, the official Paralympic sport competition system is governed only by the blind judokas. In 2017 and 2018, in the framework of the Paralympic Association, Germany and England hosted World Championship for judokas with intellectual disabilities who are able to train in mainstream groups without adjustments. The Slovenian judo history confirms that judo is an extraordinary sport that can provide a safe and healthy practice for everyone. We find that the twenty-five-year old path of the Slovenian inclusive judo brings experience and knowledge into practice, while there is a lack of professional literature, records, testing, and measurement. Only four studies could be found: Eight Motor Tests (Masleša, 2013), Equilibrium Exercises (Tatalovič, 2014), Special Judo Fitness Test (Šimenko, 2015) and Measuring Grip Strength of G-judokas (Pečnikar, Karpljuk and Šimenko, 2016). We are faced with a hasty selection of sports, in which athletes with diverse abilities can be involved. By documenting inequality, we do not want to contribute to the control and management of athletes with diverse abilities, but on the contrary, we are convinced that it is possible to combat poverty and social exclusion and to avoid untenable inequalities if there is a political will for this (Abrahamson, 1997). There are no data on the actual number of involved athletes with diverse abilities in Slovenia. According to the Statistical Office of the Republic of Slovenia (2014), we do not even have data on the number of people with disabilities in Slovenia. However, this number is estimated at between 160.000 and 170.000 people (disabled workers, children, and adolescents with special needs, military and war invalids, and moderately, heavily and severely mentally and severely physically affected persons). Disabled people account for almost 15% of the world's population. Koželj (2014) considers that we do not have the planned education of young athletes with diverse abilities, as in other countries, we do not have a network of centers and we do not have adequately trained coaches or training programs for coaches of athletes with diverse abilities. Therefore training for coaches, volunteers and others working in the field of inclusive sports should be organized in order to further develop the profession, to accumulate rich practices of inclusive sports, to obtain information on how many athletes we currently have in Slovenia, where they train, how they train, who coaches them, their psycho-physical conditions and diseases in order to transparently link official competition systems, to regularly perform tests and measurements of athletes, and to simplify and unify the integration of athletes with diverse abilities into sports clubs and other societies.

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RELATIONSHIP BETWEEN PHYSICAL FITNESS TESTS' AND SPECIAL JUDO FITNESS TEST PERFORMANCE AND CLASSIFICATORY TABLES' DEVELOPMENT FOR JUVENILE AND CADET MALE ATHLETES

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INTRODUCTION

Judo is a combat/fighting sport characterized by a huge variety and quantity of technical and tactical elements which require the whole body and are expressed through great variability in what concerns intensity and intermittence (Crnogorac, 2010). For that reason, the judo combat dynamic is in everlasting change. Besides the importance of the „decision taking" ability referred by Carratalã and Carratalã (2005) and Veloso et al. (2016), in order to succeed in judo athletes need to develop various physical abilities where power and anaerobic capacity, power and aerobic capacity, maximum isometric strength and dynamics, muscular power and resistant strength can be included (F. Franchini et al., 2011). In this context, a study by E Franchini et al. (2018), which assessed the manual handgrip strength of 406 judoists, has given normative data and its results have been put in a five level scale. Another study by Ceylan and Balci (2018) concluded that the *Special Judo Fitness Test* (*SJFT*) may discriminate athletes of different levels. In line with these results, Agostinho et al. (2018) concluded that the best athletes present better results in the *SJFT* (among other tests). The results of this study allowed the creation of eight scoreboards, considering each of the applied tests to cadets and juniors of both genders.

As for the anthropometric factor it continues being a factor to take into consideration in the judo competitive success (Sertić & Segedi, 2014). In this context Agostinho et al. (2018) refer that body mass is indirectly linked to the performance, namely in *SJFT*. Also E Franchini et al. (2005) concluded that body fat has a negative influence in the motor performance. According to a study by Wazir et al. (2017), the general anthropometric features allows the discrimination of athletes with different performance levels, as well as the results obtained in a battery of general tests make it possible to predict the young judoists´performance. Nowadays, some researchers have been exploring the potential advantage of accessing to data related to the maturation degree of sportsmen when grouping athletes (Cumming et al., 2017). Given the age range of our judoists (juveniles and cadets), it seemed also important to us to study the maturation together with the issues linked to physical fitness. In view of the above, the aim of our study was to create scoreboards based on the physical fitness tests and morphological assessment results, both for juveniles and cadets, in order to contribute for an improvement of the training and talent detection process.

METHODS

Participants

Table 1 presents the demographic characteristics for each group**.** Four hundred and thirty male judo athletes from Clubs and National Team of Portugal, were evaluated. Athletes age, height, sitting height, body mass BMI and fat, were as following (mean ± standard deviation): male Juvenile - 13.5±1.0 years, 1.63±.08 m, 1.26±0.01 m, 55.4±14.2 kg, 20.5±3.5 kg/m^2, 11.4±5.5 (%); male cadets – 15.7±0.6 years, 1.70±0.08 m, 1.35±1.0 m, 61.6±11.5 kg, 20.1±4.9 kg/m^2, 9.6±2.9 (%).

Table 1. Demographics variable in male Juvenile and Cadet athletes

Group	Male Juvenile	Male Cadet		
Variable	(n=220)	(n=210)	F	P_Value
Age (years)	13.5±.7	15.7±.6	289.3	0.000
Height (m)	1.63±.08	1.70±.08	12.94	0.000
Sitting Height (m)	1.26±0.01	1.31±.05	4.78	0.000
Weigth (kg)	55.0±14.2	61.6±11.5	6.6	0.012
BMI (kg/A^{2}m)	20.5±3.5	20.1±4.9	0.2	0.651
% Fat	11.4±5.5	9.6±2.9	4.3	0.041

Measures and Procedures

The handgrip strength was assessed with the handgrip test.To evaluate the Physical Fitness the athletes performed the Beep Test ($VO_{2máx}$), Sit-ups (1 min) Push-ups (1 min), Handgrip Strength (kg) using a dynamometer (Takei Physical Fitness Test, TKK 5001), Squat Jump (cm), Countermovement Jump (cm) was evaluated according to the Bosco protocol (1994), and measured using Chronojump measurement technology (Bosco System, Globus, Italy. Standing board Jump (cm) and Sit and Reach (cm). To the SJFT, participants performed the original recommendations by Sterkowicz (1995). Briefly, the SJFT is divided into three active periods (A, 15 sec; B and C, 30 sec) with 10-sec intervals between them. During each period, the athlete being evaluated throws 2 partners (separated from each other by a distance of 6 m) as many times as possible using the ippon-seoi-nage technique. Immediately after and 1 min after completion of the test, the athletes' heart rate was measured using a heart rate monitor („Polar® RS400).

Analysis

All analyses were performed using the SPSS software (Version 23.0, IBM SPSS, Chicago, IL), and the significance was set at 5%. Participants were stratified by age group (Juvenile, 13-14 years old and Cadets, 15-16 years old). Basic descriptive statistics (mean and standard deviation) were calculated for all the variables, which also were examined for normality by the Shapiro-Wilk test and homogeneity of variances by the Levene test. Analysis of variance (ANOVA) was performed to test the differences between the two groups. For each test scales percentile values were adopted to establish the following categories, as suggested by Sterkowicz-Przybycień and Fukuda (2014), cited in Agostinho (2018): excellent, highest 5%; good, next 15%; regular, middle 60%; poor, next lowest 15%; very poor, lowest 5%.

RESULTS

Table 2 and Table 3 presents the Physical Fitness performance (PFT) and SJFT for each group.

Table 2. Physical fitness performance (PFT) in male Juvenile and Cadet athletes

Variable	Male Juvenil (n=220)	Male Cadets (n=210)	F	P-Value
Beep (nº)	72.2±19.2	82.8±15.1	1.596	0.003
VO2máx (ml.kg^{-1}.min^{-1})	43.1±6.5	46.7±4.7	2.999	0.002
Sit-ups 1 min (nº)	44.9±8.6	51.3±8.6	0.000	0.000

Push-ups (nº)	43.5±17.3	56.2±13.4	4.963	0.000
Rigth Hand Grip (kg)	33.0±8.3	41.0±8.0	0.225	0.000
Left Hand Grip (kg)	31.8±8.0	38.8±7.2	1.013	0.000
Squat Jump (cm)	22.7±4.2	26.0±4.5	0.920	0.000
Countmovent Jump (cm)	27.2±5.6	30.1±4.6	0.929	0.006
Standing board Jump (m)	1.86±0.2	2.0±0.2	0.029	0.001
3 kg medicine ball Throw (m)	3.70±0.68	4.79±0.83	0.4562	0.001
Sit and Reach (0=26 cm)	31.2±6.8	35.5±6.8	0.078	0.002

Cadets performed better than Juvenile in the SJFT, with higher number of throws in A, B, C (P< 0.01) for all comparisons final heart rate (P= 0.05), and index (P< 0.001), as well as higher performance in the PFT (P< 0.001). Considering these differences, tables were established by age groups, using percentile values. Thereby, each of the parameters of the SJFT (number of throws, heart rate after and 1 min after the test, and SJFT index), as well as absolute results in Physical Fitness Tests, were classified by age (Juvenile and Cadet).

Table 3. Special judo fitness performance in male Juvenile and Cadet athletes

Variable	Male Juvenil (n=220)	Male Cadets (n=210)	F	P-Value
Throws in series A	5.4±0.6	6.0±0.7	1.042	0.000
Throws in series B	9.6±1.1	10.5±1.0	0.124	0.000
Throws in series C	8.9±1.0	9.4±1.1	0.279	0.007
HR immediately after(bpm)	181.9±12.3	181.2±12.9	1.583	0.023
HR 1 min after (bpm)	145.8±16.9	144.6±15.2	0.216	0.761
Index bpm/throw	13.8±1.9	12.7±1.5	1.901	0.001

Table 4 and Table 5 presents the Physical Fitness classificatory table for male Juvenile and Cadet group; and Table 6 and Table 7 presents the SJFT table, respectively for male Juvenile and Cadet group.

Table 4. Physical Fitness classificatory table for male Juvenile judo athletes

Level	Beep (nº)	$VO_{2máx}$ ($ml.kg^{-1}.min^{-1}$)	Sit-ups 1 min (nº)	Push-ups (nº)	Rigth Hand Grip (kg)	Left Hand Grip (kg)	Squat Jump (cm)	Countmov Jump (cm)	Standing board Jump (m)	Sit and Reach (0=26 cm)
Excellent	≥96	≥51	≥60	≥69	≥48.1	≥45.2	≥29.1	≥35.6	≥2.17	≥41.5
Good	81-95	46-50	48-59	51-68	38-48	35-45	25-29	27-35	1,95-2.15	34-41.0
Regular	73-80	44-45.8	44-47	40-50	32-37	32-34	22-24	26-28	1.87-1.92	29-32.7
Poor	54-72	37-43.2	40-43	28-39	25-31	24-31	19-21	26-23	1.70-1.86	25.5-28.9
Very Poor	≤53.8	≤36.8	≤39.0	≤27.6	≤24.8	≤23.2	≤19.0	≤22.7	≤1.69	≤25.4

Table 5. Physical Fitness classificatory table for male Cadet judo athletes

Level	Beep (nº)	$VO_{2máx}$ ($ml.kg^{-1}.in^{-1}$)	Sit-ups 1 min (nº)	Push-ups (nº)	Rigth Hand Grip (kg)	Left Hand Grip (kg)	Squat Jump (cm)	Countmov Jump (cm)	Standing board Jump (m)	Sit and Reach (0=26 cm)
Excellent	≥100	≥52	≥70	≥78	≥54	≥51	≥33	≥37	≥2.25	≥46
Good	90-99	49-52	59-70	61-77	47-53	45-50	28-32	32-36	2.09-2.24	39-45
Regular	79-90	45-48.7	50-58	55-60	40-45	39-44	24-27.2	30-32	1.99-2.08	34-38
Poor	71-78	43-45.1	45-50	45-54	35-39	34-38	22-24	25-29	1.85-1.8	30-33
Very Poor	≤70	≤42.8	≤44.4	≤44.2	≤34.02	≤33.4	≤21.7	≤25.0	≤1.84	≤29.5

Table 6. Special Judo fitness test classificatory table for male Juvenile judo athletes

Level	Nº of throws	HR after (beats/min)	HR 1 min after (beats/min)	Index
Excellent	≥28	≥191	≥174	≥12.95
Good	25-27	184-190	146-172	14.8-12.64
Regular	23-23	181-184	141-145	15-70-14.79
Poor	22	171-180	133-140	19.5-15.67
Very Poor	≤21	≤170	≤132	≤19.30

HR, heart rate

Table 7. Special Judo fitness test classificatory table for male Cadet judo athletes

Level	Nº of throws	HR after (beats/min)	HR 1 min after (beats/min)	Index
Excellent	≥30	≤172	≤133	≤11.38
Good	28-29	184-173	147-134	11.3-12.7
Regular	26-27	185.4-192	159-148	12.8-13.7
Poor	24,5-25	191.6-199	168-160	13.7-15.9
Very Poor	≤24.2	≥200	≥169.7	≥15.96

HR, heart rate

DISCUSSION

The main findings of the present study were: (a) Cadets performed better in PFT (higher values in physical parameters) and SJFT (higher number of throws in A, B, C, and lower final heart rate and index); (b) body mass was higher and fat (%) was lower in Cadets than in Juveniles with different in to all performance variables (Wazir et al. (2017). Concerning the differences in performance between age groups (Juvenile and Cadet), and considering the values of SJFT in Cadets, are similar to the results of the study of Agostinho (2018). Research using a generic testing battery to reveal performance related characteristics in judo showed that explosive strength, balance,

flexibility and agility contribute to faster-executed judo skills (Monteiro, 2016; Trava et al., 2016; Franchini et al, 2005). In fact, Juveniles also presented lower mean and peak power during Beeps test compared to Cadet judo athletes. Studies with grappling combat sports athletes (Sertić & Segedi, 2014; Agostinho, 2018) suggested that differences in aerobic capacity and maximal isometric strength between adolescents and adults are probably related to maturational aspects, such as higher testosterone release, increased muscle mass and glycolytic activity for the more matured athletes. Practitioners should use relevant monitoring and assessment tools as part of a long-term athletic development strategy. Practitioners working with youth should systematically progress and individualize training programs for successful long-term athletic development (Lloyd et al., 2016): (a) help foster a more unified and holistic approach to long-term athletic development, (b) promote the benefits of a lifetime of healthy physical activity, and (c) prevent and/or minimize injuries from sports participation for all boys and girls. One limitation of our study is that sexual maturation was not assessed, which does not allow us to infer if this was the cause of the difference between our groups. This is de first study that compared the performance in the SJFT between Juvenile and cadet judo athletes. As Cadet athletes are probably sexually mature than Juvenile judo athletes (Cumming et al., 2017), is a possibility to explain the difference in the results of SJFT and PFT on the two Groups and the Cadets has a longer time of judo training seems also to be a plausible explanation for these differences.

CONCLUSIONS

In conclusion, Cadets performed better than Juveniles, in the Physical Fitness tests and in the SJFT. Additionally, the normative data were established based on Clubs, National and International Juveniles and Cadets level athlete of Portugal from these ages and we now can be evaluated by using a scoreboards based on the physical fitness tests and morphological assessment results, both for juveniles and cadets, in order to contribute for an improvement of the training and talent detection process, and the 5-grade scale proposed in this study, and used as a reference to guide young athletes' evaluation, training, and during the rehabilitation processes. Thus, coaches, strength and conditioning professionals, now have a detailed sex and age specific classification for judo-specific aerobic and anaerobic and aerobic, flexibility and neuromuscular fitness, as well as judo-specific strength-endurance and explosive strength performance. To promote and encourage in the ages Juvenile and Cadet, to enhance both physical fitness and abilities with a primary focus on motor skill and muscular strength development.These classificatory tables can also be useful for judo coaches to monitor specific physical performance during different phases of periodization process and individualize training programs, to promote the participation in physical conditioning that helps reduce the risk of injury to ensure their on-going participation for successful long-term athletic development.

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DEVELOPMENT AND INTERNATIONALIZATION OF PROACTIVE PROGRAMS TO TEACH HOW TO FALL: ADAPTED UTILITARIAN JUDO AND SAFE FALL-SAFE SCHOOLS©.

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INTRODUCTION

A fall is an involuntary event which results in a person coming to rest inadvertently on the ground or floor or other lower level (WHO, 2018). The consequences derived from falls have made them a public health problem in relation to mortality, psychological sequelae and the high economic cost they cause. To respond to this problem, the WHO proposes, among other measures, to develop comprehensive and multifaceted fall prevention strategies, giving priority to research and public health initiatives that explore risk factors and define effective preventive strategies. In this same line, it urges to promote individual and community education to increase social awareness.

In response to this challenge, the University of Seville (US), the European Judo Union (EJU) and the Andalusian Federation of Judo and Associated Sports (FANJYDA), following their belief of Judo for society, sign a collaboration agreement (MOU) to develop and promote two proactive programs that influence the education of individuals in the event of a fall: Adapted Utilitarian Judo (focused on the older adult population) and Safe Fall-Safe Schools© (focused on children in school age).

The JUA program is presented by the US for the first time in 2015, during the 6th International Congress of Physical-Sports Activity for Seniors, a proposal for proactive intervention on falls in the older adult population. This program of scientific and methodological content had already been approved and endorsed by the Portal of Ethics of Biomedical Research of Andalusia. The program is awarded as the best research project with the publication of Campos-Mesa, Delcastillo-Andrés, Castañeda-Vázquez, Toronjo-Hornillo (2015). That same year, the company Ceroone Technology signes a research contract 68/83 with the US in support of the development of proactive proposals to teach the older adult population to fall safely.

The above-mentioned research leads to the presentation of results in the 3rd European Science of Judo Research Symposium & 2nd Scientific and Professional Conference on Judo: „Applicable Research in Judo" held in Croatia (2016). After subsequent implementations, two articles have been recently published, *Adapted Utilitarian Judo: The Adaptation of a Traditional Martial Art to a Program for the Improvement of the Quality of Life in Older Adult Population* (DelCastillo-Andrés, Toronjo-Hornillo, Toronjo-Urquiza, Cachón Zagalaz, & Campos-Mesa, 2018) and *Effects of the Application of a Program of Adapted Utilitarian Judo on the Fear of Falling Syndrome (FOF) for the Health Sustainability of the Elderly Population* (Toronjo-Hornillo, Castañeda-Vázquez, Campos-Mesa, González-Campos, Corral-Pernía, Chacón-Borrego, & DelCastillo-Andrés) (2018). Both articles with the aim of triggering new training and research challenges.

