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FOREWORD

Ladies and gentleman, dear all participants and readers of the 6th SCIENTIFIC AND PROFESSIONAL CONFERENCE ***„APPLICABLE RESEARCH IN JUDO“*** proceedings book.

The European Judo Union, The Croatian Judo Federation and the Faculty of Kinesiology of the University of Zagreb *(Croatia)* are organizing this joint research conference for the SIXTH time.

Here we are together again in Poreč after a three-year break caused by the Covid pandemic.

To remind you, we started in 2015. in Zagreb and moved to Poreč in 2016. and we were there until 2019., and we remain here.

Our invited lecturers and participants were Olympic winners and European and World champions and medallists, best judo sport scientists and researchers, most influential coaches from all over the World, judo professors and lecturers as well as judokas and their coaches who wanted to listen about new knowledge in judo sport.

This year we will continue with the same tradition and we tried to maintain the quality of the conference as before.

This year's conference is bigger than ever before in Poreč and will host many researchers who will present many interesting topics. This year invited lecturers will present their work, for the first time, both theoretical and practical.

We would like to remind you that this conference is called applicable research in judo for several reasons.

First we wont to preesent papers and result of research witch is applicable for judo trening and can improve judo sport in many ways .

Second, judokas from Europe, ex competitor, coaches, trainers researchers and professors give their opinions from results of their research and experiences through their scientists and professionals papers.

Third, from the first conference till today our Conference offered materials and papers that are useful for trainers and coaches for beginners to high class judokas.

We are all very happy to be a part of this six edition of this conference and we hope that all of you will enjoy in oral and practical presentation of results of this year presenters.

Thanks to everyone who, with their papers, suggestions, reviews and other activities necessary for the organization of a scientific conference, contributed that the Conference each year is better and better, and we expect that this one surpass the ones held so far.

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TEACHING AND TRAINING JUDO TO ATHLETES: ACTIVE AND TRADITIONAL METHODOLOGIES CONTINUUM

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INTRODUCTION

Judo is a Japanese martial art founded by Jigoro Kano in 1882 and became the official Olympic sport for men in 1964 *(Tokyo)*, promotional for women in 1988 *(Séoul)* and official in 1992 *(Barcelona)*. Sport is a multi-faced concept, normally intends as 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 *(Cambridge Dictionary, n.d.)*.

Sports competition and training evolve over time mainly due to changes in competition rules and training methodologies. Training methodologies may change thank to research within sports science disciplines aiming to improve athlete/team performance through its translation into practice *(Bishop, 2008)*.

Therefore, even in sport, the teaching and training methodology could follow an evidence-based approach, to allow sports operators to update and use the most modern methodologies, because it is scientifically proven that this approach improves many aspects of the athlete's performance *(Bishop, 2008)*, and of injury prevention *(Pocecco et al., 2013; Rosenblat Ben, 2015)*.

Olympic Judo, as sport, needs the same up-to-date approach on the best methodologies to improve the Judo athletes to face the training and the competition in the best way and for as long as possible, as a youngster and as a veteran Judo athlete.

Athletes are a heterogenous group: from 6 years old to veteran *(80 years old)*, female or male or other, different weight, different height, different physiology, different agility, different way to learn, different phycology, different way to feel Judo, different way to experience the competition, different way to live the sport.

Teaching and training methodology must respect an important principle: the individualization of the training stimulus *(Weineck Jurgen, 2009)*.

Active methodology, classified as innovative one, can help the teaching and training process also in Judo, allow the athlete to be at the center of the process and learn to learn to be successful *(Calmet Michel, 2022; Pierantozzi Emanuela, 2022)*.

Active and traditional methodology

The first question to answer is: what are the aims of our training?

Train an athlete to be autonomous, responsible, able to find solutions and make decisions.

These aims have been part of European schools since the “Siècle des lumières”, and they are still relevant today. They can be found in a recent article *(2023)* by Jane Bridge in the Esprit du Judo magazine, in her chronicle section:

“A judoka, who searches everywhere by his own means, who accumulates and analyzes information alone, who thinks about situations and finds solutions, who manages to set up a system based on the principles of Judo that make the difference, and not always apparent when you watch some athletes combat..."

Simplifying the approach to teaching and training athletes in Judo, we can describe two methods: traditional and active method. One hand, the traditional method sees the teacher/coach at the center of the process and the student reproduces the proposal, which we also call the "top down" methodology. On the other hand, the active method the one

in which the student is at the center of the learning process and actively participates by producing possible solutions, which we call "innovative".

Active judo methodology integrated with traditional methodology was described 45 years ago in France *(Vial Patrick et al., 1978)*. Michel Calmet schematized and combined the two methods *(fig.1)* for a recent online seminar to train Italian martial arts teachers *(Calmet Michel, Emanuela Pierantozzi, 2022)*.

This part could be a kind of methodology or framework to analyze.

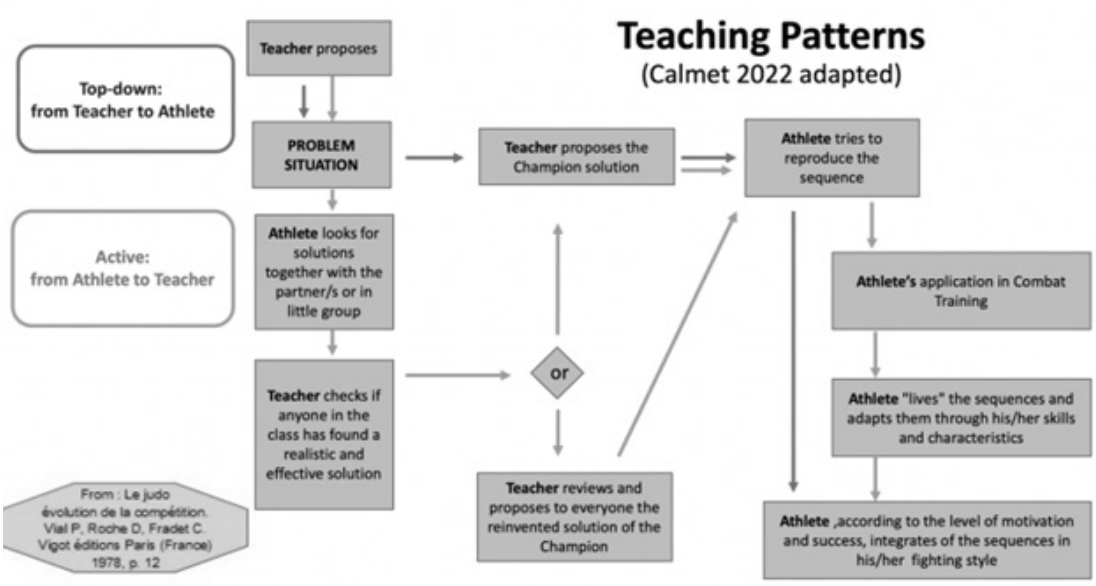

***Fig.** 1: Top-down (Traditional) and Active (Innovative) Teaching Patterns (Vial P. et al. 1978, adapted Calmet - Pierantozzi)*

These methods are connected, they could be a continuum: when the active methodology fails because of a problem *(teacher knowledge and skills, team knowledge and skills, student/team maturation or motivation, etc.)*, the students and the learning process need to go further because of certain situations *(limited time, security priorities, competitive pressure, etc.)*, then the traditional method can be used, where the coach gives the champion's solution to the class.

We have an example about kata. If the concept of kata is not well understood by learner/apprentice/kid, kata could be understood as an obstacle to progress in judo and obtain degrees or dan. To teach kata, we often think about model and traditional or top-down pedagogy: the master knows, and the learner/apprentice/kid does not know.

Active methodology is based on a cognitivist approach: the apprentice can find, retrieve, and put together things already known, but she or he cannot do it alone; he/she needs an environment, a teacher, practice partners and guidance to learn and facilitate learning *(Calmet Michel et al., 2024)*. In this paper *(Calmet Michel et al., 2024)*, we have shown that apprentices could find the principles of the gonosen-no-kata and we think that this methodology could be extended to other kata such katame-no-kata or kime-no-kata or goshin-jitsu. We are also closely following the development of kodomo-no-kata a new kata for children *(International Judo Federation, n.d.)*. This kata can become a way for the child to formalize his or her knowledge and understanding of the concept of kata if it is taught with active teaching methods.

Advantages and limitations of the two methods

Every strategy a teacher adopts has advantages and limitations. In short, a few methods advantages:

Active methodology:

- Athlete learns more deeply everything and learn to learn, learn to create, impower his/her personality and self-confidence.

- Teachers and Athletes have a more direct interaction: Athlete receive frequent and immediate feedback from instructors during active learning activities.
- Athlete learns through collaboration and interaction with other Athletes, engaging more deeply with course content and acquiring valuable social skills.
- Teaching is more inclusive: Athletes with different learning styles receive a personalized experience.
- Traditional methodology:
- Less time to teach a new Judo skill.
- The teacher could find quick and more effective solutions to Judo problems than his/her athletes.
- The teacher strictly controls the training process.
- In short, a few methods disadvantages.
- Active methodology:
- New possible solutions found by the athletes not necessarily known by the teacher, so the teacher could become more human and less superhuman in the eyes of his/her pupils.
- The athletes would wrong the solutions in competitive situations.
- Traditional methodology:
- Lack of participation from Athletes.
- Teacher resistance to change and lack of creativity (teacher and athlete).
- Teacher could select athletes closest to his/her teaching/training style and eliminate those who differ.
- The athlete does not learn autonomously to solve new problems that may arise in competition.

Although both methods have advantages and disadvantages, innovative teaching and training sees the student at the center of the process. Furthermore, in sport today, teaching and training methodologies place the athlete at the center, as the active protagonist of his/her growth process.

Judo Asian Martial Art

Judo is an East Asian martial art and some researchers, such as Wojciech J. Cynarski *(2018)*, have raised questions about the philosophy of Asian martial arts, which directly or indirectly influences the way of practice in the training room, trying to understand the impact of ideas on teaching and training methodology. The author found that some martial arts leaders focus more on tradition while others are innovative, albeit to different extents, which directly or indirectly influences the way of practicing in the dojo *(Cynarski, 2018)*.