For the development of the Safe Fall-Safe Schools© program, focused on the problem of falls in the child population, the US signs a research contract 68/83 with the FANJYDA. The scientific and methodological content of this program is approved and endorsed by three independent Ethical Committees in Spain, Hungary and Italy.

The result of the design and implementation of this second program is reflected in the presentation of the PhD Thesis entitled *Design, implementation and evaluation of two proactive programs based on judo for the teaching of falls in at-risk populations* (Toronjo-Hornillo, 2019); the elaboration and defense of the Final Master's Project *Safe Fall-Safe School intervention proposal in secondary school students who practice volleyball* and *Safe Fall-Safe School program implementation in an educational center in Seville: study on protected forms and safe to fall*; likewise, the following Final Degree Projects are implemented, presented and defended: *Didactic Unit for the application of the Safe Fall-Safe School program in primary education*, also *Implementation of the Safe Fall-Safe School method in the sports club of football ASD Messina in Italy*, and *Implementation of the Safe Fall-Safe School program at the Ceip Isbilya (school) in Sevilla Este*.

The presentation of the update of the results has been carried out in more than 18 international congresses of which we can highlight the World Conference on Injury Prevention and Safety Promotion 2018 (Bangkok, Thailand), XVI. Congress of Sport Science Hungary (MSTT, Nyíregyháza, Hungary), International Society of Behavioral Nutrition and Physical Activity (ISBNPA, Prague, Czech Republic), III National Congress and IV International Congress of Quality of Life and Healthy Lifestyles (Chillán, Chile), 7th Ethnography and Qualitative Research Conference (Bergamo, Italy), and the 6th International Congress of Educational Sciences and Development (Setúbal, Portugal). The dissemination of the program's results continues with the participation in the Safe Kids Worldwide Prevention Convention, 2019 (Washington, USA) and in the EU-Safety 2019 (Belgium, Luxembourg).

Regarding the dissemination of the program in specialized journals, 7 publications have been accepted in prestigious journals and quality indexes in the Journal Citation Reports and the Scientific Journal Rankings, of which we highlight the work of Toronjo-Hornillo, Del Castillo-Andrés, Campos-Mesa, Díaz-Bernier, and Zagalaz-Sánchez (2018), published in *Sustainability*; and Del Castillo-Andrés, Toronjo-Hornillo, Castañeda-Vázquez, Campos-Mesa, and Rodríguez-López (2018), published in the *International Journal of Environmental Research and Public Health*.

The results of some of these works were presented to the World Health Organization in Copenhagen in January 2018, in a meeting with the director of the Injury Prevention programs of the WHO Regional Office for Europe.

The internationalization of the program begins with the delivery of seminars in Brighton (England, 2017) and Milan (Italy, 2018), being Italy the first country to sign the agreement with the EJU. To these, we add the 1st International Conference on Training and Research Safe Fall-Safe Schools© in Cádiz (Spain, 2018). During this last seminar the training in teaching and research was carried out with 10 European countries: Germany, Denmark, Hungary, Italy, Czech Republic, Russia, Serbia, Sweden, Switzerland and Spain, as host country. From this meeting, the EJU has signed collaboration agreements with Denmark, Hungary, Czech Republic, Russia, Sweden, Switzerland and Serbia, while at the moment other countries, such as the UK and Luxemburg are preparing the agreement for the signature.

As a result of this internationalization of the Safe Fall-Safe School© the program has been formed and implemented in Denmark, Hungary, Italy, and Spain with very encouraging results. While the other countries that have signed the agreement are preparing to collect the first results between 2019 and 2020. At present, we can point out that the training of the program has been carried out on a sample of more than 22,800 schoolchildren, with a research sample of over 3,000 boys and girls.

All this work has been recognized with the „Science Award 2016" of the European Judo Union to the Research Group Physical Education, Health and Sport of the University of Seville for the development of the research projects presented here, *Adapted Utilitarian Judo* and *Safe Fall-Safe Schools*©.

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COMPARING JUDOKA EXPERIENCES OF ELITE SPORT SYSTEMS

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INTRODUCTION

Significant investment in elite sport systems such as human, physical and financial resources in the past decades, indicates the importance for nations to achieve in elite sport competitions globally and gain competitive advantage over counterparts that do not invest similarly (Goranova, 2014; Heckman, 2000). Benefits of such investment relate to the economic, political, social and reputational development of a country's image globally (Maguire, 2014). Professionalizing elite sport systems resulted in the need for highly structured and organized systems of athlete development that cater for specialized elite athletes capable of sustaining themselves sport performance (Agergaard & Ryba, 2014; De Bosscher, Shibli, van Bottenburg, De Knop & Truyens, 2010).

Effective utilization of resources to implement a holistic elite sport system is increasingly accounting for the success of elite athletes and teams (Smith & Smolianov, 2016). However, the context of the operating environment could significantly impact on the availability of resources (Böhlke & Robinson, 2009; De Bosscher, De Knop, van Bottenburg & Shibli, 2006) and therefore experiences of elite athletes. Elite sport systems should include professional human resources with structured athlete performance pathways, physical resources equipped with advanced technology, and athlete support at events and tournaments as well as career and financial incentives (Andersen, Houlihan & Ronglan, 2015; Böhlke & Robinson, 2009; Canadian Institute for Sport, 2014; De Bosscher et al., 2006). This concurs with the educational perspective of the human capital theory, indicating that education and training develops the skills and competencies of employees, that increases their capacity and therefore productivity that leads to higher wages (Nafukho, Hairston & Brooks, 2004). Although challenged by some critiques, the application of this theory lies in the education and development of elite athletes as resource to sustain high performance during competition.

Evidently, the experiences of athletes regarding the operating environment of elite sport systems will differ based on the context of the system, including benefits, access to resources and degree of professional service delivery. Judo is not different to this context as it is a modern Olympic sport with a substantial global footprint. More than 200 National Federations are affiliated with the International Judo Federation (IJF) (Ohlenkamp, 2006), representing the continental unions of Africa, Asia, Europe, Oceania and Panamerica (IJF, 2019). Due to judo being practiced globally by countries in developing and developed contexts, multiple contextual realities exist. The question therefore arises: How do the perceptions of judokas relate to the context of the elite sport system they participate in? This paper reports on an international comparative analysis of the experiences of judokas of elite sport systems in three countries (Netherlands, England and South Africa).

METHODS

The research followed a descriptive design with a concurrent mixed methods approach utilizing focus groups as qualitative and a self-structured questionnaire as quantitative research techniques. Focus groups were conducted with, and questionnaires completed by judokas, that constituted the qualitative and quantitative research techniques respectively. Results were triangulated to develop an in-depth understanding of the perceptions of athletes of the elite sport systems they participated in (Cresswell & Plano-Clark, 2007). In order to ensure gender representation and avoid bias, female and male elite judokas were selected through purposive sampling (Teddlie & Yu, 2007).

A self-designed questionnaire aimed to establish the experiences of judokas on categories of management of elite sport systems that included programme design and performance analysis, facilities and technology, and support services. A total of 104 elite judokas from South Africa (n=37), England (n=29) and the Netherlands (n=38) completed a questionnaire. In addition, qualitative data originated from three (3) focus groups with elite judokas from South Africa (n=8), England (n=7) and the Netherlands (n=8). A proportionally representative sample of male (61.5%), female (38.5%), junior (55.8%) and senior (44.2%) judokas participated in this study, providing contextually appropriate data.

The psychometric properties of the judokas' questionnaire revealed statistically significant results at the $p < 0.005$ levels. The Kayser-Mayer-Olkin (KMO) values for the respective scales were above the minimum recommended score of 0.6, and Cronbach's Alpha ranged from acceptable to excellent (above 0.8). In order to ensure trustworthiness of the qualitative data, criteria described by Shenton (2004) regarding credibility, transferability and confirmability was utilised.

RESULTS AND DISCUSSION

Programme design and performance analysis

Programme design and performance experiences of elite judokas consisted of measuring communication of training and competition programmes, as well as analysis of athlete and team performance at club and national level. A one-way analysis of variance (ANOVA) between these experiences of BJA, JSA and JBN elite judokas was conducted, revealing a statistically significant difference at the $p < .05$ level for the three groups with $F (2, 100) = 17.52$, $p = .00$. The actual difference in experiences between groups, using eta-squared was large (0.26). Post-hoc comparisons using the Bonferroni adjustment indicated that the mean score for the BJA elite judokas ($M = 4.38$, $SD = .49$) was significantly different from JSA ($M = 3.45$, $SD = .59$) and JBN ($M = 3.55$, $SD = .87$) elite judokas. No statistically significant difference existed between the experiences of elite judokas of JSA and JBN, although the mean score of JBN judokas was higher (see above). Differences in athlete experiences existed regarding clear communication of training and competition plans, regular monitoring and evaluation of training and competition performances, and national coaches providing detailed feedback on performances.

In support of the findings, South African judokas agreed that they were satisfied with information on how to qualify for the national team, however planning challenges were evident with one South African judoka stating that *„I know there are qualification tournaments for the Olympics, but I don't know how many, or exactly how to qualify"*. Another narrative from a South African judoka amplifies the uncertainty of the situation *„…my coach knows, so I rely on him to tell me"* referring to Olympic qualification.

In contrast, a judoka from England explained that: *„The BJA distributes the qualification criteria at the beginning of the Olympic cycle, so it's clear to us and our coaches, how to qualify. If anything changes, we are notified"*. Another judoka of England added that: *„There are compulsory qualification events, national training sessions, and national camps. We are also subject to testing at camps"*. Similarly, a Dutch judoka indicated that they *„… know how to qualify for the Olympic Games. The programme is explained to us, and I think you can get it from the website"*. Another narrative from a Dutch judoka indicated that: *„We have selection events that we must compete in, and there are national trainings that we must attend"*.

Öcal (2015) indicates that human resource, administrative, financial and employee performance should measure performance management in a professional context. Dutch and British judokas express confidence in the communication of a clear and goal-directed performance programme. South African judokas have a contrasting experience, expressing uncertainty and limited knowledge of their performance programmes.

Facilities and technology

Elite judokas were requested to indicate their experiences of the facilities and technology of their elite sport systems represented by the extent of access to a judo venue, strength and conditioning gymnasium, the use of technology during training and competition, and the quality of facilities. A one-way ANOVA was conducted between the experiences the three cohorts (JSA, BJA and JBN) of respondents. A statistically significant difference was reported between the experiences of judokas of facilities and technology at the $p < .05$ level for the three groups $F (2, 100) = 19.42$, $p = .00$. The actual difference in experience between judoka groups, using eta-squared was large measuring 0.28. Post-hoc comparisons using the Bonferroni adjustment indicated that the mean score for the BJA ($M = 4.72$, $SD = .36$) was significantly different from JSA ($M = 3.79$, $SD = .81$) and JBN ($M = 4.07$, $SD = .54$). Although no statistically significant difference existed between the experiences of JSA and JBN judokas, JSA judokas had a lower mean score than JBN as seen above. JBN were in the process of constructing an exclusive high performance center for judo in the area of Papendal at the time of the study, which may have impacted the results. Differences in elite judoka experiences existed regarding access to high quality judo training venues, strength and conditioning gymnasiums, and the extensive use of video recording technology during performance.

Substantiating the results, the majority of judokas from England agreed that they had positive experiences of the quality of training and support facilities at the British Judo Centre of Excellence. One England judoka indicated that: *„The strength training equipment and the dojo (place of judo training) are top quality"*.

The developed status of the Dutch and England elite sport systems arguably contributed to a more positive experience of judokas in this section. The relative absence of elite judo and strength and conditioning training facilities for JSA judokas could have influenced the use of technology, resulting in a more negative experience. This result confirms recommendations made by De Bosscher (2016), and Fletcher and Wagstaff (2009) that emphasize access to elite training facilities and the use of technology to enable successful athlete performances.

Athlete support

Elite judoka experiences of athlete support in their elite sport systems consisted of 18 items categorized through factor analysis into athlete club-level financial, national federation financial, career and sponsorship support as well as financial incentives. A one-way ANOVA between the experiences of the three groups revealed a statistically significant difference at the $p < .05$ level ($F (2, 100) = 15.78$, $p = .00$). The actual difference between the athlete support experiences of judoka cohorts (BJA, JBN and JSA), using eta-squared was large measuring 0.24. Post-hoc comparisons using the Bonferroni adjustment indicated that the mean scores for the experiences of BJA ($M = 2.45$, $SD = .73$) and the JBN ($M = 2.43$, $SD = .82$) judokas were significantly different from the experiences of JSA judokas ($M = 1.65$, $SD = .48$), indicating greater overall positive experiences of athlete support amongst BJA and JBN judokas than those of JSA. Significant differences existed in the experiences of elite judokas related to financial support at club and national federation level to cover costs of local and international training camps and tournaments. Other significant factors related to career support and financial incentives, including support from the national federation to secure a tertiary education, employment during judo careers, the provision of living accommodation, and offering financial incentives for peak performances. Finally, elite judokas from the BJA and JBN expressed more positive experiences regarding support through sponsorships than JSA judokas.

This narrative from an England judoka supported the positive experiences measured that were measured: *„We get considerable financial support when we are Olympic medal-winners and contenders"*. A similar situation exists in the Dutch context according to a judoka: *„We pay for some events, but not everything. When you are a top-level athlete, you get paid a salary"*. In the Netherlands, the JBN, Ministry of Education and Olympic committee strategically align their support, as explained by a Dutch judoka: „[They]…*allowed me time for training during*

the school day". However, in South one judoka explained his experience as *„…some of us get financial support from our clubs, but very few get support from JSA. Some get support through JSA for their tours, like Olympic players"*.

Results indicate that BJA and JBN judokas experience the support offered as more aligned to achieving international performance goals. The results are aligned with recommendations made by De Bosscher et al. (2006) and the Canadian Institute of Sport (2014).

CONCLUSION AND RECOMMENDATIONS

Based on the above, the context of elite sport systems could significantly influence the perceptions of judokas in elite sport programmes. Judokas from England and the Netherlands perceived their systems to be more appropriate, effective and efficient for its purpose with regards to programme delivery compared to the judokas from South Africa. Factors include the design, performance analysis, facilities and technology, and athlete support, including establishing, communicating, implementing and monitoring and evaluating performance goals and plans.

Where elements of elite sport systems are globally recognized to be broadly similar, the development and experiences of elite athletes should be managed within the contextual environment that the programme is implemented. These experiences of athletes should be managed through the appropriateness, effectiveness and efficiency of the programme to obtain expected results. This implies that the resources of the elite sport system should be managed contextually in order to create positive experiences for athletes.

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INTEGRATION OF JUDO ELEMENTS INTO OFFICIAL PLANS AND PROGRAMS AT POLICE COLLEGE IN ZAGREB AND THEIR EFFICIENCY - TRANSITIVE SCREENING

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INTRODUCTION

Martial arts program directed toward students who attend Police College, i.e. police officers is specific, comprised of many martial arts techniques (karate, judo, aikido), (Kosanović, 1988; Jozić, 2000; Jozić, Zečić, & Hržen-jak, 2011; Lucić & Gržeta, 2007; Sertić & Segedi, 2013), (Table 1). Elements of judo training with its own diverse structure, composed of offensive and defensive techniques either in a standing position or on the ground, are particularly favorable for improving and enhancing levels of students´ psychophysical preparedness, police officers as well. Judo as a modern martial sport has its unique history and philosophy, it is more than training body, since mind, spirit, character, moral and ethics are being continuously trained (Lascau & Callan, 2013). Elements of judo training, like posture, leverage, choking, various movement, grappling and holding techniques, defense against armed or unarmed assailant, influence positively on a level of students´ situational activities (Lucić & Gržeta, 2007; Sertić & Segedi 2013). Official program currently in force at Police College requires high level of physical readiness, team cohesion, team proceeding and fighting skills. These factors are indispensable during utilization of physical strength for rough conditions in which tasks are executed, therefore continuous inter-disciplined training is required (Jozić, Mendeš, Zidar, Lauš, Jozić, & Sertić, 2019).

Selection of elements for development of all needed abilities, working methods, distribution of elements, choice of methodological organizational form of work, site of work in various cycles of sport preparation of tactical employees will depend on specificity of police work and educational aims for Police College students. Students´ success and efficiency during their educational years and later in practice are determined by level and structure of various motor abilities, anthropometric characteristics and fighting skills (Jozić, 2003; Jozić & Zečić, 2012). Police college program for students includes, techniques, tactics of police proceedings, arrest and self-defense skills (Renden, Nieuwenhys, Savelsbergh, & Oudejans, 2016). Presented arrest and self-defense training elements should create prerequisites for risk identification in practice, in order to manage risk which can come up in various police proceedings.

The main objective of this paper is to determine efficiency of four-month-long special physical preparation training of students attending Police College programs.

METHODS

Participants

This research was conducted on a random sample consisted of twenty students attending police college on a part-time basis. Data collected during test sessions will be used in planning effective training programs for shock and ordinary micro-cycle activities.

Sample of variables

In research of efficiency and training treatments, all subjects were tested applying a set of eight variables evaluating motor abilities. Following tests were used: test for evaluation of flexibility (SAR), standing long jump (LJ), pull ups (PLU), push ups in 1 minutes (PU), sit ups in 2 minutes (SU 2 min), bench press at 70% of body weight (Bench 70%), squats in 60 seconds (SQ 1min), double-leg vertical jump (VJ) and two anthropological measures, as well (Mišigoj-Duraković, 2008), body height and body weight (Metikoš et al., 1989.; Jozić, 2003, Jozić, 2004; Jukić et al., 2008).

Description of specifically targeted programs for specialized training

Part-time students are trained in accordance with official programs composed of judo elements, police self-defense and trainings that were dominated by modern methodical organizational forms of work, like stage training, circuit methodical organizational form of work, contemporary methodical organization form of work using free weights (which creates work-out of greater intensity), training simulators, kettlebells, all commensurate with police officers´ individual characteristics.