Judo was created by Jigoro Kano, adapting jujutsu to the ideas of physical education, sport and Olympics, however not every Judo student is combat sport athlete and not every Judo master teach Judo as sport, who teach and train Judo as Sport must update itself and possibly enrich the teaching and learning methods with the most modern strategies, useful for the best development of the student, of his /her own athlete.

Some practical examples

Active Methodology, in this situation student are looking for solutions:

a. Examples with beginner Judo athletes:
   → Nage waza - Kuzushi, collaborative situation, problem and question: “In Judo standing combat we have to break opponent balance to throw down him/her. What and how many directions to break Uke balance are there in standing static situation?”
   → Ne waza – rolling for osae komi, collaborative an/or oppositive situation, problem and question: “in Judo ground combat, we can win by keeping the opponent on his/her back to the ground for 20 seconds. If Uke is prone on four supports, how could Tori put Uke’s back on the tatami?”
b. Examples with high level Judo athletes:

→ Nage waza – Kumi kata, collaborative situation and/or oppositive, problem and question: “In Judo combat the chance to throw the opponent start from a good Kumi kata on the judogi. How to manage the Kumi Kata in Kenka yotsu situation, when the opponent gets Hight Kumi Kata and close the your head?”

→ Ne waza-transition, collaborative and/or oppositive situation, problem and question: “in Judo combat the transition control gives the ability to get ippon on the ground if there isn’t ippon in tachi waza situation. How many transition situation Tori can create and handle after an O Uchi Gari attack?”

Traditional Methodology, in this situation the teacher shows the solutions:

a. Examples with beginner Judo athletes:

→ Nage waza - Kuzushi, collaborative situation, problem and solution: “In Judo standing combat we must break opponent balance to throw down him/her. In Judo we have 8 different directions to break balance to Uke”

→ Ne waza – Rolling for Osae Komi, collaborative an/or oppositive situation, problem and solution: “in Judo ground combat we can win by keeping the opponent on his/her back to the ground for 20 seconds. If Uke is prone on four supports, we can attack from his/her side, grasp his/her arm with our 2 arms and pull and push to roll on his/her back”.

b. Examples with high level Judo athletes:

→ Nage waza – Kumi kata, collaborative situation and/or oppositive; problem and solution: “In Judo combat the chance to throw the opponent start from a good Kumi kata on the judogi. When the opponent closed your head-collar, first you must put your front against the chest opponent's shoulder lapel grip side, thus creating sufficient space to place a lapel side grip under the corresponding opponent's armpit, push the corresponding arm and thus regain an upright position and control of one's position.”

→ Ne waza- Transition, collaborative and/or oppositive situation; problem and solution: “in Judo combat the transition control gives the ability to get ippon on the ground if there isn’t ippon. When Tori throws by O Uchi Gari the opponent, Tori can be in 3 possible situations with those 3 different solutions...”

CONCLUSION

In combat competition, Judo athletes continuously must solve problems, often unpredictable. The movement must be adapted to attack, judoka must defense or counterattack the opponent, in standing, transitioning or ground situations. To be successful in combat athletes need, overall, to surprise the opponent with a timing and powerful throw, or precise movement to control, choke or armlock him/her in ne waza.

To build these skills in the athletes, the coach must teach and train the students to be able to autonomously produce effective solutions during combat in the competition situation. The active teaching and training methodology, combining with the traditional way, could help trainer to achieve this goal.

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SPECIFIC TESTS AND MONITORING IN JUDO TRAINING

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ABSTRACT

Training monitoring methods would help to increase control over the training prescription for judo athletes, thus improving performance and avoiding problems associated with overtraining, injury, and burnout. The aim of this paper is to present the characteristics of the main specific tests used in the field of judo and to reflect on how to monitor high performance judokas. A characteristic of judo is the presence of high intensity repetitive efforts that require multiple aerobic and anaerobic metabolic pathways. To the best of our knowledge, it is very difficult to find a single test that simultaneously assesses all performance factors in judo. There is a tendency in judo-specific events to use technical skills. It is important to note that the tests use these skills in standardized situations that do not occur in practice. Caution should be exercised when assessing endurance in judo, as the tests are not entirely accurate due to the complex nature of the sport. There is more consistency in the assessment of aspects related to strength. There is a wide range of methods available to evaluate the training process in judo. It is very convenient to apply an individualization of this evaluation.

Key Words: *Specific tests, assessment, judo, evaluate, CMJ, HRV, WER, Time to exhaustion.*

INTRODUCTION

Competitive judo is a combat sport that alternates periods of high intensity with periods of pause motivated by the situations of the match. Its actions are based on grappling in which the opponents try to throw, immobilize, or submit *(through a technique of strangulation or blocking of the elbow joint)* each other to win the fight, alternating situations standing and, on the ground, demanding a high technical and tactical development to achieve success *(Agostinho et al., 2015)*. Because the physical demand is very high, physical preparation and control of training loads also play an important role in this sport *(Franchini, Vecchio, et al., 2011)*.

Judo has a very complex structure, its nature combines different physical skills, technical, tactical, and psychological aspects. There is no single physiological model, therefore, there is no consensus in the literature about a marker that can be used as a predictor of performance and training control variable. According to Julio et al. *(2017)* the metabolic pathway that predominates in a judo bout is the contribution of the oxidative system *(70%)*, followed by the ATP-PCr systems *(21%)* and finally the glycolytic pathway *(8%)*. The work-pause ratio is 2:1 to 3:1 and out of the 4 minutes of the competition bout, more than 50% of the time is spent in the grappling contest.

Judo coaches and trainers need information about the training process. Affordable training monitoring techniques would help to increase control over the training prescription for these athletes, thereby improving performance and avoiding problems associated with overtraining, injury, and burnout. The aim of this paper is to show the characteristics of the main specific tests used in the field of judo and to reflect on how to monitor high performance judokas.

WHY IS IT IMPORTANT TO EVALUATE?

When a measurement is made, it consists of recording qualitative/quantitative information and when it is evaluated, what is done is to use that information to make decisions, that is, to interpret the information to find a solution.

The information provided by specific judo tests can be used in many ways, the results obtained can be used to know the current state of our athlete in relation to the benchmark in his category. It also helps to know the status and development of our athlete in comparison with previous tests. All these data can be used to check if the evolution of the plan is as expected and if we are applying the appropriate training.

There is a tendency to design specific judo tests that evaluate physical condition in conditions similar to combat or competition, thus trying to simulate real conditions and get as close as possible to the experience lived by athletes during competition or training. Generic tests can also be used, but specific tests have a more attractive ecological component and have the appearance of greater rigor, an aspect that is not objectively demonstrated. Chaabene et al. *(2018)* developed a study aimed at systematically reviewing the available literature and critically analyzing the methodological quality, validation data and feasibility of sport-specific tests in Olympic combat sports, in this sense questioning the validity of some tests commonly used in judo and other combat sports.

SPECIFIC TESTS IN JUDO

As described in the previous paragraphs, a characteristic of judo is the presence of high-intensity, repetitive efforts that require multiple aerobic and anaerobic metabolic pathways. To the best of our knowledge, it is very difficult to find a single test that simultaneously evaluates all performance factors in judo.

Specific tests include specific skills *(throwing or simulated fighting)*. Obviously, there is a tendency to design tests to evaluate judo performance as similar as possible to sport practice. In this sense, it must be considered that a simulated evaluation based on technical elements performed in a submaximal and standardized manner is no longer a specific evaluation, so that the information is no longer accurate, since the practice of judo does not conform to standardized parameters, but on the contrary is characterized by uncertainty and the constant appearance of changing situations.

Many of the specific tests involve the repetition of a technical skill of the sport for a certain period of time or until fatigue. This is an aspect that causes some controversy among coaches, as it is discussed whether a poor technical execution can be a good evaluation criterion. At the very least, it could be argued that it is useful to observe how efficiency is lost as fatigue sets in.

Often coaches seek an individual evaluation of each of their athletes, in this sense less specific tests are often used, but which have shown a consistent relationship with judo performance *(Chaabene et al., 2018)*, for example the 1RM test, isokinetic strength tests, CMJ or repeated jumps, Wingate test, or the maximal aerobic capacity test. Table 1 shows the most common judo specific tests.

Table 1. Judo specific tests

TEST	AUTHOR
Course Navette adapted to judo.	(Thomas et al., 1989)
Special Judo Fitness Test (SJFT).	(Sterkowicz, 1995)
JMG Test.	(Garcia, 1999)
TEP test.	(Villani, 2001)
Blasco Test.	(Blasco-Lafarga, 2008)
Azevedo's judo endurance Test.	(Azevedo et al., 2007)
Uchi-komi Fitness Test (UFT).	(Almansba et al., 2012)
Santos Test.	(Santos et al., 2010)
COP Test.	(García García, 2012)
Judogi Grip Endurance Strength Test (JGST).	(Franchini, Miarka, et al., 2011)
Specific Judo Battery of the University of Zagreb	(Segedi et al., 2014) (Sertić et. al, 2015)
Special Fitness Test for Combat Sports (SFTCS).	(Błach et al., 2021)
Judo Aerobic Test	(Figueiredo et al., 2022)

MONITORING PERFORMANCE IN JUDO

In addition to specific tests to assess physical fitness, modern judo incorporates several systems to continuously monitor the training process. Typically, these systems are inexpensive, easy to use, and can be administered frequently without requiring a great deal of time.

Rate of Perceived Exertion (RPE)

It has been shown to be useful at different levels of competition and for different genders to monitor the workload of mixed sessions and individual randori in judo, currently quantified using a Borg Category Ratio-10 *(CR-10)* RPE scale multiplied by the duration of the session *(Bromley et al., 2018)*. Often, the load perceived by the athletes does not coincide with that programmed by the trainers *(Viveiros et al., 2011)*.

Well-being test

One of the most commonly used instruments to assess general indicators of athlete well-being is the Hooper test *(Hooper & Mackinnon, 1995)*. It is based on a psychometric questionnaire of sleep quality, perceived fatigue, general muscle soreness, and stress levels on a 7-point scale *(scores from 1-7 with 0.5-point increments; 1 and 7 represent poor and very good well-being, respectively)*.