Program is based on selection of elements for improvement of adaptive and specific fitness abilities of police officers. It means that on special physical preparation trainings intensity prevail over extensity. In order to improve maximal strength we use loads at 60-100% for 1RM. Domineering type of training in police force, as well as in army is based on a rule „train the way you fight", meaning that training is specific and situationally characterized, (Šalaj & Šalaj, 2011). During special physical preparation the emphasis is on team proceedings, speed of performing specific police self-defense techniques, elements of judo, creation of specific tactics for team, unit and platoon proceedings, altogether with the aim of increasing level of intrinsic motivation, controlling anger and emotional tension occurred during situational proceedings in a practice, thus increasing students´ adaptive skills.

Table 1. Elements of overall program for students attending Police College in Zagreb

No	Training themes: **RUNNING AND ELEMENTS OF FITNESS**	Frequency
1	40-m dash running	15
2	100-m dash running	10
3	Intermitted running up to 2400 m	6
4	Intermitted running up to 3200 m	4
5	Intermitted running up to 8000	3
6	Pull ups 1-3 min	20
7	One-legged hop	8
8	Parallel bar dips	15
9	Kettlebell	10
10	Sit ups	5
11	Rope climbing with legs and hands techniques	6
12	Infantry polygon with obstacles	8
13	Pentathlon elements	12

14	„Sparring" in standing position and on the ground (Randori; Combat and fighting practice, closely mimics competitive situational elements)	15
15	Joystick grip pull ups (Galvao and Howell, 2010)	18

	Training themes: **JUDO BREAKFALLS**	
16	Front break falls	10
17	Back break falls (*)	10
18	One-sided break falls (*) (*) pre-exercises for judo break fall techniques: supine position, sitting, kneeling and squatting position	10
19	Judo break falls with lifting and standing in stance; squat&elbow sprawls, front break fall (Zempo Tenkai), left-sided and right-sided break falls (Yoko Ukemi), back break fall (Ushiro Ukemi)	15

	Training themes: **JUDO THROWING TECHNIQUES *BASICS OF COMBAT (judo)***	
20	Judo, a foot technique throw – o soto gari (large outer reap), deashi harai (body drop)	10
21	Judo, hand technique throw – tai otoshi (body drop)	10
22	Judo, a hip technique throw; Koshi – guruma (hip wheel)	10

	Training themes: **SELF-DEFENSE ELEMENTS *SELF-DEFENSE – unarmed assailant***	
23	Defense against hand strikes	10
24	Defense against leg strikes	10
25	Defense against chokes	10
26	Defense against grappling	10
27	Defense against assailant who holds your weapon	10
28	Physical control hold	15
29	Leverage (elbow, wrist and arm joint)	20

	SELF-DEFENSE – defense against armed assailant	
30	**Defense against stick attack**	10
31	Defense against a knife attack (coming from the top, side and from under, defense against a straight stab in the stomach, suppression of a knife attack to other person)	12
32	Defense against pistol attack (defense against underarm pistol attack, defense against attack with pistol in-holster at the front, defense against attack with pistol in-holster behind)	10
33	Combat situations trainings Jozić (2002), Jozić, & Mendeš (2010).	10

	CLOSING PART OF TRAINING: 5 minutes	
34	**Stretching elements**	10
35	Elements of autogenic training, Kwatsu medicine of judo, Momirović and Sviben (1960)	15

Methods of processing data

Descriptive statistical parameters will be calculated as follows:

- arithmetic means (Ar.M.); - standard deviation (S.D.); - maximal result (Max);
- minimal result (Min); - skewness-measure of asymmetry (a3); - Kurtosis – measure of „peakedness" (a4).

RESULTS AND DISCUSSION

Table 2. Descriptive parameters for transitive screening.

	N	Ar.M.	Min	Max	S.D.	a3	a4
BH	20	183,45	174,00	196,00	5,52	0,34	0,36
BW	20	90,25	70,00	117,00	12,29	-0,06	0,14
SAR	20	80,48	70,60	95,00	7,03	0,39	-0,72
LJ	20	226,33	170,00	270,00	27,24	-0,34	-0,72
SU 2 min	20	62,45	40,00	100,00	17,49	0,78	-0,12
PLU	20	8,55	0,00	20,00	5,95	0,58	-0,85
BENCH 70%	20	16,35	1,00	55,00	12,96	1,30	2,84
PU 1 MIN	20	31,85	14,00	57,00	11,07	0,36	-0,08
VJ	20	44,45	35,67	59,00	5,88	0,80	0,41
SQ 1 MIN	20	43,75	30,00	65,00	9,37	0,47	-0,17

Body height (BH), body weight (BW), sit and reach (SAR), double-leg long jump (LJ), sit-ups (SU), pull-ups (PLU), bench press at 70% of body weight (Bench 70%), push-ups in 1 min. (PU 1min), double-leg vertical jump (VJ), squat (SQ) in 1 min.

Table 2 show basic descriptive parameters of a group of part-time students attending Zagreb Police College. Concerning the results presented in Table 2, we can see descriptive statistics for anthropometric and motor variables, arithmetic means (Ar.M), minimal results (Min), maximal results (Max), standard deviation (S.D.), skewness – measure of asymmetry (a3) and Kurtosis – measure of curvature (a4), Dizdar (2006). Data were processed by statistical package „Statistic for Windows 9.0".

Obtained results presented in Table 2 show basic descriptive parameters of the first-year part-time students in transitive testing. Students demonstrated relatively good development of motor abilities (Table 2, descriptive parameters), their results belong to average and above average category when compared to established standards for Croatian army members (Jukić et al., 2008), and intervention police members, In-service programs, book 1, Command of Intervention police, (2013), and this is outcome of regularly conducted aerobic training and high level of intrinsic motivation for training and specialized training.

Lower limb flexibility in first-year part-time students is important because it increases amplitudes of movements and in some situations can be used as a tool, or prevention training for athletes as well as police officers, tactical employees, Scofield and Kardouni (2015). Average result obtained on a flexibility test was 80.48 cm, and belongs to category of higher result than result obtained by Croatian army members (Jukić et al., 2008), probably because part-time students were taller than members of Croatian army. Results obtained on a flexibility test indicate that part-time students in their structure of moving will be „softer", more economical and situationally more successful, taking individually or as a team, so they will more easily and rationally perform all elements of

police self-defense, aerobic and anaerobic tests, and probably achieve desired potentials in many other motor abilities as well as in fighting skills in a faster and easier way. Based upon the test results for evaluation of explosive jumping strength of part-time students attending the second semester of the first year, whose average result for double-leg long jump was 226.33 cm (Table 2, descriptive statistical parameters), we can annotate that these entities achieved desired level of lower limb explosive jumping strength.

Average results of mentioned test indicate that part-time students obtained almost identical results as Croatian army members, i.e., recruit, they are also better than military pilots but weaker than members of special units of Croatian army (Jukić et al., 2008). Test results for evaluation of explosive jumping strength, measured by double-leg long jump distance, in this paper, indicate that good result achieved in this exercise can be used as a good predictor for criterial, dependable variable, that is, successful performance of firearm shooting, according to Đuranović (2009).

Tests for evaluation of repetitive strength, both sit ups in 2 minutes and pull ups until failure, showed good level of repetitive strength of arm musculature and shoulder area, abdominal and trunk musculature when compared to tactical employees, (Dawes et al., 2014). Comparing results obtained by part-time students attending the second semester of the first year, to part-time S.W.A.T. team members who are occasionally engaged in S.W.A.T. operations, we found that students have almost identical level of repetitive strength of arm musculature and shoulder area, whose average obtained result was 8,55 pull ups (Table 2, descriptive parameters).

Test results for evaluation of repetitive relative strength of arm musculature and shoulder area (bench 70%) point to good repetitive relative strength of arm musculature and shoulder area of the first-year part-time students, but with observation that there are entities who can lift 70% of their body weight only once. Considering results it can be said that official and individual program should have following: training elements for development of entities´ repetitive relative strength of arm musculature and shoulder area, needed number of judo throwing together with additional exercises with weights, kettlebells and, of course, lot of sparring in standing position and on the ground.

Test for evaluation of explosive jumping strength, i.e. double-leg vertical jump test, shows relatively good development of lower limb explosive force, and with average result of 44.45 cm (Table 2, descriptive parameters), according to domestic authors, belongs to category of acceptable results. Presented result is superior to result obtained by Croatian army recruits, but worse than result obtained by special military teams and Croatian military pilots (Jukić et al., 2008), and also worse than explosive jumping strength results obtained by part-time students attending the second-year at Police college, whose average result was 51,16 cm, (Jozić et al., 2019).

CONCLUSION

Results collected by diagnostic procedures point to good level of motor abilities of part-time students attending the second semester of the first year. Tested students demonstrated well developed explosive jumping strength of lower limbs, with average result of 44.45 cm, which is considered as a good average result when compared to the established standard results for Croatian army members, (Jukić et al., 2008). Considering the test results of lower limbs explosive strength, (Table 2), it can be concluded that part-time students have desirable level of lower limbs explosive strength, as can be seen by obtained results of double-leg long jump where average measured distance was 226.33 cm. Presented result is at the same category as Croatian army members, (Jukić et al., 2008), and worse than results of members of Special task unit of Intervention police, In-service programs (2013), implying that only some students are able to pass the highest level of the test for explosive power of lower limbs, enabling them to be accepted in special police unit, (Šalaj & Šalaj, 2011). In special police forces maximum required value to be obtained on explosive power test of lower limbs, i.e. double-leg long jump, is 260 cm, and has been applying during annual testing.

Results of double-leg vertical jump are at the same level as results obtained by Croatian army members but in some cases they were a little bit higher. Therefore, we can be satisfied with obtained results of initial testing, where the average result was higher than 51 cm (Table 2), with some excellent individual results. Test results show acceptable level of explosive jumping strength of part-time students attending the second year of education.

Results of initial training indicated relatively good, but not enough developed relative repetitive strength of arm musculature, shoulder area (pull ups with the 8 repetitions), (Table 2) and trunk (sit-ups in 2 min), altogether substantial in performing official duties (Mendeš et al., 2018); these can be upgraded with application of judo training (Sertić & Segedi, 2013) and police self-defense, (Jozić, 2002; Jozić et al., 2019; Jozić & Mendeš, 2019). Current physical fitness of students indicates necessity of reinforcing special physical preparation program with elements for improving arm musculature, shoulder area and trunk as well. Important roles in special physical training should belong to training with kettlebells and free weights, according to Jozić & Zečić (2012), and monitoring officers´ progress by following tests: bench press at 70% of body weight and pull-ups on bars and quality performance of different police tactics, arrest and self – defense skills, according to Renden et al., (2016).

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ANALYSIS OF UNSUCCESSFULLY PERFORMED THROWING TECHNIQUES BY SENIOR MALE COMPETITORS AT BOSNIA AND HERZEGOVINA STATE CHAMPIONSHIP

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INTRODUCTION

Judo combat is an intense and dynamic activity, where competitors try to successfully apply specific throwing techniques (Kajmović, Rađo, & Mekić, 2011) in interaction. Competitors have to create uncertainty (create action-reaction) and have to attack and defend in the same time (Calment, et al., 2015; Franchini, et al., 2008). Judo consists of great number of different throwing techniques (Daigo, 2005), but only a number of them is efficiently applied during competitions. Usually, the competitors organize a system of attacks in which the number of attacks varies between 4 and 8 attacks (Franchini, et al., 2008). In order to determine which throwing techniques and techniques on mat are the most efficient during competitions, performances of competitors at different levels of competitions were analyzed (Kajmović, et al., 2017; Kajmović, & Rađo, 2016; Miarka, et al., 2014; Kajmović, Rađo, & Kapo, 2007), and the results were applied in the training process. However, the competitors have a great number of failed attempts when implementing efficient throwing techniques due to certain reasons, i.e. errors. One can say that no one champion has won one competition with only one throw (Calment, et al., 2015). These throws are unsuccessful because they could not achieve specific Ippon or Waza-ari score, in accordance with the criteria defined by the International Judo Federation rules, which at certain moments forced judges to punish contestants for false attacks. Strategy used by the competitor on competition are: to attack to create uncertainty within the opponent, to create and use action-reaction and to attack to win time (Calment, et al., 2015).. A number of scientific research have shown a much clearer picture of the error problem during the performance of certain throwing techniques (Gutiérrez-Santiago, et al., 2009, Gutiérrez-Santiago, et al., 2013, Prieto, et al., 2013, Prieto, et al., 2014; Prieto, et al., 2016). In addition, errors that occur during the performance of the throw can contribute to injuries among competitors (Prieto, et al., 2014), and for this reason, knowing errors that occur during the performance of the throwing technique, both during the competition and training, can lower their number. Among strategies, there are false attacks when a competitor fails. We need to know if this failure could create injury or pathology. The aim of this research is to analyze unsuccessfully performed throwing techniques, as well as the reasons why they were unsuccessful among senior competitors attending the Bosnia and Herzegovina State Judo Championship held in 2017.

METHODS

Subjects

The sample of subjects consists of a sum of n = 253 unsuccessfully performed throwing techniques by senior competitors in all seven weight classes.

Variables

- Successfully and unsuccessfully performed throwing techniques
- Unsuccessfully performed sub-groups of throwing techniques: leg (ASHI), hand (TE), hip (KOSHI), rear sacrifice technique (MA SUTEMI) and side sacrifice technique (YOKO SUTEMI)
- Unsuccessfully performed individual throwing techniques

Procedure

Data for this research was collected from the video of the unsuccessfully performed throwing techniques from the Bosnia and Herzegovina Senior State Judo Championship held in 2017. Three Sony video cameras were used to record each individual competition area. The two observers were tasked to look at each unsuccessful technique three times in order to ensure that the analyzed unsuccessfully performed throwing technique was the accurate technique as well as the errors that occurred during throwing attempts. The data was entered into the prepared protocols for tracking unsuccessful throwing techniques.

Statistical analysis

All unsuccessful throwing techniques are presented with the frequencies and percentage values (%).

RESULTS

The results of this research have shown that seniors at the Bosnia and Herzegovina State Judo Championship have a much greater number of unsuccessful throws (68,7%) than successfully executed throwing techniques (31,3%) (Figure 1). In Figure 2., the largest number of unsuccessful attempts for throwing techniques is from the foot techniques group (Ashi) 38,1% and hand (Te) 29,4%, rear sacrifice technique (Ma Sutemi) 17,1%, side sacrifice technique (Yoko Sutemi) 8,7% and hip technique (Koshi) 6,7%.

The greatest number of unsuccessfully performed throwing techniques refers to the following techniques: Ippon Seoi Nage, Uchi Mata, Tomoe Nage, Seoi Nage etc. (Table 1).

Figure 1. Percentages of successfully and unsuccessfully performed throwing techniques.

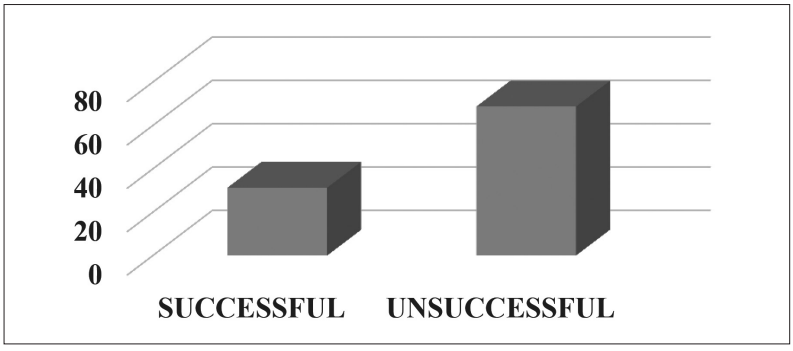

Figure 2. Percentages of unsuccessfully performed throwing techniques sub-groups in judo.

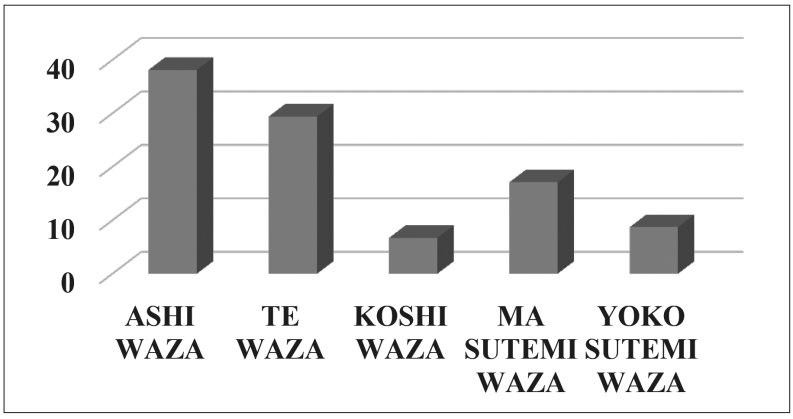

Table 1. Percentages of unsuccessfully performed judo throwing techniques.