Heart Rate (HR)

Many methods using HR calculate the accumulated time in different HR zones and are recommended for intermittent efforts. There is a progressive weighting factor for each HR zone, and this weighting factor is calculated taking into account the elapsed time in each zone.

HR-based methods are less suitable for controlling internal TL in randori sessions. Detanico et al. *(2012)*noted that HR is not a good indicator of exerted effort in judo; HR does not even correlate in a significant way with aerobic capacity during randori. Moreover, Franchini et al. *(2013)* showed that HR was unaffected by changes in the work-pause ratios of different judo-specific training tasks, but oxygen uptake was affected.

Heart Rate Variability (HRV)

The analysis of HRV dynamics provides information on the state of the autonomic nervous system, indicating whether there is a sympathetic or parasympathetic predominance, and thus allows the monitoring of both physical and mental stress in athletes *(Morales et al., 2014)*.

Counter Movement Jump (CMJ)

The CMJ is widely used for its ease of measurement in the field. It is characterized by its ability to detect states of fatigue and its relationship with levels of strength and performance. It has been frequently used in studies in the field of judo to observe the evolution of performance and fatigue *(Carballeira & Iglesias, 2007; Detanico et al., 2012b; Kons et al., 2021; Serrano-Huete et al., 2016)*.

F/V Profile

One testing method that has recently received widespread attention is the assessment of muscle function using the force-velocity *(FV)* relationship. In short, modeling force and velocity data collected under three or more loading conditions provides a line that allows assessment of the selective ability of muscles to produce maximal levels of force *(F0)*, velocity *(V0)*, and power *(P0) (García-Ramos et al., 2019)*. In this way, we can observe whether our athletes have a force or speed deficit.

Time to exhaustion

The complex nature of randori in judo makes it difficult to quantify the training load. During participation in randori-based training camps, trainers find it difficult to adjust the workload. Often, the sensations of each athlete are used.

With the intention of objectively quantifying this type of work, an adaptation of the WER method was developed, in which the load can be estimated before the session from the maximum work capacity as a function of time to exhaustion. Desgorces et al. *(2007)* propose a formula to calculate the internal load from the external load using the time to exhaustion.

In judo, a protocol has been developed to calculate the Randori Maximum Time to Exhaustion *(RMTE)*. It is based on a continuous standing randori in which the UKE is changed, and the TORI is maintained until exhaustion *(Morales et al., 2016)*. The stopping can be voluntary, or the trainer can consider that it is not possible to continue.

It is a good tool to anticipate the internal load by programming the external load. It has some limitations, such as the fact that adaptations can be made in a period of 4 weeks and the RMTE can improve, so it would have to be tested again. The development of this test is very aggressive because it takes the athlete to the limit and is not very well accepted by them.

CONCLUSION

There is a tendency in judo specific tests to use technical skills. It is important to note that the tests use these skills in standardized situations that do not occur in practice.

Caution should be exercised when evaluating endurance in judo, as the tests are not completely accurate due to the complex nature of the practice. There is more consistency in the evaluation of aspects that are related to strength.

There is a wide range of methods available to assess the training process in judo. It is very convenient to apply an individualization of this assessment.

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JUDO IS, IN ITS ESSENCE, A SYMMETRICAL SPORT – BUT IS IT IMPACTING AND DEVELOPING JUDOKAS BODIES IN THIS WAY?

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ABSTRACT

Objective. Judo is supposed to represent a sports discipline that symmetrically develops both sides of the human body. This study aimed to review the literature on morphological *(a)*symmetries in judo. **Methods**. The literature search was conducted via PubMed, SPORTDiscus and ResearchGate databases and included all works published until December 2020 where papers written in English and where full text was available were included. Review papers, case studies, conference abstracts and books were excluded from the final selection. **Results**. Twelve studies met the inclusion criteria. Methods used to evaluate morphological symmetries were: Classical Anthropometry, 3D Body Scanning, Bioelectrical Impedance and Ultrasound Imaging. The most frequently identified asymmetry is the forearm girth, followed by the elbow, thigh, and calf girths. **Conclusion**. The study presents a review of scientific works on the topic of morphological *(a)*symmetries in judo. This indicates that judo-specific training causes specific morphological adaptations in judokas. However, how they are caused and their impact on performance is unclear. Therefore, further work should combine morphological and functional asymmetries to understand asymmetries' impact on judo performance better. In addition, a unified methodology for judokas should also be used, where researchers should report dominant and non-dominant body sides related to combat stances.

Key Words: *judo, symmetry, asymmetry, technology, laterality, screening*

INTRODUCTION

Judo is supposed to represent a sports discipline that symmetrically develops both sides of the human body *(Mala et al., 2015)*. Therefore, the judo exam program for the Kyu and Dan belts requires judokas to demonstrate the knowledge of performing all throwing techniques and kata elements bilaterally *(Šimenko, 2018)*. Regular bilateral implementation of technical elements leads to the consistent development of the athlete's body and reduces the possibility of injury. Unfortunately, we often see that young judokas begin to specialise prematurely in the desire for quick and good results in younger age categories *(Simenko et al., 2017)*. In practice, this means countless repetitions of the implementation of the judokas special technique *(tokui waza)*, with which the judoka achieves the most technical points, and it is usually only performed in the athlete's dominant side *(Drid et al., 2010)*. This can lead to potential body and muscle asymmetries such as flat feet, asymmetry of the shoulder joint, body posture with an excessive tilt of the head forward and asymmetry in the position of the shoulder blades *(Castropil et al., 2014)*. However, despite this, according to the literature, judo belongs to the sport that causes the lowest values of body asymmetries *(Krawczyk et al., 1998; Mala et al., 2019)*. Therefore, this work will aim to present a mini-review on the topic of morphological *(a)*symmetries in judo.