Techniques	%
Ippon Seoi Nage	19,8
Uchi Mata	18,2
Tomoe Nage	11,9
Seoi Nage	8,7
O Uchi Gari	8,7
O Soto Gari	5,5
Sumi Gaeshi	5,1
Yoko Tomoe	3,9
Harai Goshi	2,8
Tani Otoshi	2,4
De Ashi Barai	2,0

DISCUSSION

The results of this analysis helped to fully realize the defined goal of this research, whose aim was to determine the most successful throwing techniques and the reasons for the unsuccessful throw. The errors that occur in the throwing techniques (Table 1) differ depending on the throwing technique used. In general, the most common reasons for failure during the attempt to perform a throw are: the competitors lose the established grip while performing the throw, the insufficiently unbalanced opponent in the first stage of the throw (Kuzushi), during the Ippon Seoi Nage, Uchi Mata, Seoi Nage, Harai Goshi techniques the hand (Hikite) holding the opponent's sleeve does not pull forward, but is next to the Tori's body, the Tori's insufficient rotation during the execution of the throw, the attempt to carry out the attack without preparation, the attack begins at a great distance, the Uke's weight is not supported by the leg that is to be attacked by a certain judo technique, so Uke has the ability to evade attacks and switch to a counter attack. These observations are important and they should give us explanations to avoid injury or pathology. During the rear sacrifice technique Tomoe Nage, which is the third unsuccessful technique, the most common errors are that the Tori is not pulling the Uke towards him, his arms are by his body, his foot used to step forward to Uke is set away from his feet, and the Tori's hips are away from his feet. It is noticeable that after the unsuccessful use of Tomoe Nage, Tori attempts to apply the Ude Hishigi Juji Gatame armlock, which was also unsuccessfully performed. Several authors have investigated errors in various throwing techniques. Gutiérrez-Santiago, et al. (2009) conducted research whose purpose was to provide a tool, based on the knowledge of technical errors, which helps to improve the teaching and learning process of the *Uki Goshi* technique. The results show that the absence of a correct initial unbalancing movement (45,5%), the lack of proper right-arm pull (56,8%), not blocking the receiver's body (*Uke*) against the attacker's hip -*Tori*- (54,5%) and throwing the *Uke* through the *Tori*'s side are the most usual errors (72,7%). They have concluded that not blocking the body with the *Tori's* hip provokes the *Uke's* throw through the *Tori*'s side during the final phase of the technique (95,8%), and positioning the right arm on the dorsal region of the *Uke's* back during the *Tsukuri* entails the absence of a subsequent pull of the *Uke's* body (73,3%).Gutiérrez-Santiago, et al., (2013) studied the most common technical errors, and their behavioral sequences, in the judo throw *Morote Seoi Nage*. The results showed that a sub-optimal knee bend produces a throw around the side rather than over and towards the front of the shoulder, an inadequate hip and trunk position, caused by prior incorrect placement of the left foot, leads

to a failure of weight bearing, which itself is the cause of the side throw. Prieto, et al. (2013) concluded the most frequent technical errors, and their associated behavioral sequences, in the judo throw *O-soto-gari*, proposing improvements to the way in which judo is taught and learnt. The most common errors were related to the initial failure to put the adversary off balance, to an incorrect position of the supporting foot and of the pectoral area, to an incorrect reaping action, to insufficient traction and incorrect direction of the arms in the final part of the throw, and to insufficient trunk flexion in the final stage. Prieto, et al., (2014) studied errors in the teaching-learning process of judo techniques: Osoto-Guruma, and the aim of this article was to suggest some changes in the teaching-learning process methodology of the judo osoto-guruma technique, establishing the action sequences and the most frequent technical errors committed when performing them. They identified following errors: the presence of typical inaccuracies during the technique performance; a number of errors affecting body balance, the position of the supporting foot, the blocking action and the final action of the arms. Prieto, et al. (2016) conducted a study whose aim was to detect the most frequent errors and their associated behavioral sequences in relation to the judo technique Ouchi-gari, the ultimate objective being to propose improvements to the way in which judo is taught. The most common errors detected were related to an initial failure to put the adversary off balance, an inadequate position of the right arm, an incorrect positioning of the face and trunk, the height of the center of gravity during the *Tsukuri* and *Kake* phases of the throw, insufficient traction effect of both arms in the final phase of the throw, and an incorrect reaping action. The reasons for unsuccessful throws can be found in: Beginners' mistakes during the learning process of the throwing technique, which the trainers did not correct at the early stage of judo technique learning, which is reflected at the senior competition. Then, in the inability to switch from school techniques to situational competition techniques. Finally, the creation of a low torque during the body rotation when performing the throw, which points to the insufficient fitness preparation of the contestants for this competition. It is obvious that, based on this research, and research by other authors who dealt with the problem of errors in the execution of the throwing technique, it is necessary to focus more seriously on correcting the errors using new motor tasks and technologies during training.

CONCLUSION

The data collected during the Bosnia and Herzegovina State Judo Championship held in 2017. year, on the number of unsuccessfully executed throwing techniques and the reasons that led to their failure, as well as the senior's mistakes, can help trainers innovate the training process with the intention of eliminating errors in the performance of throwing techniques.

These errors are not always caused by Tori because Uke is defending and the throw can fail because of Uke as well, not only because of Tori. Coaches have the ability to eliminate these errors in throwing techniques among younger age categories, and thus make long-term contributions to make competitors more efficient at competitions with as few errors and injuries as possible.

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PARENTS ATTITUDE TOWARDS JUDO

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INTRODUCTION

In these times of increasing popularity of judo sport, it is necessary to know why children choose judo as their sport activity and how we can encourage them even more to participate and stay in judo as a sport that benefits their development. A big role in that is played by the parents and their attitude towards judo.

In social psychology, attitude is defined as an evaluation of people, objects or ideas. The psychological structure of an attitude is made out of three components: cognitive (knowledge about the attitude object), emotional (emotional reactions towards the attitude object) and behavioral (behavior towards the attitude object) component (Aronson, Wilson & Ackert, 2005).

Although all attitudes have the said components, they are not all formed in the same way and every attitude can be founded more on one type of experience than on the other. Attitudes are not innate, but highly dependent on experience, the group to which an individual belongs to and informations an individual is exposed to, furthermore every new situation and outside influence can affect the strengthening or change of an attitude towards someone or something (Zvonarević, 1981).

To be able to plan a certain activity, we need to know the attitude of the people towards that activity. Thus, there are already different measuring instruments for attitude evaluation towards specific sports available: the scale for attitude evaluation towards combat sports (Bosnar, Sertić & Prot, 1996), the scale for general attitude evaluation towards football (Bosnar & Benassi, 2008), the scale for attitude evaluation towards sailing (Prlenda, Oreb, Kostanić, 2010) and so on. In regards to judo, there is only one measuring instrument that evaluates the attitude towards judo constructed up to this date (Žanetić, 2018).

The aim of this study is to determine the attitude of parents of young judoka towards judo sport, the reasons as to why they signed up their children to judo practices and the contentment with the choice of judo as a sport activity for their children, as well as determine the differences in said values between mothers and fathers.

METHODS

The measurement was carried out on a sample of 243 parents of young judokas coming from one judo club in Zagreb, out of which 145 were women and 98 were men. The scale used in this study represents a modified version of the scale of attitude towards judo evaluation (Žanetić, 2018) in a sense that it is adapted to the population which is measured. To be specific, the original scale was constructed with the aim of measuring the population that had a contact with judo sport and the subjects had tried judo classes and were well-informed about it. As a different population is being processed in this study, namely the parents of the children that practice judo, some items on the scale were redundant and would not give useful information, so they were removed. On the other hand some items regarding parenting and the children themselves were added, just as items related to the reasons of signing the children up for judo practices and the outcomes of their practicing of judo sport. The scale was designed as an online questionnaire where general information about the subjects is gathered in the first four items of the scale, and further 58 items measure the attitude towards judo, reasons of signing the children up for judo practices and the outcomes of their practicing of judo sport. The items are graded on a Likert scale from 1 – I completely disagree to 5 – I completely agree.

Frequencies, means, standard deviations and minimal and maximal given responses were determined for every item on the scale. Afterwards the differences in answers between men and women were determined with the t-test for independent samples. All data was processed with the standard package of STATISTICA programme.

RESULTS AND DISCUSSION

Table 1. Frequencies (f), means (AS), minimal given response (min), maximal given response (max) and standard deviations (SD) of all answers.

Item	f	AS	min	max	SD
I am very knowledgeable about combat sports	243	2,19	1,00	4,00	0,95
I am very knowledgeable about judo sport	243	2,23	1,00	5,00	0,89
I am very knowledgeable about the rules of judo sport	243	2,14	1,00	5,00	0,89
I love to watch judo bouts	243	3,58	1,00	5,00	1,17
Judo is a sport suitable for all ages	243	4,45	1,00	5,00	0,90
Only wild and aggressive people practice judo	243	1,09	1,00	5,00	0,42
When judo is on TV, I switch the programme	243	2,28	1,00	5,00	1,19
Judo develops people, not just physically but their personality traits as well	243	4,48	1,00	5,00	0,95
I would never practice judo	243	1,87	1,00	5,00	1,21
Women that practice judo are mannish	243	1,45	1,00	5,00	0,98
Judokas are just right, calm and composed individuals	243	3,96	1,00	5,00	1,05
I could not practice judo out of fear of hurting someone	243	1,61	1,00	5,00	1,04
I value and respect judokas very much	243	4,48	1,00	5,00	0,83
Judo is a skill in which the goal is to injure your opponent	243	1,08	1,00	5,00	0,44
Judo is an exciting sport in which something exciting can happen at any moment	243	3,94	1,00	5,00	1,00
People wearing a kimono look very funny	243	1,15	1,00	5,00	0,60
I consider judo much less applicable than other combat sports	243	1,30	1,00	5,00	0,72
Judo is incomprehensible and boring	243	1,31	1,00	5,00	0,75
Judo is great because it teaches us to defend ourselves in the best possible way	243	4,19	1,00	5,00	0,98
I would prefer it if my child practiced some other sport	243	1,38	1,00	5,00	0,78
Practicing judo develops self-confidence and character	243	4,71	1,00	5,00	0,69
Judo is a noble skill in which fighters respect each other	243	4,71	1,00	5,00	0,69
I am happy that my child chose judo as his/hers sport activity	243	4,76	1,00	5,00	0,67
Judo elements should be practiced on physical education classes in schools	243	4,54	1,00	5,00	0,79
Judo should not be on the Olympic programme	243	1,15	1,00	5,00	0,62
I do not understand judo rules at all and I am not interested in them	243	1,95	1,00	5,00	1,07
When there is a judo tournament nearby, I always go watch it	243	2,60	1,00	5,00	1,10

Judo requires a lot of dedication and effort, which positively develops personality traits	243	4,63	1,00	5,00	0,69
It gives me pleasure to overcome an opponent with my abilities	243	4,44	1,00	5,00	0,84
I do not approve of judo as a sport activity for my child	243	1,06	1,00	5,00	0,32
Judo is an interesting sport in which everyone has the same opportunity for progress	243	4,30	1,00	5,00	0,90
I consider judokas cruel and arrogant	243	1,10	1,00	5,00	0,44
Everyone should try to practice judo at one point in their life	243	3,68	1,00	5,00	1,09
Judo is not good because it favors one specific type of people	243	1,31	1,00	5,00	0,70
Judo is much more interesting than other combat sports	243	3,10	1,00	5,00	1,00
I do not find judo interesting at all, it is a lame sport	243	1,35	1,00	5,00	0,79
Judo is great because it encourages children's growth and development in the right way	243	4,64	1,00	5,00	0,74
I respect judo as an Olympic sport	243	4,74	1,00	5,00	0,75
I signed up my child for judo because I consider judo an excellent sport for the overall child development	243	4,79	1,00	5,00	0,65
I signed up my child for judo because I want my child to learn how to defend himself/herself from an attacker	243	3,60	1,00	5,00	1,23
I signed up my child for judo because I want him/her to become stronger and more coordinated	243	4,63	1,00	5,00	0,74
I signed up my child for judo because judo practices are held in the school that my child is attending	243	3,38	1,00	5,00	1,56
I signed up my child for judo because he/she can attend judo practice immediately after school, which suits us	243	2,65	1,00	5,00	1,59
I signed up my child for judo because some of his/her friends were already attending judo practices and he/she wanted to join them	243	2,11	1,00	5,00	1,45
I signed up my child for judo because he/she saw the presentation/poster in school and got interested in judo	243	2,70	1,00	5,00	1,65
I signed up my child for judo because I saw an advertisement for judo on social media	243	1,67	1,00	5,00	1,06
I signed up my child for judo because my child needs discipline, which he/she will develop on judo practices	243	2,74	1,00	5,00	1,49
I signed up my child for judo because other parents recommended it to me	243	2,46	1,00	5,00	1,51
I signed up my child for judo because I heard that the coach is excellent with children	243	3,09	1,00	5,00	1,57
I signed up my child for judo because I think he/she can achieve big results in competitive judo	243	2,09	1,00	5,00	1,17
It is important to me that my child achieves top results in judo	243	1,57	1,00	5,00	0,90
I expect my child to attain the black belt in judo one day	243	2,04	1,00	5,00	1,21
I always accompany my child to his/her competitions and cheer for him/her	243	4,57	1,00	5,00	0,88

Practicing judo has a positive impact on my child	243	4,78	1,00	5,00	0,57
My child behaves better ever since he/she started practicing judo	243	3,37	1,00	5,00	1,14
My child got better at studying ever since he/she started practicing judo	243	2,94	1,00	5,00	1,12
My child returns fulfilled from judo practices	243	4,65	1,00	5,00	0,68
My child is very interested in judo	243	4,27	1,00	5,00	0,88

From the results in the first table we can see that all items have a full distribution of answers except for the first one „I am very knowledgeable about combat sports" which shows us that our examinees are very diverse but that none of them consider themselves very knowledgeable about combat sports, although some of them do consider themselves knowledgeable about judo sport and judo rules. From the stated informations we see that parents generaly have a positive attitude towards judo and towards their children practicing judo. In the results of the first three items we notice that most parents do not have a high level of knowledge about combat sports nor judo so we can conclude that they recieve most informations about judo from their children and their interaction with coaches. The fact that people who do not know this sport in detail, most often get a very good opinion about it represents an excellent platform for judo brand marketing. We notice that the reasons of signing the children up for judo practices are more oriented towards the fact that parents find judo usefull and a high-quality sport for their children, while also valuing more that their child is satisfied and happy on practices than that he/she achieves competitive results, which is all best presented in answers on items „It is important to me that my child achieves top results in judo", „I signed up my child for judo because I consider judo an excellent sport for the overall child development" and „My child returns fulfilled from judo practices". Emphasis on the pedagogical line of judo as opposed to the exclusively sportsmanlike one was the main idea of the founder of judo – Jigoro Kano and in these answers we can notice the success in that field.

Table 2. T-test independent samples by gender. Means for women answers (AS Ž), means for men answers (AS M), standard deviations for women answers (SD Ž), standard deviations for men answers (SD M), p-value (p) and t-value (t) of all item asnwers.

Item	AS Ž	AS M	SD Ž	SD M	p	t
I am very knowledgeable about combat sports	1,95	2,54	0,84	1,01	0,00	-4,96
Only wild and aggressive people practice judo	1,02	1,18	0,14	0,63	0,00	-3,00
I would never practice judo	2,06	1,58	1,33	0,95	0,00	3,08
I could not practice judo out of fear of hurting someone	1,74	1,43	1,14	0,84	0,02	2,30
Judo is a skill in which the goal is to injure your opponent	1,03	1,15	0,30	0,58	0,04	-2,09
I consider judo much less applicable than other combat sports	1,20	1,45	0,56	0,89	0,01	-2,68
Judo is a noble skill in which fighters respect each other	4,78	4,60	0,58	0,81	0,05	1,98
Judo elements should be practiced on physical education classes in schools	4,66	4,37	0,70	0,88	0,00	2,90
I do not approve of judo as a sport activity for my child	1,02	1,11	0,14	0,47	0,03	-2,19
I consider judokas cruel and arrogant	1,02	1,21	0,14	0,66	0,00	-3,41
Judo is much more interesting than other combat sports	3,21	2,94	1,01	0,96	0,04	2,07
I signed up my child for judo because I consider judo an excellent sport for the overall child development	4,86	4,69	0,47	0,84	0,05	2,00

I signed up my child for judo because I want him/her to become stronger and more coordinated	4,73	4,49	0,63	0,86	0,01	2,52
I signed up my child for judo because he/she can attend judo practice immediately after school, which suits us	2,84	2,37	1,60	1,54	0,02	2,30
I signed up my child for judo because I heard that the coach is excellent with children	3,34	2,73	1,56	1,52	0,00	2,99
I signed up my child for judo because I think he/she can achieve big results in competitive judo	2,22	1,90	1,24	1,05	0,04	2,12
I expect my child to attain the black belt in judo one day	1,88	2,27	1,13	1,28	0,02	-2,45
My child returns fulfilled from judo practices	4,73	4,54	0,60	0,76	0,03	2,16

In the second table the results of answers on specific items in which a statisticly significant difference between men and women answers was found are shown. We can notice that women would want to practice judo on a smaller scale than men and that they have a somewhat bigger fear of injuries in judo. We can attribute that to a somewhat more negative attitude of women towards combat sports as opposed to men attitude towards combat sports, which was shown in some other studies as well, as stated by Šarić (2016) and Prot & Radić (2010). On the other hand we notice that although both men and women have mostly positive opinions about judokas, men find them to be arrogant and aggressive a bit more, as seen in items „Only wild and aggressive people practice judo„ and „I consider judokas cruel and arrogant". Interesting results are found in the item „Judo is much more interesting than other combat sports" where we see that women agree with that statement significantly more than men, probably because judo is much less violent than other combat sports in which men probably take more pleasure in. Both men and women consider judo excellent for overall children development and we notice that women pay more attention to it when signing up their children on judo practices. Women consider that their children can achieve higher results in judo on a somewhat bigger scale, while men expect their children to persist and achieve a black belt in judo significantly more.

CONCLUSION

This study gives us a lot of usefull information about the attitude of parents of young judoka towards judo and about the reasons of signing up children to judo practices. We can conclude that parents of young judoka have a mostly positive attitude towards judo. We also notice that they are not very familiar with judo rules or judo sport in general, but nonetheless they have a very good opinion about it which is shown to have a key role in signing up children on judo practices. We see that recommendations from other parents and different judo club advertisments play a role in making people interested in signing their children up for judo, still the biggest reasons of signing them up are the positive aspects of judo and its positive influence on children. Likewise, significant differences between mothers and fathers in answers to different items have been found, which opens up possibilities of different approaches by which the judo sport can be brought closer to parents so they would sign their children up for judo practices. Informations obtained in this study can help us increase the number of children practicing judo and in that way spreading this exceptional sport, which by itself enables a further positive sport development course.

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THE INCREASING IMPORTANCE OF ASHI WAZA, IN HIGH LEVEL COMPETITION. (THEIR BIOMECHANICS, AND SMALL CHANGES IN THE FORM)

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EJU Scientific Commission

UPDATING TECHNICAL INFORMATION

In these last times, in high level competition, the use of Ashi Waza is increased, probably due to the new referee regulations. See Tab 1,2,3,4, in both functions as winning techniques and /or most used also

Table 1. Winning techniques at Olympic Rio 2016 (Female) *[1]* (Personal Elaboration)

Rio Olympic 2016 Winning Nage Waza (Female)		
Te Waza	15	20%
Ashi Waza	32	**42% (25%)***
Koshi Waza	16	22%
Ma sutemi	1	0,01%
Yoko Sutemi	12	16%
Lever	44	58%
Couple	32	42%

Table 2. Winning Techniques at Olympic Rio 2016 (Male) *[1]* (Personal Elaboration)

Rio Olympic 2016 Winning Nage Waza (Male)		
Te Waza	42	27%
Ashi Waza	55	35% **(24%)***
Koshi Waza	29	19%
Ma sutemi	16	10%
Yoko Sutemi	14	9%
Lever	101	65%
Couple	55	35%

Table 3. Winning Techniques at Olympic Rio 2016 (Total) [1] (Personal Elaboration)

Rio Olympic 2016 Winning Nage Waza (Total)		
Te Waza	57	26%
Ashi Waza	87	37% **(24%)***
Koshi Waza	45	19%

Ma sutemi	17	7%
Yoko Sutemi	26	11%
Lever	145	63%
Couple	87	37%

Table 4. Most Used Techniques 2017 World Championship [2] (Personal Elaboration)

World Championship 2017 Most used Nage Waza		
Te Waza	152	34%
Ashi Waza	226	50% **(62%)***
Koshi Waza	31	7%
Ma sutemi	21	5%
Yoko Sutemi	19	4%
Lever	223	49,7%
Couple	226	50,3%

In the first three months of 2019 we have this trend as winning techniques application, (see tab 5.)

Table 5. Winning Techniques in the IJF competition in first Three Months of 2019. [3]

(March) 2019 Winning Nage Waza		
Te Waza	68	26%
Ashi Waza	120	46% **(32%)***
Koshi Waza	26	10%
Ma sutemi	14	5%
Yoko Sutemi	36	13%
Lever	144	54%
Couple	120	46%

**Percentage of winning Ko Waza techniques utilized among Ashi Waza.*

INTRODUCTION

In this paper we are interested, both: at the description of Biomechanics of the Ashi Waza techniques, with precision of few of them, members of the Japanese, so called, Ko Waza group; and at the biomechanical analysis of the small changes in the applicative form of them.

These small changes, from the basic movement defined by Kodokan and show in thousand books, probably born from practical competitive situations. They are today become the usual applicative form, not only present among the various National Federations, but also in Japan itself among Universities dojos and the Kodokan. Among the Ko Waza techniques, we will select for our analysis only the following: Ko Uchi Gari, Ko Soto Gari, Ko Uchi Barai, Ko Soto Barai, Ko Soto Gake, Ko Uchi Gake

That are considered by Japanese followers different throwing techniques, as the different names show us.

But from the Biomechanical point of view all these Kodokan throws are based on the same physical principle and practically on the same movements.

The small changes, introduced in the judo practice in these years, have introduced small variations in the shape of the movement showed by Kodokan as perfect form of throwing, leaving unchanged the biomechanical principle that holds them.

The best representation in the books regarding the executive form of these techniques, we find it without a shadow of doubt in the golden text of Kazuzo Kudo 9th Dan ***[4]*** the last Kano's student, who in the Ashi Waza of our group mentions and shows the following throwing techniques: Ko Uchi Gari, Kouchi Barai, Kouchi Gake, Kosoto Gari, Kosoto Barai, Kosoto

That you can see in order in the next eight figures:

Fig.1-3 Ko Uchi Gari, Ko Uchi Barai Ko Uchi Gake

Fig.4-8 Kosoto Gari, Kosoto Barai Kosoto Gake, Ni Dan Kosoto Gari, Ni Dan Kosoto Gake

One of the best analysis of Ko Uchi Gari history name is presented in [5] in which the authors affirm that „Ko-uchi-gari [minor inner reaping throw] is a versatile throw of which the exact origin is unknown". Again, it is possible to read in this very interesting paper" Clear and correct jūdō-specific and didactic terminology are helpful in acquiring the complex motor skills that enable a refined and highly technical jūdō". [5].

The „Didactic terminology" used by Japanese Masters is very useful to help the proficient judo students to understand and categorize the complex movements that build the judo throwing techniques, but there are some shadows in it. The problem, with the Japanese terminology of Kodokan techniques, is that it is often of generalist type thus impeding to highlight the deep biomechanical connections, that exist in them and thus preventing an approach of global methodology of teaching.

Despite the different names used to characterize what „for the Japanese Masters" may appear as different techniques, it is easily to see that all these „different" techniques are based on the same mechanical movement, to

hook, to reap and / or to sweep Uke's foot with Tori's foot. In term of biomechanics there is no differences among them, regarding the applied physical principle, the only thing different is the kind of resistance that the swept foot shows, for low friction the sweeping action is sufficient, for high friction to reap or to hook is better, this means that force must increase from Barai action to Gari or Gake.

BASIC BIOMECHANICS OF LEG MOVEMENT OF KO UCHI - KO SOTO

In term of Biomechanics the group of techniques described before in picture, can be seen as the same application of the ***Couple*** applied by Tori by Arms and one leg ***[6]***, starting in two parallel planes to his transverse plane and continuing along the trajectory defined by the rotation of Uke's body around his center of Mass, (the presence of the external gravity force produces noticeable variations in this trajectory and head and feet of Uke move along a path which differs from a perfect circumference, centered in its center of mass). The action of the Tori's foot is simple is a movement that appear similar to the pendulum movement with a final collision against the Uke's foot. The force applied could be different if the Uke's foot is moving on the Tatami (low friction) sweeping action is necessary with only a low impact force, if the weight of Uke is on the foot well stable, (high friction: first detachment) hooking or reaping action are necessary with a high impact force. However, if we analyze closer the only one mechanic model that will describe these techniques; the leg action could be modeled like a physical pendulum who collides the adversary's foot. Remembering the previous discussion about the friction variability connected to the so called actions: barai, gari, and gake, it is possible define a good modeling of these actions.

This model could be the model that describes a variable dumping physical pendulum, in connection with the mechanics of an anelastic collision between feet.*[6]* These models are well known both in Physics and Biomechanics. Remembering the anatomy of legs (fig.9)

Fig 9, 10, 11 Adductor muscles that work during Ko Uchi-Ko Soto adduction Movement

Normally the inferior kinetic chain action could be considered a physical pendulum, a pseudo-rigid body that undergoes, in first simpler approximation, a fixed axis rotation about a fixed point.

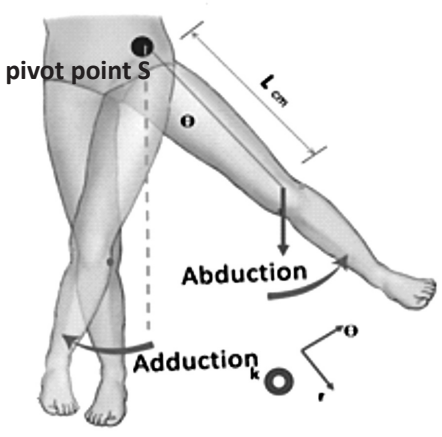


Fig. 12 Biomechanics of Kosoto-Kouchi

The torque T applied by the muscular structure about the pivot point *S* is given by the component of gravity force and the resultant of muscular action.

$T = T_{cm} \wedge (mg + T_r) = l_{cm}\, r \wedge (mg + T)\,[\cos\theta r - \sin\theta\,\theta] \cong -l_{cm}(mg + T)\sin\theta \mathbf{k}$

When θ > 0 the torque about S is directed in the negative **k̂** -direction (into the plane of page) when θ < 0 the torque about S is directed in the positive **k̂** -direction (out of the plane of page)

The moment of inertia of the center of mass about the pivot point *S* is I_s.

The rotational equation of motion is then, considering with good approximation,

$T_r \approx -T\sin\theta$ [2]

$-\left(T + mgl_{cm}\right)\sin\theta = I_s \frac{d^2\theta}{dt^2}$ [3]

$\frac{d^2\theta}{dt^2} - \frac{\left(mgl_{cm} - T\right)}{I_s}\sin\theta = 0$ [4]

The addition of damping to Eq. [4] makes it analytically unsolvable.

Assuming that the damping is proportional to the angular velocity, the equation of motion becomes:

$\frac{d^2\theta}{dt^2} + \mu\frac{d\theta}{dt} - \frac{\left(mgl_{cm} - T\right)}{I_s}\sin\theta = 0$ [5]

There are no chaotic solutions of Eq. [5].

Almost all solutions of this equation describe phase space trajectories terminating at the stable fixed point: $\theta = \frac{d\theta}{dt} = 0$ which *„attracts"* all trajectories from its *„basin of attraction."*

Another important notation is that the equation is a kind a Langevin rotational equation, which solution, it is well known, is the Rotational Brownian Motion on very short interval of time and microscopic space.

But as already demonstrated in ***[7]*** for the linear analogous, the same for the rotational ones, as predicted by the Hamilton equations of the athlete's system

$\frac{d\theta}{dt} = \omega = \frac{L}{I_s}$ [6] $\frac{dL}{dt} = T - \mu L$ [7] The solutions are easily evaluated:

$L(t) = \mathrm{T}\tau + \left(L_0 - \mathrm{T}\tau\right)e^{-\frac{t}{\tau}}$ [8]

$\theta(t) = \theta_0 + \frac{\mathrm{T}\tau}{I_s}t + \frac{\tau}{I_s}\left(L_0 - \mathrm{T}\tau\right)\left[\left(1 - e^{-\frac{t}{\tau}}\right)\right]$ [9]

the stationary solutions $t >> \tau$ *are*

$L(t) \approx T\tau$ [10]

$\theta(t) \approx \theta_0 + \frac{T\tau}{I_s}t$ [11]

As well known, to account for the sharp distribution in mechanical terms, Langevin added to the right-hand side of equation a stochastic force ξ *(t)*, also called *white noise.* It is a random function of time with zero mean and a covariance proportional to the Kinetic energy produced, in our case. „athletes fight", by the work of push-pull forces. For which: $\langle\xi(t)\rangle = 0$.

Working out Langevin's picture, it is found that if *f* is the solution of the so-called Klein–Kramers equation,

$\frac{\partial f}{\partial t} + \frac{L}{I_s}\frac{\partial f}{\partial r} + \frac{\partial}{\partial L}\left[\left(T - \mu L - \frac{\mu I_s\omega^2}{2}\frac{\partial}{\partial L}\right)f\right] = 0 \cdot$ [12]

$E_k = \frac{\mu I_s\omega^2}{2} = 0$ Letting in equation [12] gives a partial-differential equation on *f* which, mathematically speaking, admits the Hamilton equations [6] and [7] as its characteristics Langevin's approach is cast in the language of

rotational dynamics with a novelty, namely the stochastic force ξ*(t)*. When the latter is input into rotational Newton's second law of motion, we obtain a stochastic differential equation.

Langevin's equation looks more intuitive at one sight and indeed was put forth before, its mathematics is subtle and open to criticism.

Defining the average of any observable *O* from the probability density *f* in the usual way of classical statistical mechanics:

$$\langle O \rangle \equiv \iint O f(\theta, L, t) d\theta dL \qquad [13]$$

It is possible to show by algebraic manipulations that equation [13] entails

$$\frac{d\langle \theta \rangle}{dt} = \frac{\langle L \rangle}{I_s} \qquad [14] \equiv [6]$$

$$\frac{d\langle L \rangle}{dt} = T - \mu \langle L \rangle \qquad [15] \equiv [7]$$

Because in our situation T and μ are independent of position the Hamilton equations [7] and [8] are recovered on average.

Then the Newtonian approach is connected to the average on long time and space, while the Brownian motion characterizes very short time and microscopic space of observation.

In the mechanical model of Ko Uchi- Ko Soto movement, it is not important the whole free motion which could be harmonic, but only the first part of it, till to the feet collision. Now we can consider the equation that drive the Barai Action. In such application, in the general equation [6] it is possible to consider the μ negligible (~ 0) and the equation [6] becomes equal to the equation [5].

Instead the equation [6] will better model the Gari- Gake action in function of the increasing friction between Uke's foot and the tatami, given by the amount of body weight that rests on it.

The impact force can be easily evaluated by the collision theory, considering, for simplicity, only the impact point. If the impact of the feet is like a plastic-collision (feet connected to each other after the collision) we can write prior to the moment of collision between the foot with body of mass M1 and the leg with body mass M, the Tori foot has a high tangential velocity V.

After the collision, the foot quickly binds to the other foot by lifting the body and imparts a velocity v to it. Linear momentum before and after the collision is preserved so that:

$$MV = (M_1 + M)v \qquad [16]$$

After the foot is connected with the other foot, the kinetic energy of the combination of feet thrusts the Uke's body outward and upward to a height h. All the kinetic energy is transformed to potential energy and

Therefore:

$\frac{1}{2}(M_1 + M)v^2 = (M_1 + M)gh$ [17] Solution of Eqs. [16] and [17] yields the velocity of the Tori's foot.

$$V \approx \frac{(M + M_1)}{M}\sqrt{2gh} \qquad [18]$$

From this result we can evaluate the formula of the effective impact force, whose variability is linked to the contact speed divided by the square root of the double height

$$F = M\frac{dV}{dt} \cong (M + M_1)\sqrt{2g}\,\frac{d}{dt}\left(\sqrt{h}\right) \cong (M + M_1)\sqrt{2g}\,\frac{d}{dx}\left(\sqrt{h}\right)\frac{dx}{dt} \qquad [19]$$

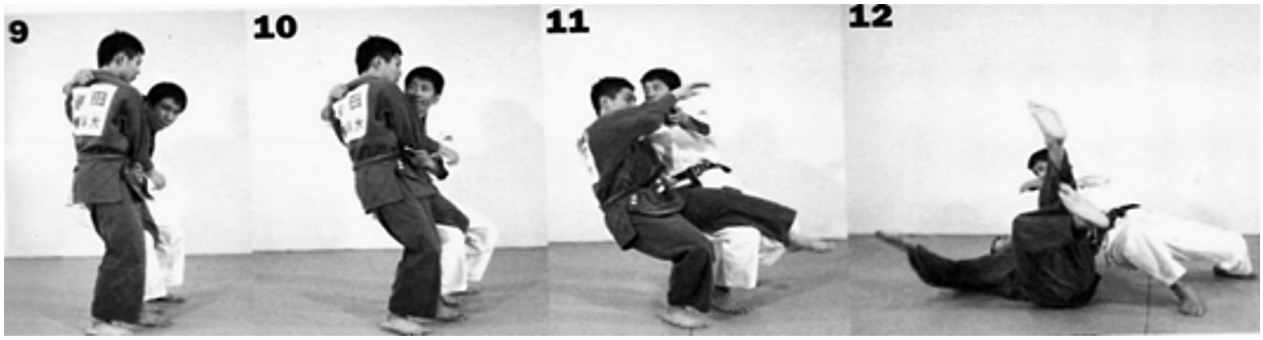
Whit simple calculations we obtain

$$F = M\frac{dV}{dt} \cong (M + M_1)\sqrt{\frac{g}{2h}}v \qquad [20]$$

As numerical example we can evaluate the force produced by a leg of a 71Kg athlete, against a 69Kg adversary, if the whole leg weights 24Kg and the adversary's foot is raised to 7 cm, and the weight on the adversary's foot is approximately half of the total weight (34,5 Kg) and the impact velocity is v=0,8 m/s the force applied is about F≈390 N that is the force to accelerate 390 Kg at 1 m/s.

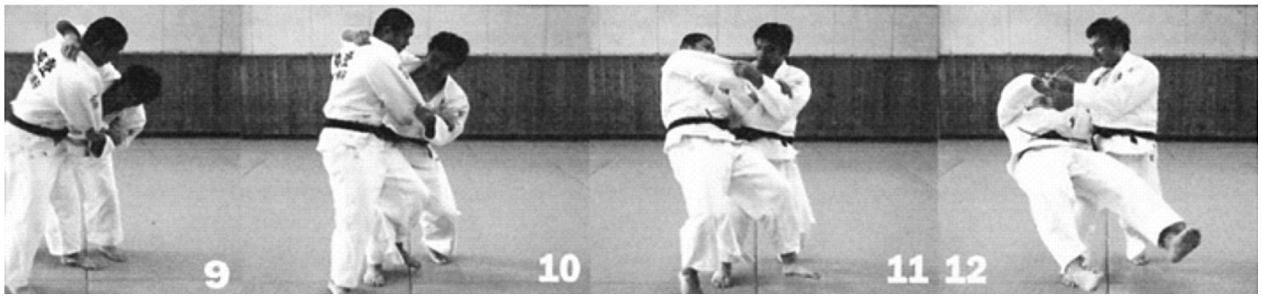
MINOR CHANGES

Today as already previously indicated around the world and in the Japan too little changes are introduced into the Kodokan form, these variations probably born from competitive application are, for some people, they seemed more effective, or more suited to their morphological structure, so much so that in Japan for example Nakamura Yukimasa performs a Kosoto Gari very different from the Kodokan Form (Fig 4) using the thigh to sweep, instead of the foot, this kind of variation is the type shown in the following figures.



Figg.13-16 Modern variation of Kosoto Gari [8]

Same thing just a little bit different we can see in the execution performed by Tobitsuka Masatoshi



Figg.17-20 Modern variation of Kosoto Gari [8]

Who in the next sequence shows a different form of Kosoto Gari, in a quick tactical attack at the beginning of the fighting, very similar to the off-grips Korean Kosoto Gari attack, on the opportunity of a mistake of the opponent's grips.