METHODS

Protocol and search method

The literature search was conducted via PubMed, SPORTDiscus and ResearchGate databases and included all works published until December 2020. The search used the following terms: judo OR combat sports OR symmetry OR asymmetry OR body OR morphological. Additional literature was identified by checking the identified papers' reference lists.

Inclusion and exclusion criteria

Papers written in English and where full text was available were included. Review papers, case studies, conference abstracts and books were excluded from the final selection.

RESULTS

Overall 12 papers were included in this mini-review. Table 1 presents papers that analyse morphological symmetries of judokas with the method of classical anthropometry.

Table 1. Studies on judo morphological symmetries done with the method of Classical Anthropometry

AUTHORS	(Socha et al., 2017)	(Krstulovic et al., 2017; Kuvačić, 2017)				(Krawczyk et al., 1998)	BODY SIDE
No. of participants	25	14	24	14	14	13	
Gender	F	M	M	F	F	M	
VARIABLES	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	
Arm length	/	/	/	/	/	78.20 ± 4.18	R
						77.66 ± 4.30	L
Upper arm girth	26.90 ± 2.03	/	/	/	/	35.02 ± 3.09	R
	27.00 ± 1.92					34.66 ± 3.23	L
Flexed biceps girth	/	35.60 ± 2.42	35.00 ± 3.19	32.40 ± 3.54	31.60 ± 2.08	/	R
		35.20 ± 2.69	34.54 ± 3.09	32.56 ± 3.66	31.26 ± 2.13		L
Elbow breadth	11.4 ± 2.8	7.6 ± 1.9	10.0 ± 3.5	14.9 ± 7.6	15.3 ± 4.9	/	R
	11.6 ± 3.1	7.5 ± 1.9	10.0 ± 3.5	14.7 ± 7.4	15.5 ± 5.1		L
Forearm Girth	23.66 ± 1.46*	29.28 ± 1.57	29.36 ± 2.75	27.06 ± 3.56	25.36 ± 1.02	36.64 ± 2.03*	R
	23.38 ± 1.52*	29.27 ± 1.58	28.89 ± 2.36	26.04 ± 2.35	25.51 ± 1.09	30.14 ± 1.87*	L
Wrist girth	/	17.84 ± 0.82	17.49 ± 1.51	15.81 ± 0.90	15.79 ± 0.55	/	R
		17.62 ± 1.50	17.41 ± 1.57	15.85 ± 0.96	15.72 ± 0.53		L
Wrist breadth	/	6.03 ± 0.25	5.87 ± 0.35	5.26 ± 0.30	5.16 ± 0.23	6.21 ± 0.28	R
		5.97 ± 0.23	5.80 ± 0.38	5.18 ± 0.32	5.13 ± 0.23	6.18 ± 0.32	L
Suprailiac skinfold (mm)	15.8 ± 5.6	/	/	/	/	/	R
	13.9 ± 4.2						L
Thigh girth	54.88 ± 3.81	54.26 ± 4.25	55.09 ± 4.48	53.85 ± 3.89	54.18 ± 4.48	61.72 ± 6.23	R
	54.55 ± 3.80	54.16 ± 4.07	54.96 ± 4.54	53.48 ± 4.35	53.80 ± 4.27	61.48 ± 5.93	L
Thigh skinfold (mm)	/	10.5 ± 2.8	13.9 ± 4.2	21.7 ± 9.3	23.5 ± 4.9	/	R
		10.5 ± 2.9	13.9 ± 4.2	21.4 ± 9.4	23.6 ± 4.8		L
Knee breadth	/	9.55 ± 0.58	9.65 ± 0.55	8.95 ± 0.54	9.01 ± 0.57	10.38 ± 0.80	R
		9.57 ± 0.55	9.70 ± 0.55	8.95 ± 0.54	9.03 ± 0.62	10.41 ± 0.81	L
Calf girth	35.06 ± 2.74	37.76 ± 2.36	38.16 ± 2.58	35.87 ± 2.91	35.27 ± 2.55	40.16 ± 2.75	R
	35.04 ± 2.70	37.67 ± 2.37	38.08 ± 2.62	35.74 ± 2.90	35.41 ± 2.45	39.95 ± 2.97	L
Calf skinfold (mm)	5.2 ± 1.3	10.0 ± 1.6	11.8 ± 3.8	16.2 ± 5.6	19.6 ± 7.8	/	R
	5.3 ± 1.4	10.0 ± 1.5	11.8 ± 3.8	15.3 ± 7.0	19.5 ± 7.7		L

***significant** *bilateral differences noted; all other variables are reported in cm; M-mean; SD-standard deviation; R-right side; L-left side.*

Table 2. Studies on judo morphological symmetries done with the method of 3D body scanning.

AUTHORS	(Šimenko & Vodičar, 2015)		(Kambic et al., 2017)		(Simenko et al., 2017)		(Šimenko et al., 2017)		BODY SIDE
No. Participants	10		10		10		10		
VARIABLES	M	p	M	p	M	p	M	p	
Shoulder height	141.87	0.5	143.90	0.76	/	/	/	/	R
	142.12		143.69						L
Armscye girth	45.14	0.89	43.80	0.42	45.38	0.91	/	/	R
	45.25		44.33		45.42				L
Arm lenght	57.46	0.36	58.83	0.25	58.24	0.41	/	/	R
	57.04		57.91		57.85				L
Upper arm girth	33.35	0.22	31.53	0.92	33.27	0.48	23.94	0.72	R
	32.87		31.5		33.06		24.07		L
Elbow girth	28.28	0.43	27.41	0.03*	27.76	0.003*	22.47	0.005*	R
	27.76		26.44		27.13		21.56		L
Forearm girth	28.58	0.03*	27.6	0.02*	28.9	0.019*	22.77	0.01*	R
	28.12		26.87		28.42		22.26		L
Wrist girth	17.49	0.07	17.8	0.57	17.86	0.83	15.8	0.09	R
	17.09		17.94		17.81		15.39		L
Waist height	101.67	0.19	103.44	1	/	/	/	/	R
	101.64		103.44						L
Leg lenght	102.47	0.18	104.26	0.52	104.25	0.11	/	/	R
	102.55		104.29		104.15				L
Thigh length	35.11	0.42	31.61	0.24	32.26	0.51	/	/	R
	35.05		31.47		32.17				L
Thigh girth	64.02	0.66	56.43	0.28	58.22	0.004*	47.06	0.559	R
	64.21		55.97		57.18		46.9		L
Mid-Thigh length	52.21	0.84	48.53	0.06	50.95	0.00*	/	/	R
	52.16		47.91		49.79				L
Mid-thigh height	67.01	0.19	65.2	0.32	64.18	0.07	/	/	R
	67.04		65.21		64.09				L
Knee height	50.04	0.17	49.43	0.18	48.48	0.08	/	/	R
	50.11		49.47		48.35				L
Knee girth	37.86	0.21	38.63	0.06	38.85	0.105	33.57	1	R
	37.57		38.34		38.36		33.57		L
Calf height	37.08	0.68	37.23	0.24	36.12	0.06	/	/	R
	36.98		36.14		35.46				L
Calf girth	35.98	0.56	36.9	0.15	36.88	0.037*	31.31	0.64	R
	35.91		36.46		36.34		31.22		L

***significant** *bilateral differences noted; all other variables are reported in cm; M-mean; p-significance value; R-right side; L-left side.*

Only one study reported fluid bilateral differences on a sample of 19 judokas between prefered *(P)* and non-prefered *(N)* body side for upper *(P 4.0 ± 0.7 l vs N 4.0 ± 0.6 l)* and lower limbs *(P 10.2 ± 1.5 l vs N 10.1 ± 1.4 l)* measured with electrical bioimpedance *(E-BIA)* Tanita MC-980MA *(Mala et al., 2019)*. No significant asymmetries were noted.

E-BIA was also used to report skeletal muscle mass *(MM)* differences in the upper and lower extremities. In youth male judokas, the asymmetries were noted in arms *(p=0.01)* and legs *(p=0.00)*, while in youth female judokas, the asymmetries were noted only in the legs MM *(p=0.00)* by Mala et al. *(2017)*. In senior judokas, E-BIA detected symmetrical distribution of arms and legs MM *(Šimenko & Vodičar, 2015)*.

Additionally, two studies used ultrasound imaging to evaluate muscle morphology *(Fukuda et al., 2018; Kons et al., 2020)*. Bilateral differences in ultrasound-derived muscle morphology of the vastus lateralis were noted; however, the study reported only the absolute differences and not the actual bilateral data *(Fukuda et al., 2018)*.

The muscles 'echo intensity *(EI)* and muscle thickness *(MT)* of the rectus femoris *(RF)* and vastus lateralis *(VL)* were assessed using ultra-sonography equipment on a sample of 12 male judo athletes *(23.0 ± 3.9 years)* and are presented in Table 3 *(Kons et al., 2020)*.

Table 3. Ultrasound bilateral variables of rectus femoris and vastus lateralis muscles of judokas.