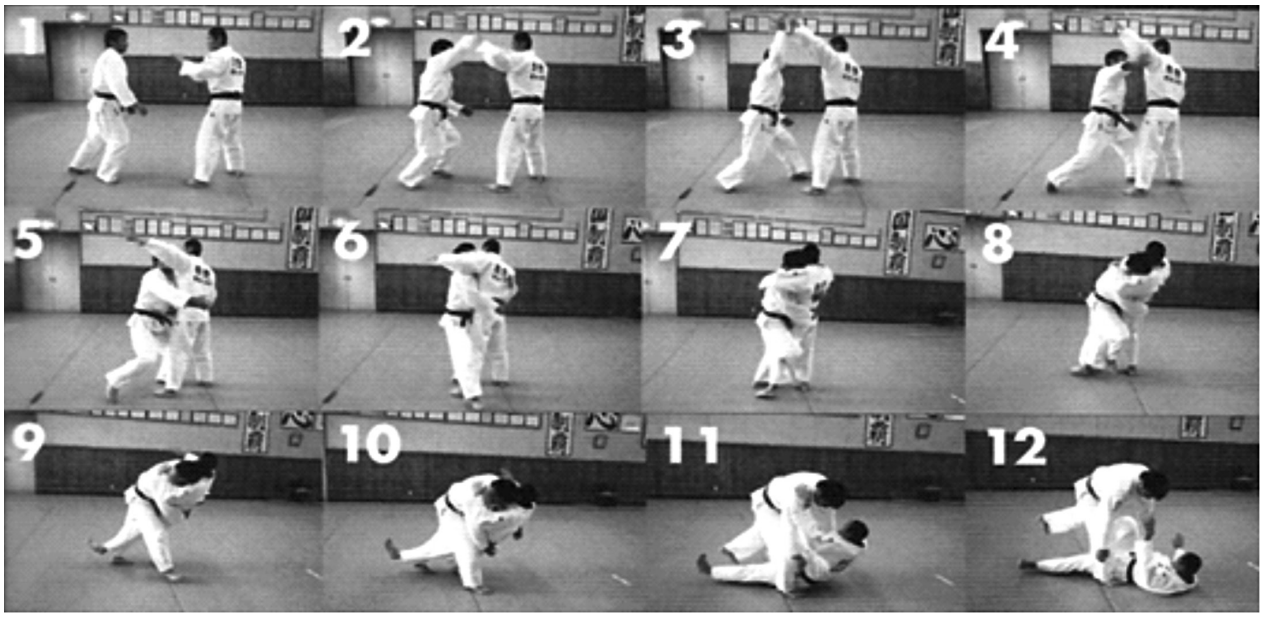
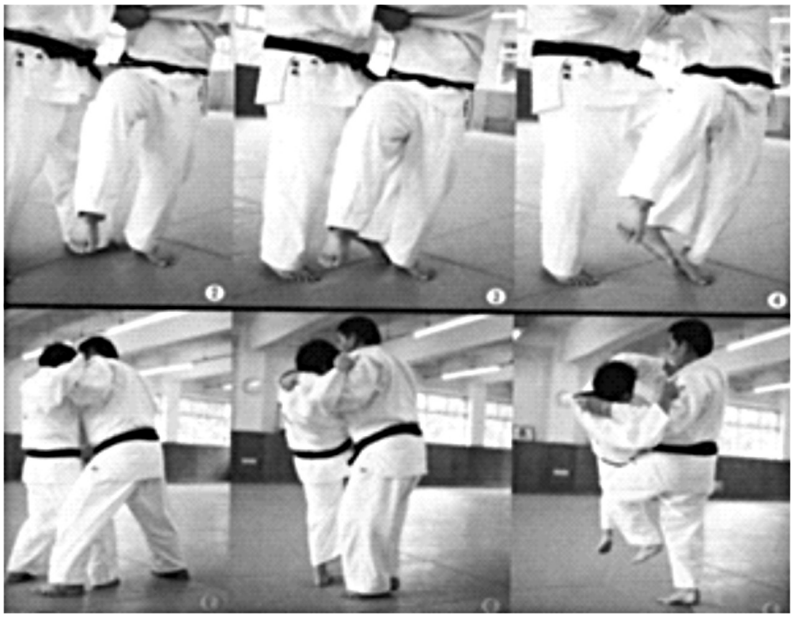


Fig.21 Tactical variation of Kosoto Gari [8]

In the next figures we can see the personal interpretation of Kosoto Gake of Masuchi Katsuyuki



Figg.22-27 Modern interpretation of Kosoto Gake [8]

This kind of variations are a multipurpose application because if Uke's resistance is stronger, the technique can always be changed from a Couple Application into a lever variant by rotating Uke on the thigh.

Not only Japanese Champions give new personal interpretations of the classical form proposed by Kodokan, but contribution come also from other countries, very well-known are the Russian or the Korean contributions, (Like Kabarelli or Reverse Seoi). In our examination focused on the Ko Waza of the Couple's group, the next figures show a very effective French Interpretation of competitive Ko Uchi Gake, performed by Larose.

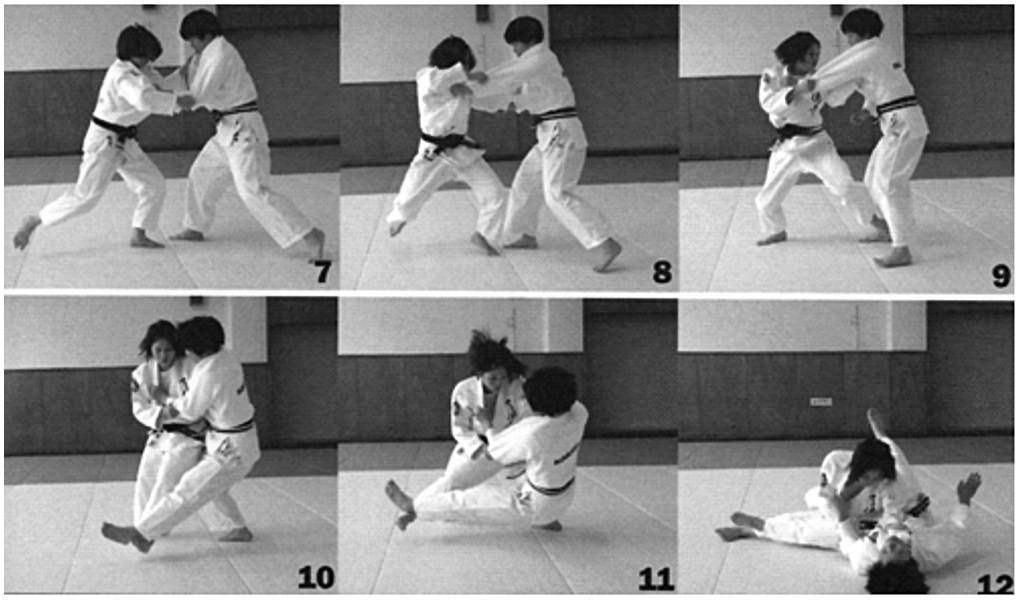
Figg.28-29 Modern French competitive form of Ko Uchi Gake

Less interpretative changes, have been seen around the world, about Ko Uchi Gari. It seems that the Kodokan form of this technique, could be almost perfect, in itself.

Ko-Uchi-Gari in the Biomechanical Classification is classified as a „Couple applied by Arm(s) and Leg".

Ko-Uchi-Gari re¬quires a simultaneous opposing set of forces (Couple) provided by the *Tori'*s arms driving the Uke to his rear corner and *Tori'*s foot sweeping *Uke'*s foot in the opposite direction, thus forwards, the pendular motion before analyzed. In Ko-Uchi-Gari, the forces operate in the Tori's trans¬versal plane. Tori, who is applying, the „couple," thus moves in the sagittal plane. At the same time, the move¬ment incorporates a rotation around the vertical axis in¬volving the trunk/leg compartment which encompass¬es the coxo-femoral articulation. These two concomitant actions highlight the flexibility the Tori needs in order to perform Ko-Uchi-Gari effectively. Important is, maintaining the control, not to bend the torso and carry out the action as straight as possible (pushing the *hara* toward the *tatami*), so as to apply the torque as simultaneously as possible. This is one of the most common mistakes. Control should not end at the beginning point of the reaping and Uke starting to fall, but should be maintained throughout the final point.

In the next sequence Fukumi Tomoko shows a competitive and very effective application of classical Ko Uchi Gari, in which it is possible to found all the previous described phases.



Figg.30-35 Modern interpretation of Ko Uchi Gari [8]

However, all these minor changes, if they change the classical form proposed by the Kodokan, they do not change its basic mechanics. All the interpretative variants seen, belong to the Couple group and are modeled by a pendulum model (actually three-dimensional and not one-dimensional as shown).

These small techniques today show a growing notoriety, that is often combined, not only with their effectiveness, but also with the brevity of the movement and its practical simplicity.

CONCLUSION

In this short paper it is shown the biomechanical models of Ko Uchi, Ko Soto, throwing techniques, that are increasing in importance, because of their effectiveness in competition, so as to increase their presence as winning techniques in international competitions.

All these techniques are classified in the Couple group with a Couple applied by Arms, and Leg, as seen before the basic mechanics is the same the only difference is the increasing forces and Couple applied against the increasing resistance die to increasing friction, between tatami and Uke's feet.

It is significant that all new interpretive variants have been developed in techniques in which the actions of Gari and Gake are applied. This is certainly due to the need for increased strength and to the fact that the new variants or make the technique more flexible with regard to the increased defensive capabilities at international level, such as Japanese variants shown in Fig (13-27) or drastically decrease these capacities making the technique of fact indefensible, such as the French variant in Fig (34-35).

The action of Ko Uchi Gari has not undergone any major changes, which shows that its effectiveness is such that, even with the agonistic evolution, it retains all its effectiveness in the synthetic form identified by the Kodokan.

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A COMPARISON OF SELF-CONTROL AND EMOTIONAL CONDITION MECHANISMS IN DIFFERENT SITUATIONS OF THE APPLICATION OF JUDO TECHNIQUES

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INTRODUCTION

The idea of Jigoro Kano, the founder of judo, was for a man to improve through judo, a physical and mental training, thus contribute to our social community (Kanō & Lindsay, 1887). Judo as a physical exercise consists of an aim that contains physical culture and health, sport, self-defence, and mental development (Harrison, 1919). The technical form of judo was taken from the old *jūjutsu* schools that were taught by Kano (Callan & Bradić, 2018; Hoare, 2009), as well as where he practiced and studied (*Tenjin Shin'yō-ryū-jūjutsu*, *Kito- ryū-jūjutsu*), and many others. By establishing Kodokan judo, Kano focused his own experience and knowledge on the development of a person. The suffix *„jutsu"* denotes the purpose of application with the aim of practice, specifically directed at defence and overcoming of an enemy and his destruction. The suffix *„dō*" marks the goal of training towards perfection of a man in his intellectual and moral potential (Brousse & Matsumoto, 1999; Callan, 2018). To achieve the stated goals, it is necessary to develop a high level of mechanistic control that is in correlation between the physical exercises and different mental states (Suino, 2007). Therefore, the physical and the mental exercise in judo is in a constant state of mutual dependence.

MATERIALS AND METHODS

Detecting aspects that govern the control of emotions which are part of a mechanism of self-control, are key to defining the benefits of judo practicing at the mental level (Montero-Carretero, Moreno-Murcia, Gonzalez-Cutre, Amado, & Gimeno, 2015). In addition to self-control, the control of emotions is connected as a detector of various conditions and attitudes towards the performance of judo techniques and various forms of judo exercises

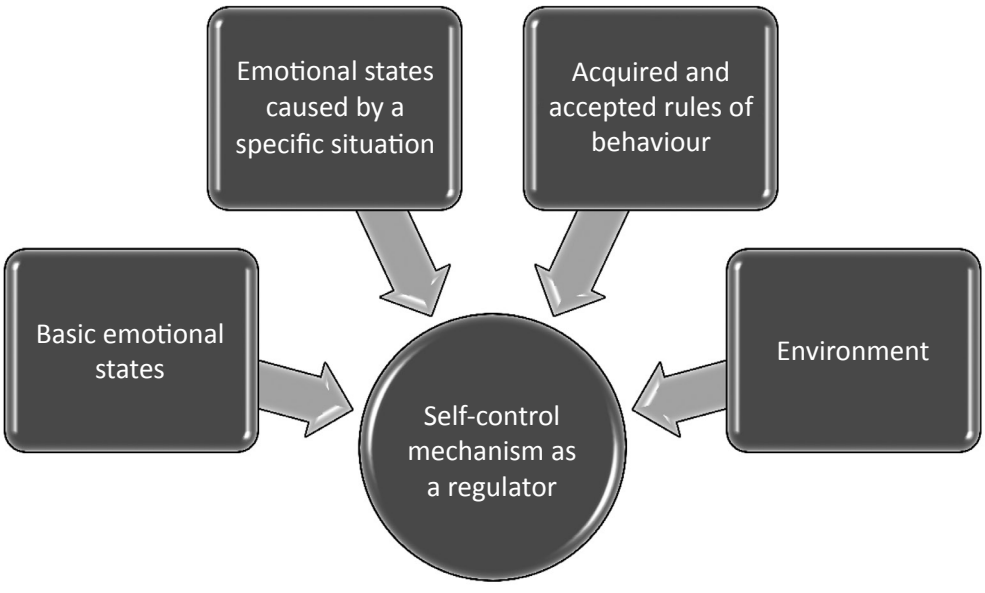

Figure 1. – Definition of influencing functions on self-control mechanisms

(Santos, Fernández-Río, Almansba, Sterkowicz, & Callan, 2015). The defining of self-control is in direct correlation with knowledge of the rules of behaviour in certain situations, caused by internal or external factors in different emotional states (Adriana & Mircea, 2011; Takšić, Mohorić, & Munjas, 2006).

Kodokan Judo contains in its structure a large number of technical elements (100 techniques since 01 April 2017) and as such it is an activity with great opportunities for different applications. A judo technique can be methodically processed in a way that contains a game and entertainment (Callan, Heffernan, & Spenn, 2019), in a way to achieve a sports result and success (F. D. Lascau & Rosu, 2013), as well as to be extremely dangerous and destructive for the opponent (Pocecco et al., 2013). One throw can be processed methodically consisting of a game, and as such acceptable for learning in children (Bradic, 2018), and can be processed in such a way as to achieve the result and victory on a sporting competition, but also as a self-defence application where a serious injury can be inflicted on the opponent or even death.

Based on the description above, several factors are the key:

1. Knowledge of judo technique principles
1. Mastering the application of the specific techniques
1. Managing the self-control mechanism in different emotional states depending on the situation

DISCUSSION

Judo training in its original form contains randori (free style exercise free practice; free sparing), shiai (battle in a competitive form match; bout), kata (forms forms; formal exercise; pattern practice), and intellectual exercises (Kano, 2005). The competition takes place according to the rules (Holme, 1997), and compliance with the rules itself is defined by the control of emotions through the self-control mechanisms. The emotional state of an individual in situations where he is at the border of respect or disrespect of the rules, produces the development of self-control (Takšić, Mohorić, & Duran, 2009; Vulpe & Macovei, 2015). Structurally judo is a martial sport that in its technical structure uses techniques that aim to beat the opponent in the fight. The actual techniques are in their original form inherited from the old *jūjutsu* schools, intended to destroy their opponents, and the mere victory in the competition or training is in its original form a complete destruction of the opponent (Kanō & Lindsay, 1887; Otaki & Draeger, 1983). Judo is regulated by rules that set the limit for the execution of total destruction, based on the principles of combining technical elements with maximum power through the principles and tactics

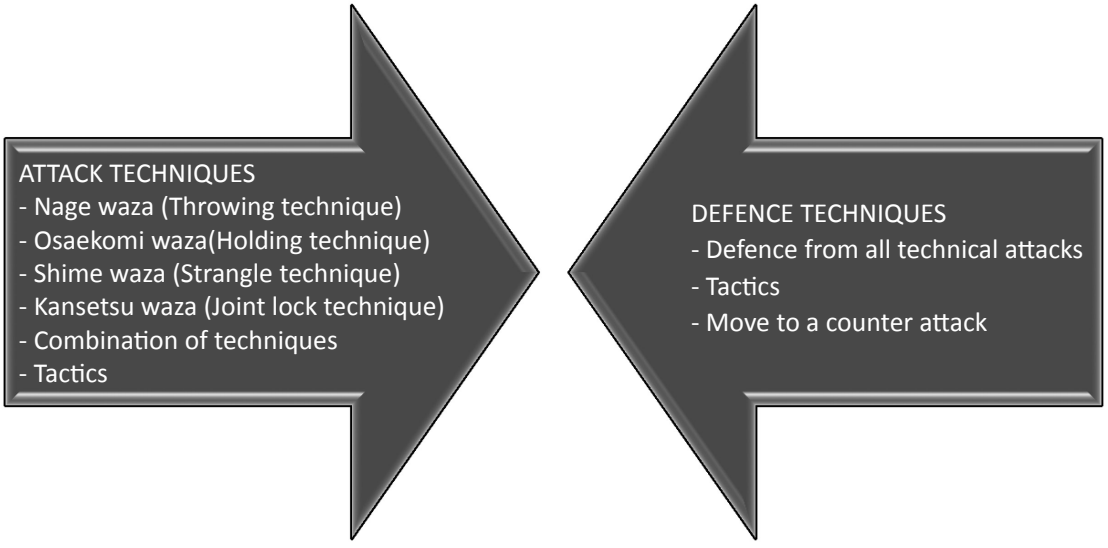

Figure 2. – Display of elements in a practice of randori and shiai methods

of a fight. Through such exercising, the mechanisms of self-control develop dramatically because the conditions in which techniques of judo are applied in are in extreme emotional states when in attack and in defence (Mitić, Mitrović, Bratić, & Nurkić, 2011; Szabo & Urbán, 2014).

The regulation of emotional control is extremely high during a combat situation when all the factors required for winning the fight are being maximally utilised together. The reason is not only the reality of victory or defeat, but the mere application of a technical element that had a consequence of destroying the opponent as its original goal (Bennett, 2009; Leggett, 1998). The use of a technique for the purpose of winning or defending against the opponent's full force, causes a state of stress associated with the emotional state which ordinarily would jeopardise health (Mitić et al., 2011). Judo technique must be applied within the constraints of the rules, but despite this, the *judoka* is under extraordinary emotional strain that directly affects their self-control mechanism. Exercising such continuous and systematic overload positively influences the development of self-control (Smojver-Ažić, Jug-Dujaković, Bradić, Takšića, & Đonlića, 2016; Young, 2009).

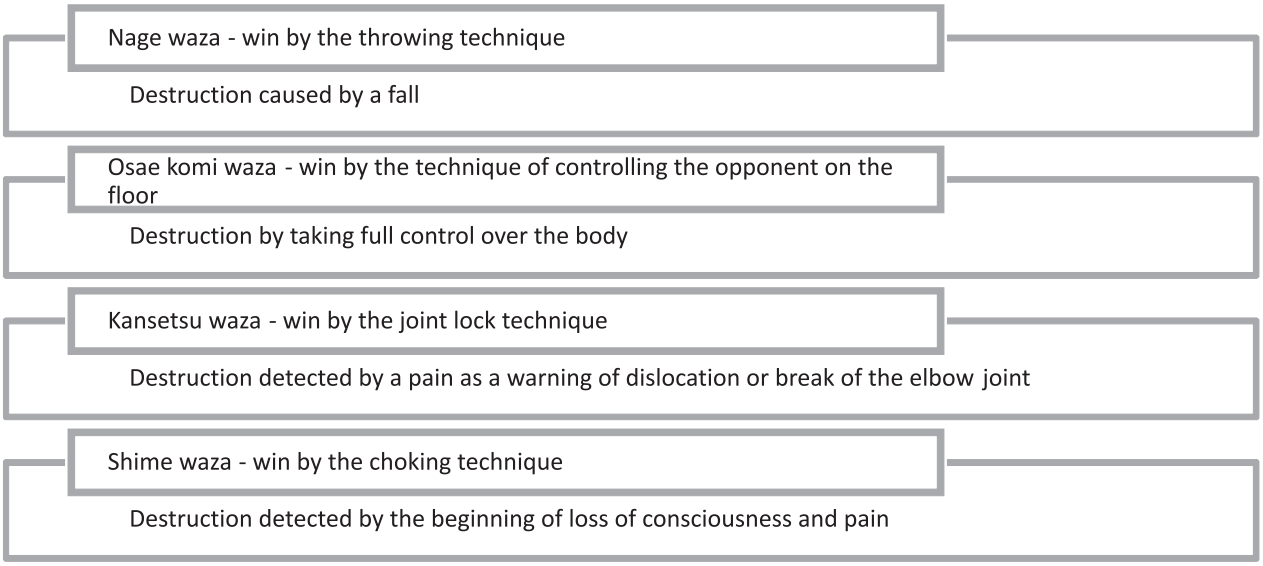

Figure 3. – The structure of judo techniques according to their original aims of destruction

The methodological learning of judo techniques and principles correlates with the goals of using such elements (Kano, 1986). Nowadays in judo, a great deal of attention is given to the methodology, because through various methodological principles, learning of judo techniques and principles can maximally influence the acceptance of such elements (F. Lascau & Callan, 2012).

Examples of different models of the methodical learning of judo technique and principles:

1. Methodological forms through the elements of the game (children and younger age categories and the beginners)
2. Methodological forms with technical-tactical tasks (competitors)
3. Methodological forms with the purpose of therapeutic or specific body engagement (a training with injuries that is directed towards the development of a particular muscle group or movement)
4. Methodical forms aimed at destroying opponents (self-defence)

Through the stated methodical principles of learning, the technical sequence of learning is similar, and the essential difference is in the mental state and state of the emotions that is regulated by the self-control mechanism (Imada & Matsumoto, 2004; Kano, 1932).

Examples of the connection between the methodical forms and emotional states:

1. Methodical shapes through elements of the game - relaxed state, fun,
2. Methodical forms with technical-tactical tasks -a high stage of emotional excitement due to the self-control factor that is directed towards solving of the set tasks and achieving the results
3. Methodical forms with the purpose of therapeutic or particular body engagement - a small stimulus of emotions with the self-control mechanism activated only to fulfil the task set
4. Methodical shapes aimed at the opponents' destruction - an extremely high stage of emotional excitement with maximum strain of the self-control mechanism in order to solve the state of feeling of immediate danger to health and life

Table 1. Display of relations of methodical forms and emotional states

Goal	*Manner*	*State of emotions*
Learning of technical elements or principles through game	Learning and fun	Emotional state directed towards the goal of relaxation and comfort
Methodological forms with technical-tactical tasks	Learning and acquiring - focus	Emotional state with a maximum self-control aimed at achieving results and solving the task
Methodological forms with the purpose of therapeutic or particular engagement of the body	Exercising and development - focus	Emotional state with self-control aimed at achieving results in the development or recovery of a certain body part
Methodological forms aimed at destruction of opponents	Learning and acquiring - focus	Emotional state with a maximum self-control aimed at preventing one's own and achieving opponent's destruction

An example using *o-soto-gari* technique:

1. *O-soto-gari* taught with an introductory game, *o-soto-gari* with a maximum control of the partner
2. *O-soto-gari* as a task of attack in a 20 sec time with achievement of the maximum result
3. *O soto gari* as entrance without leg hooking due to a knee injury (*tori*), as maintenance of the form
4. *O-soto-gari* as an application of defence from the attack by a stick with the goal of disabling the opponent

CONCLUSION

Judo in its many applications, it is nowadays successfully used as a means of education, sports, self-defence, upbringing, and the development of intellectual and moral potential.

Judo as a sport, certainly brings athletes into situations when they are completely dominant or in complete inferiority in respect to their opponents. Such conditions are regulated by the rules that control such boundaries, and through the training processes, athletes achieve self-control and recognition of different emotional states. By developing the control of emotions in conditions that are extreme in some areas, the self-control regulator responsible for respecting of the rules and norms of behaviour in everyday life is affected. The results and analysis of this problem in this research are a platform for further research and proof of the value of judo as a sport that positively influences the relation of emotional intelligence, self-control and behaviour.

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ASSESSMENT OF BODY POSTURE IN YOUNG JUDOKA 8 TO 12 YEARS

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INTRODUCTION

We are witnessing every day that the sedentary way of life is becoming more and more an initiative in the world but also in our country. In some countries around the world, children spend 3.5 to 4 hours a day watching television, laptops, mobile phones. Walking to the school is always less frequent than riding a bicycle. Children are also spending very little time playing on playgrounds or in parks Berisha, M. (2015). The reasons are different, from caring for the child's safety to the lifestyle. For example, video games that are one of the main reasons for sedentary lifestyle in children and are part of the great majority of life are becoming more perfect, more realistic and more attractive and appealing to children. According to Durnin (1992), calorie consumption in children at one day dropped by 600-700 kCal, approximately equal to 60 minutes or 45 minutes of walking. We are also witnessing an increasing problem of wearing heavy school bags, which should not exceed 10% of the total body mass of the child, and most of them are twice as heavy as the allowable weight. The School of Sports Science from Oslo and Lars Bo Andersen conducted a research in (2006.) at 2000 children aged 9 to 15 and came to the conclusion that children should spend at least 90 minutes a day in some physical activity.

Therefore, this issue needs to be addressed at the earliest school age or in the slow-down phase of growth and development (from 5 to 10 years) since at puberty these issues are even more pronounced. The best posture is the one in which the person most economically moves, providing the best comfort and who has no predisposition for future postural problems (Torlaković, 2013).

Stefanović et al. (1972) Braun's scale determined four types of posture:

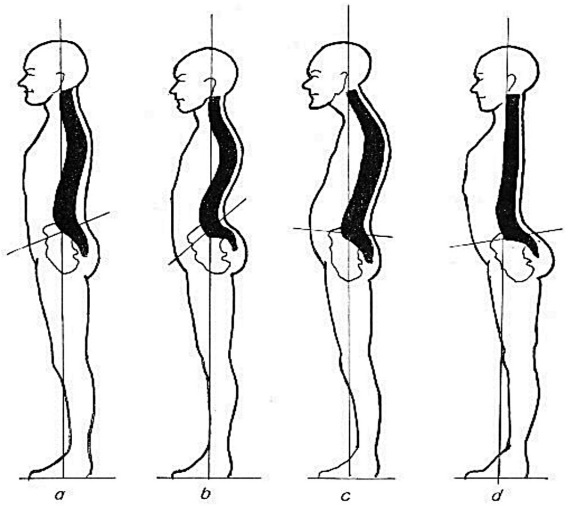

Figure 1. Four types of body posture according to Stefanovic et all (1972).

– *Posture type A* - upright holding of the head, shoulders are right, the chest basket is somewhat more elongated than the head, the belly is drawn, the blades are attached to the back, the physiological curvatures (cervical and lumbar) do not exceed 3 to 5 cm from the vertical-vertical line;

- *Posture type B*- a is slightly inclined, the breasts are easily inflated, the lower part of the abdomen is somewhat relaxed, the physiological spine is somewhat enhanced;
- *Posture type C*- the head is folded to the chest, the shoulders are relaxed and stretched forward, the lower part of the abdomen is bent, the blades are far apart from the chest (scapula tool), the physiological of the spine is very pronounced;
- *Posture type D*- head is easily folded back, flat back, there is no lordotic and kifotic component.

According to Kosinac (2002.) the so-called crisis or developmental phases of growth characterize the transformation of an individual, and they can be divided into three phases: age of the first year (uprightness and walking); age of school leaving (6-7 years of age); age of puberty (adolescent growth momentum). The key period for the prevention of deformity is the beginning of education (primary school).

The aim of the research is to determine the postural status of young judoka in the ages 8 to 12 and to determine the types of body posture, to determine the average values in all variables and to give them a final assessment, to determine the objectivity of the judoka and to determine if the differences between boys and girls in postural status.

MATERIAL AND METHODS

This study has 30 members of the Judo Club Hercegovac Mostar, 20 male and 10 female, participants. The age range of respondents is between 8 and 12 years. Parent certification was requested before the test to agree with the study.

The method of Napoleon Wolanski was used to assess the status of certain segments of postural status. There are three grades in Wolania: 0, 1 and 2. Rating 0 is given when all parameters are in normal relationships - normal status. Rating 1 represents a certain deviation from normal body holding status. Score 2 is characterized by a significant deviation from normal status.

Three judges, kinesiologists, who are familiar with the subject and the issue and who have many years of experience in working with children, are qualified for this type of research to evaluate the respondents in the following variables:

1. Head posture (HP) 2. Shoulder posture (SP) 3. Chest shape (CS) 4. Shoulder blade posture (SBP) 5. Scoliosis deviation (SD) 6. Front abdominal wall posture (FAWP) 7. Leg shape (LS) 8. Foot shape (FS).

In order to gain an assessment of body posture or the grade of one component, scoring is done according to Senad Turković, Nijaz Skender, Muhamed Tabaković, (2005).

Table 1. scoring according to Senad Turković, Nijaz Skender, Muhamed Tabaković, (2005).

0 points	**If the component is within the limits of the criteria given, such a condition is considered normal**
1 point	The first degree of deterioration of the body's hold, deformity is noticed
2 point	The second degree, ie „extreme" deviation, is a more difficult form of deformity

When the aforementioned segments of the body of estimation, based on their sum, are obtained the following degree of body posture: 0 points - excellent posture; 1-4 points - very good posture; 5-8 points - good posture; 9-12 points - weak posture; 13-16- very bad posture

The analyzes were done with STATISTICA 16.0. An analysis of the objectivity of judging three judges was carried out, descriptive statistics for boys and girls.

RESULTS AND DISCUSSION

Table 2. Descriptive statistics of postural status according to N. Wolanskom

Variables	N	Mean	Min	Max	Sd
Head posture (HP)	30	0.07	0.00	1	0.25
Shoulder posture (SP)	30	0.31	0.00	1	0.42
Chest shape (CS)	30	0.07	0.00	1	0.25
Shoulder blade posture (SBP)	30	0.18	0.00	1	0.37
Scoliosis deviation (SD)	30	0.16	0.00	1	0.36
Front abdominal wall posture (FAWP)	30	0.22	0.00	1	0.39
Leg shape (LS)	30	0.07	0.00	1	0.25
Foot shape (FS)	30	0.34	0.00	1	0.48
Total sum	30	1.37	0.00	5.60	1.36

Legend:N- number of participants; Sd- standard deviation

According to the results, the largest number of children of Judoka have very good body posture 77% of them, excellent body posture has 20% of children, while 3% of subjects had good body posture. There were no respondents who had a poor and very bad bady posture. These results can be attributed to the biomechanical structure of judo sports, which is not a unilateral sport. The research includes children who systematically train this sport for at least two years, and regular physical exercise for the good postural status.

Table 3. Descriptive statistics of postural status of a boy

Variables	N	Mean	Min	Max	Sd
Head posture (HP)	20	0.10	0.00	1.00	0.31
Shoulder posture (SP)	20	0.40	0.00	1.00	0.47
Chest shape (CS)	20	0.10	0.00	1.00	0.31
Shoulder blade posture (SBP)	20	0.23	0.00	1.00	0.42
Scoliosis deviation (SD)	20	0.18	0.00	1.00	0.38
Front abdominal wall posture (FAWP)	20	0.20	0.00	1.00	0.38
Leg shape (LS)	20	0.03	0.00	1.00	0.02
Foot shape (FS)	20	0.37	0.00	1.00	0.48
Total sum	20	1.58	0.00	5.60	1.52

Legend:N- number of participants; Sd- standard deviation

Table 4. Descriptive statistics of the postural status of a girl

Variables	N	Mean	Min	Max	Sd
Head posture (HP)	10	0.00	0.00	0.00	0.00
Shoulder posture (SP)	10	0.13	0.00	0.66	0.23

Chest shape (CS)	10	0.00	0.00	0.00	0.00
Shoulder blade posture (SBP)	10	0.07	0.00	0.66	0.21
Scoliosis deviation (SD)	10	0.10	0.00	1.00	0.32
Front abdominal wall posture (FAWP)	10	0.27	0.00	1.00	0.44
Leg shape (LS)	10	0.20	0.00	1.00	0.42
Foot shape (FS)	10	0.30	0.00	1.00	0.48
Total sum	10	0.96	0.00	3.00	0.88

Legend:N- number of participants; Sd- standard deviation

From the tables 3 and 4 we can conclude that girls have slightly better total score (0.96) of body posture than boys (1.58). According to Napoleon Wolga, both groups in average fall into a group of very good body posture. The highest average score and the lowest scores for boys are from shoulder posture (SP) - (0.40) while girls have the lowest scores from the Foot shape (FP) - (0.30). On average, the boys had better results from the Leg shape (LS) - variables and the Front abdominal wall posture (FAWP) while the girls in the other variables were somewhat better. The biggest difference on average was that of the shoulder posture (SP); boys (0.40) and girls (0.13).

CONCLUSION

Based on the results, we also conclude that the method of Napoleon Wolchan is a good method for assessing bodily deformities. The results of the research have shown that the N. Wolans method is objective if it is carried out by a person skilled in the art and does not need special equipment for its application, which greatly facilitates the implementation of the process, thus making it possible to use it in a large number of institutions and does not require much time. This research has shown that judo can excellently prevent bad body posture.

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COMPARISON OF SOME OF THE ANTHROPOLOGICAL CHARACTERISTICS OF THE U14 JUDOKAS AND THE CORRELATION OF THESE CHARACTERISTICS WITH THE COMPETITIVE RESULT

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INTRODUCTION

In the process of sports preparation it is necessary to carry out tests (use measuring instruments – manifest variables) to evaluate all essential dimensions of athlete's preparedness. (Milanović, 2013.).

However, testing should not only become purpose for itself. Test results have their use only when they are placed in the context of success in the performance of individual sports activities. Will the success be evaluated through competition or other criteria is less important. More importantly, coaches from test results can draw the necessary information important for the training process.

The aim of this paper is to combine the competitive result during 2018 season with the results of testing certain variables of motor skills and to determine whether there is a connection between high competitive performance and a high level of motor preparedness.

METHODS

The sample of participants consisted of 13 judokas who were in U14 rank during 2018 season. They all train in the same club, under the same conditions (four times a week for 90 minutes). The main criterion for inclusion in the sample of participants was performance at the competitions covered by the Croatian Super Cup. The participants are divided into three groups, depending on their overall ranking at the end of 2018 season. Group 1 makes 5 judokas who were at the end of the season in the top 30 judokas in a total of more than 300 judokas. Group 2 is made up of 4 judokas, who made a few points during the season and were at the end of the season in the middle of the overall ranking. Group 3 consists of 4 judokas who did not score points during the season and ended up at the bottom of the overall ranking.

The sample of variables consisted of five tests which are the standard battery of tests for assessing motor abilities in chosen judo club (SDM – leg explosive power; KLNR – whole body coordination; PUR – lumbar and hamstrings flexibility; PTL – abdomen repetitive strength; PP – speed coordination). All subjects have been tested at the same time point.

The data was processed in the statistical package Statistica for Windows, version 13.1, using the t-test for independent samples and ANOVA.

RESULTS AND DISCUSSION

Table 1. T-test for independent samples – difference between group 1 and group 2

VAR	Mean 1	Mean 2	t-value	df	P
KLNR	17,6120	18,2450	-0,55905	7	0,593555
PP	10,7500	12,0300	-2,16931	7	0,066685

SDM	**212,2680**	**170,0825**	**3,40983**	**7**	**0,011291**
PUR	45,6000	41,8325	0,66040	7	0,530123
PTL	54,8000	48,5000	2,23318	7	0,060686

Table 2. T-test for independent samples – difference between group 1 and group 3

VAR	Mean 1	Mean 3	t-value	df	p
KLNR	17,6120	21,5025	-2,17358	7	0,066266
PP	10,7500	11,6750	-1,74481	7	0,124531
SDM	**212,2680**	**185,4150**	**2,39827**	**7**	**0,047587**
PUR	45,6000	41,3350	0,81865	7	0,439960
PTL	**54,8000**	**47,0000**	**2,92259**	**7**	**0,022258**

The results shown in tables 1 and 2 points to the fact that group 1, made up of the most successful judokas, achieves better numerical values than both groups in all variables, as far as the significance of these differences increases when group 1 compares with the least successful result group 2. The outcome of the judo fight largely depends on the level of motor skills and it can be assumed that the difference would be more significant if the sample of subjects involved a greater number of athletes. Strength and coordination stands out as the most important ability for success in the judo fight, which is clearly manifested in these results.

Table 3. T-test for independent samples – difference between group 2 and group 3

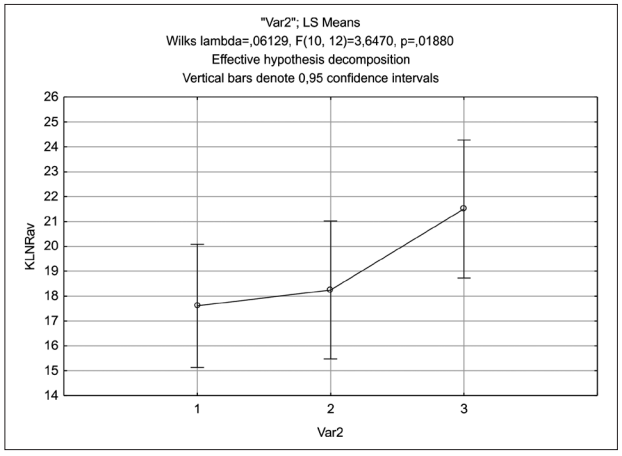
VAR	Mean 2	Mean 3	t-value	df	p
KLNR	18,2450	21,5025	1,537198	6	0,175158
PP	12,0300	11,6750	-0,936565	6	0,385131
SDM	170,0825	185,4150	1,902143	6	0,105855
PUR	41,8325	41,3350	-0,132599	6	0,898846
PTL	48,5000	47,0000	-0,362915	6	0,729110

The results in table 3 indicates that group 2 achieves better results than group 3 in KLNR, PUR, and PTL variables, while group 3 achieves better results in PP and SDM variables. No variables indicate a statistically significant difference between the groups. It is interesting to consider the fact that group 2, although in the results is somewhat better, does not at least produce numerically better results in all tests. The obvious circumstance is a small sample in both groups, and this is the point to pay more attention in future tests, but even this scarce information also points to one very important fact. A more successful group achieves better results in coordination variables, and a group that has been less successful its dominance shows in force variables. This results can be confirmed by the data obtained in the 2000 study by Sertić, which clearly demonstrates that coordination has a greater positive share in the results than strength in younger ages.

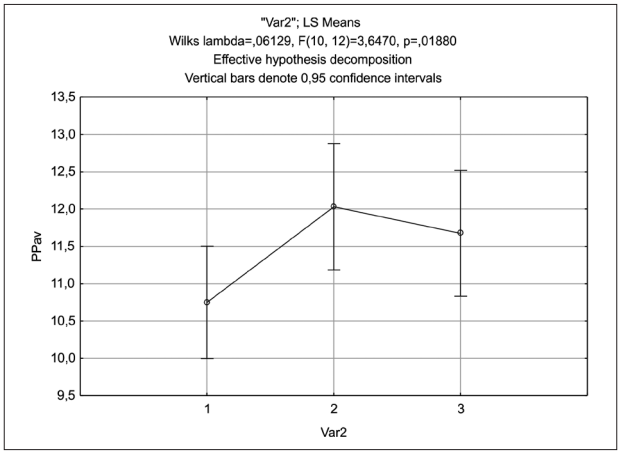
Training at this stage of development should continue to be dominated by the coordination and development of other qualitative motor skills. For development of coordination is important to use specific means specific to a particular sports activity, for example to carry out exercises that include elements from a particular sport, so we can say that training of coordination is closely related to training technique. Learning and improving judo techniques and training different combinations of techniques as well as performance on both sides will also have a

significant impact on the development of specific coordination and then directly to the competitive result. The larger scope of this type of training, and not the strength training, is fully consistent with the regular periodization of sports training in this developmental stage of young athletes (Bompa, 2005).

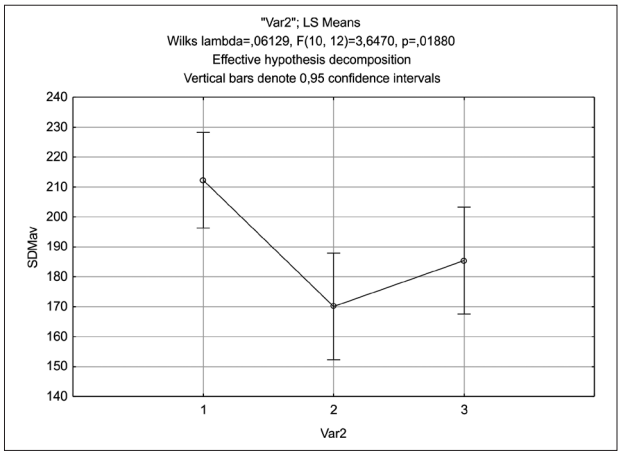
Graph 1. Results of ANOVA in KLNR



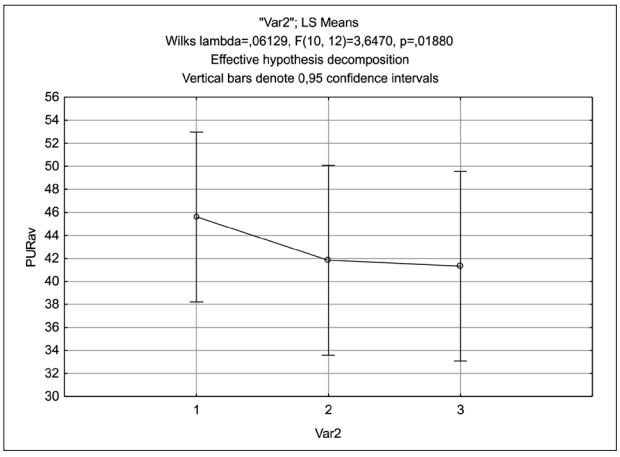
Graph 2. Results of ANOVA in PP



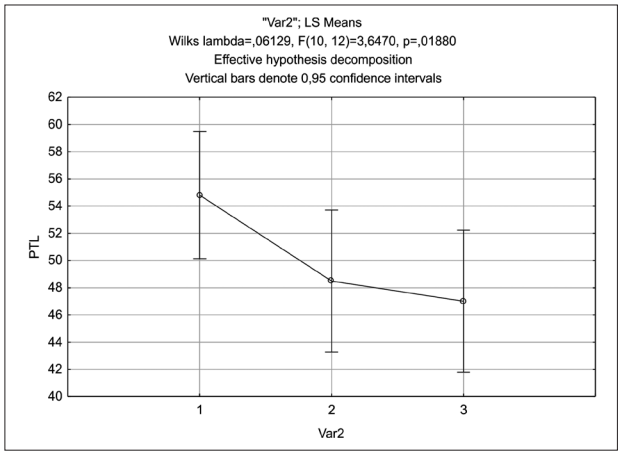
Graph 3. Results of ANOVA in SDM



Graph 4. Results of ANOVA in PUR



Graph 5. Results of ANOVA in PTL



CONCLUSION

Highly developed motor skills are one of the factors of success of athletes, respectively they have a big influence on achieving sports results. We can say that it is difficult to expect a good competitive result if an athlete does not have, along with quality technical and tactical preparation, developed motor and functional skills. The analysis of competitive results which coach administers must take into account all the factors that affect achieving the results, and if the athlete or group of athletes lags behind a certain factor within the entire equation of success, coach must take the necessary steps to bring the athlete closer to the set performance standards within their sport and their age.

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FORMATION OF SPECIALIZED PERCEPTIONS IN JUDOISTS BY MEANS OF RHYTHMIC AND MUSICAL EDUCATION

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INTRODUCTION

The situative motor activity of the judoist is expressed in certain coordination mechanisms, touching upon psychical processes that determine the quality of the technical action execution (Bleer, 2009; Lech et al., 2011). The technical action reproduction in the process of wrestling presupposes for the sportsman a good level of special training, which provides complex motor skills, some of them being psychomotor ones which allow to control and regulate the motor activity of the fighter (Lech et al., 2015; Miarka et al., 2012; Nazarenko, 2000). The coordination skills of the fighter are especially influenced by the specialized perceptions. By perception in sport activity are understood sport feelings, characterized by the sensory types of perception (sense of distance, opponent, tatami, equilibrium, space, rhythm etc. (Polevaia-Secareanu, 2015).

The result of the specialized senses perception are the motor activities that are represented by different types of reactions: to a moving object, sound, light (Polevaia-Secareanu, 2016; Imamura, 2007). In fighting they are manifested as response actions to the referee order, opponent's actions, hint of a side trainer etc. Each throw has its motor activity structure. As for example: „Hip throw" is executed in almost all types of fighting, but the throw structure, its rhythmic basis and motor „икт" (stressed syllable) can be different. That is why when studying the technical actions it is important to start from the peculiarities of the fighting type, its motor characteristic. This, in its turn aims to the process of the correct selection of teaching means and methods, which allows for the accelerated education of the motor action structure of fighters (Polevaia-Secareanu, 2016). In this regard, **the goal of the research** is to analyze the effectiveness of rhythmic education means and music use in the learning and training process of judoists.

METHODS

Theoretical analysis and generalization of literature and document data; analysis of learning and training process in judo; methods of testing the parameters of specialized perceptions, technical training; method of mathematical processing and interpretation of statistical data.

The appreciation of motor abilities was made with the use of tests that determined the specialized perceptions of „senses": of *rhythm, tempo, time, equilibrium, space*. From this perspective, we elaborated an experimental judo program tested on the students of the State University of Physical Education and Sports of the Republic of Moldova (Polevaia-Secareanu, 2016). In test participated 30 persons out of whom were created the experimental and control groups, 15 judo students in each of them. There were tested means of rhythmic education and music for a purposeful formation of the rhythmic structure of motor actions in fighting, which allowed us to project the algorithm of training of judoists at the stage of initial sport specialization (table 1).

Table 1. Creation algorithm of motor activity of judoists using the means of rhythmic education and music at the stage of initial sport specialization

Stage	*I*	*II*	*III*
Training	*OPT + SPT* →	*SPT + TR* →	*TTT*
Rhythmic structure of motor activity	Coordination and rhythmic activity	Rhythmic structure of motor activity	Rhythmic and structural organization of the whole motor activity

The identification of consecutive and interrelated stages of training oriented towards the formation of rhythmic structure of motor activity of judo students is essential for the elaboration of the present algorithm.

At the first stage were set the tasks of psychomotor abilities creation, especially the formation of motor coordination, based on the sense of rhythm. During the first stage process in special and overall physical training were included general and special exercises, action and music games. During the educational and training process were listened musical tracks of different genres, after which these rhythmic patterns were reproduced by means of clapping, stomping and snapping. During the circuit training in the fitness room were used coordination and rhythm tasks which were executed with the accompaniment of music tracks. The given stage is basic for the formation of rhythmic structure of the motor act in future.

At the second stage the special training also includes coordination and rhythmical exercises with the use of music, which were elaborated on the basis of technical elements of competitive type, on the basis of which the rhythmic structure of concrete technical act was created.

The third stage presupposed the realization of technical and tactical actions in „Randori" sparring, matches during competitions, where was shown the entire rhythmic and structural organization of specialized motor actions.

For the creation of rhythmic structure of motor action of judoists we used means of musical expression, among which we can point out *rhythm, rhythmic pattern* and *tempo* (Lech et al., 2011). The combination of exercises with different structure, completed with hands positions, gesticulation, and sound accompanying (claps, stomps and snaps) contribute to the development of motor coordination. The complexity of motor action structure is caused by the necessity to remember a big amount of comparatively independent movements. This requires the development of professional memory, and such qualities as diligence, clarity and completeness of visual representation, accuracy in movement reproduction.

In the educational and training process were included also *musical and rhythm games*, which are both means of musical and physical education. With their help is developed the sense of rhythm and tempo, ear for music, musical memory. Students acquire skills in execution of movements in conformity with means of musical expression; correct understanding of music and execution of movements in conformity with its content and type. Musical and rhythmic games contribute to the improvement of movement coordination and space orientation (Aftimciuc, 2005).

The presented means have their internal integration, which manifests itself in the cumulative effect of the lessons, where one means completes the other with the aim of the consolidation of the skill acquired during training. First of all, this refers to the complex psychomotor skill of motor coordination which includes visual and hearing coordination.

Within the frame of our program with the help of means of musical and rhythmic training were elaborated the following groups of exercises:

– exercises that form the sense of rhythm; exercises that form the sense of tempo; exercises that develop complex coordination; activate attention; exercises oriented towards the development of the sense of equilibrium; games for the development of the sense of rhythm, tempo, coordination.

The exercises were used at the preparatory, basic and final parts of the learning and training process of judoists.

In this perspective were synthesized special preparatory exercises oriented towards the education of the movements that appear directly in the process of sparring. In conformity with them there were selected the following technical actions: Double Shoulder Throw (Morote-Seoi-Nage), – Major Outer Sweep (O-Soto-Gari), body drop (Tai-Otoshi), Advanced Foot Sweep (De-Ashi-Barai). There also can be included such elements of technical acts as Uchi-Komi, which were made: in front of the mirror, with counting, under the accompaniment of music tracks with strictly determined accentuated moments and pauses, culminations, diminuendo.

RESULTS

On this basis, in conformity with the research tasks, we had established an analysis of the specialized perceptions indicators and the results of the technical training testing of judo students in experimental and control groups (Table 2).

Table 2. Comparative analysis of the base values of the specialized perception and technical training of judo students

№ p/n	Test name	$\overline{X} \pm m$		t	P
		Control group	*Experimental group*		
		Initial	Initial		
Specialized perceptions					
1	Sense of „rhythm" (point)	5,55 ± 0,16	5,60 ±0,15	0,23	>0,05
2	Sense of „tempo" (point)	6,50 ± 0,45	6,70 ± 0,45	0,31	>0,05
3	Sense of „time", s	0,751±0,20	0,73±0,20	0,062	>0,05
4	Sense of „equilibrium", s	4,17 ± 0,19	3,90 ± 0,19	1,00	>0,05
5	Sense of „space", (nr. of times)	5,60 ± 0.32	5,80 ± 0,30	0,45	>0,05
Technical training					
6	Specialized test, (nr. of times)	3,40 ± 0,18	3,46 ± 0,18	0,24	>0,05
7	Special technical test, (nr. of times)	32,20 ± 1,06	32,26 ± 1,05	0,04	>0,05
8	SPURT, s	51,59 ± 1,72	50,85 ± 1,68	0,31	>0,05

Note: n_1=15, n_2=15, (f=28) with $P < 0,05$, t = 2,048; $P < 0,01$, t = 2,763; $P < 0,001$, t = 3,674

From Table 2 follows that the judo students of the experimental and control groups at the beginning of the pedagogical experiment do not have significant differences in all the studied parameters, which is indicative of their relative uniformity (P>0,05).

The dynamics of indices, obtained at the end of the experiment is presented in table 3. Here we can see that the data obtained for all studied parameters have changed to better.

But in the control group out of five parameters of specialized perceptions only two – the sense of equilibrium: t = 2.61; sense of space t= 2.20 – have identified significance of differences for initial and final data with P<0,05. This situation can be motivated by the fact that the execution of any motor action is followed by the change of effort under the influence of the vestibular and organic analyzers. This is reflected, first of all, in the development level of the sense of equilibrium and space, because, according to (Nazarenko, 2000, p. 54), the space orientation is one component of the „multicomponent motor and coordination skill" – equilibrium.

In wrestling the above mentioned senses are manifested in a special way because there is a contact with the opponent. That is why all the learning and training process in judo is based on the categories under discussion.

In the experimental group, in comparison with the control one, the indices of the sense of equilibrium (t=3,33) and sense of space (t = 4,92) stand well above, which is confirmed by the level of certainty, respectively P < 0,01; 0,001. Similar positive results can be identified for other three parameters of specialized perceptions.

Table 3. Dynamics of specialized perceptions and technical training of judo students in control and experimental groups

№	Parameters	$\overline{X} \pm m$				$\overline{X} \pm m$			
		Control group		t	P	*Experimental group*		t	P
		Initial	Final			Initial	Final		
Specialized perceptions									
1	Sense of „rhythm" (point)	5,55 ± 0,16	5,67 ± 0,15	0,81	>0,05	5,60 ± 0,15	6,07 ± 0,12	3,61	<0,01
2	Sense of „tempo" (point)	6,50±0,45	6,74±0,44	2,02	>0,05	6,70 ± 0,45	8,60 ± 0,42	3,19	<0,01
3	Sense of „time", s	0,75±0,20	0,67±0,13	0,45	>0,05	0,73 ± 0,20	0,43 ± 0,078	2,03	>0,05
4	Sense of „equilibrium", s	4,17 ± 0,19	4,60 ± 0,18	2,61	<0,05	3,90 ± 0,19	5,40 ± 0,16	3,33	<0,01
5	Sense of „space" (nr. of times)	5,60 ± 0,32	6,26 ± 0,31	2,20	<0,05	5,80 ± 0,30	7,13 ± 0,28	4,92	<0,001
Technical training									
6	Specialized test, (nr. of times)	3,40 ± 0,18	3,47 ± 0,18	0,37	>0,05	3,46±0,18	4,00±0,17	4,15	<0,001
7	Special technical test, (nr. of times)	32,20 ± 1,06	32,73 ± 1,04	0,53	>0,05	32,06±1,05	35,73±1,00	3,57	<0,01
8	SPURT, s	51,59 ± 1,72	48,17 ± 1,66	2,15	<0,05	50,85±1,68	43,47±1,54	4,82	<0,001

Note: n_1=15, n_2=15, (f=14) with $P < 0,05$, t = 2,145; $P < 0,01$, t = 2,977; $P < 0,001$, t = 4,140

A similar situation can be noticed for the technical training set. Out of three tests reflecting the level of technical training of judo students in the control group, only one, SPURS, confirmed the validity of the obtained results (t = 2,15; P<0,05). While in the experimental group the same test (t = 4,82) presented a level of certainty P<0,001. The indices of the other two test („specialized test": t = 0,37; „special technical test": t = 0,53) have not measured up the expectations for the traditional methodology of training the judo students of the control group at the initial state of the sport specialization (P>0,05). Therefore, the current learning and training university program for judo is basically oriented towards the education of the speed and strength endurance, that provides the SPURT test. And in the case of the special technical test, which is oriented towards the development of the same skills, it is worth mentioning that the introduction of the 10 seconds pauses between the sets was the factor that disturbed the rhythmical execution of throws. In the experimental group this test (t = 3,57) brought to light a certainty of the formed abilities with P<0,01, because the tried and tested rhythm at the throw execution became firmly established as a specialized motor skill. As for the specialized test it can be noticed that it is oriented towards the identification of the ability for space orientation, maintenance of vestibular tolerance, display of speed and strength skills. After the analysis of its indices it can be noted that the content of the exercise lessons as a part of the experimental program allowed for the formation of the complex ability to combine the motor actions of judo students in the experimental group, reflecting different characteristics (t=4,15; P<0,001).

CONCLUSION

In this manner the present statement leads to the conclusion that during the pedagogical experiment the used means and methods of the experimental program, oriented towards the education of the motor rhythm, had a positive influence on the indices of specialized perceptions and technical training of the judo students form the

experimental group. More than that, the experimental program, elaborated and approved by us, for the university judo students training at the initial stage of the specialized training with the use of the rhythmic education means and music, allows for the intensification of the physical training process on a higher and more qualitative level. It is identified an accelerated formation of the necessary level of special physical training of judoists in the experimental group in comparison with the control one. In this context, due to the directed application of the effective means recommended by us, the saving of the study time can be up to 30 % of the total amount.

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