Variable	Limb		p - value
	Stronger	Weaker	
MT RF (cm)	2.21 ± 0.50	1.87 ± 0.43	0.050*
MT VL (cm)	2.55 ± 0.37	2.31 ± 0.32	0.077
EI RF (a.u.)	129.7 ± 12.1	120.1 ± 11.9	0.037*
EI VL (a.u.)	118.6 ± 12.3	107.4 ± 14.5	0.031*

***significant** *bilateral differences noted*

DISCUSSION

Our findings demonstrate that bilateral morphological differences are not widely researched in judo. Interestingly, from the classical anthropometry method, only the forearm girth measurement indicated significant asymmetries in judokas. On the other hand, the 3D-body scanning method confirmed the forearm girth asymmetries but detected additional ones in elbow girth, thigh girth, mid-thigh length and calf girth. There could be a difference in the data acquisition methods. Manual anthropometry using anthropometers, calipers and measuring tapes is simple and inexpensive. However, several limitations are present: long application time, the need for careful calibration of equipment and trained observers and their measurement error, changes in the participants' body posture, variations in tape pressure during measurement, and the identification of reference points, which can be more of a problem in people with higher body fat *(Glock et al., 2017; Rumbo-Rodríguez et al., 2021)*. Additionally, bilateral measurements are rarely done and take additional time. However, 3D body scanners are now widely available and are used in various research on body morphology and anatomical structures *(Simenko & Cuk, 2016)*. Especially a very fast, automated, touchless and high level of accuracy procedures *(Rumbo-Rodríguez et al., 2021)* might be the reason for the additional detection of asymmetries in the 3D scanning method. Additionally, the rapid development of 3D technology allows for saving the 3D-cloud data and avatars for any additional data extraction, which is impossible in manual anthropometry. The 3D scanning also allows for analysing some new variables not measured in classical anthropometry, as seen in Table 2. Exploring new anthropometrical variables could give better insight and perhaps identify essential factors impacting competition performance in various categories. Also, the development of mobile 3D body scanners is impacting the greater availability of this technology, which has the potential to be even more widely used in judo *(Bušić et al., 2021)*. This could help in a more comprehensive analysis of morphological asymmetries in judo.

Electrical bioimpedance analysis in judo was also noted with hydration and muscle mass of upper and lower extremities analysis. However, this is used in very few studies, despite these measurements being fast and commonly done in judo research. Therefore, researchers should be encouraged to report the bilateral data acquired by the electrical bioimpedance measurements more often. Researchers should also be encouraged to report the judokas' dominant and non-dominant body sides from the fighting stance point of view and not the natural laterality concept. This is poorly

reported in these studies. These data can better interpret the occurrence of asymmetries and the impact of specific judo performance on them. The same problem in the different methodologies is seen in the usage of ultrasound, where the grouping of the stronger and weaker side was used without any clear connection to the combat stance, which could better explain the results *(Kons et al., 2020)*. The ultrasound analysis discovered asymmetries in the muscles vastus lateralis and rectus femoris, which indicates that judo-specific training causes specific morphological adaptations in judokas. However, the exact cause and impact should be further investigated.

Only one study analysed the same athletes twice to investigate the impact of one-year judo training on body symmetry in youth judokas *(Kambic et al., 2017)*. This shows the lack of longitudinal studies on the development of morphological *(a)*symmetries in judo. The advancement of technology and rapid assessment could help in the future longitudinal investigation of youth judokas by combining electrical bioimpedance and 3D body scanner analysis. With this approach, we could better understand the impact of judo, bilateral and unilateral throw execution, fighting in the left or right stance, the difference between elite and sub-elite athletes, and the prevention of injuries with athletes drop-out.

CONCLUSION

The study presents a review of scientific works on the topic of morphological *(a)*symmetries in judo. The most frequently identified asymmetry is the forearm girth, followed by the elbow, thigh, and calf girths. This indicates that judo-specific training causes specific morphological adaptations in judokas. However, how they are caused and their impact on performance is unclear and needs further investigation with the analysis of functional asymmetries in judo. Therefore, further work should combine morphological and functional asymmetries to understand asymmetries' impact on judo performance better. In addition, a unified methodology for judokas should also be used, where researchers should report dominant and non-dominant body sides related to combat stances.

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ESTABLISHMENT AND ORGANISATION OF THE JUDO CLUB AT THE UNIVERSITY OF SLAVONSKI BROD

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INTRODUCTION

Judo as a polystructural acyclic sport has complete and balanced influence on human body, thus being recognised as important for human growth and development, and useful as a daily exercise for children, youth and adults *(Sertić, Segededi, Prskalo, 2010)*.

The uniqueness of judo lies in the fact that it is represented as a sport discipline at almost all existing world competitions. In addition to being a sport discipline with individual national, continental and world championships, judo is also included in the Olympic and Mediterranean Games, military and police championships, as well as European student championships and Universiades. Judo has been included as an optional sport discipline in the Universiades *(the first Summer Universiade was held in 1959 in Turin, Italy)*. As a permanent official sport, judo has been included in the Bangkok Summer Universiade in 2007, thus abolishing world student championships since 2006. Until 2007, world student championships were organised every even year, and Universiades were held in odd years.

The last World University Judo Championship was held in 2006 in Suwon, South Korea, at which the Croatian student national team achieved its greatest success by winning the fifth place as a men's team, but with only 4 judo players *(the team consists of 5 players in the same number of weight categories)*. The competition was very narrow, proceeding with an additional fight, in which Croatian men's team lost to the student team of Hungary, led by Brown, the then world champion in the category up to 73 kg.

The greatest individual success for the Croatian judo student national team was achieved by Andrea Bekić, who won the second place in 2015 at the Universiade in Gwangju *(South Korea)* in the category up to 57 kg.

Some of the most successful Croatian Judo players were or still are full-time students, like Marijana Mišković Hasanbegović, Tomislav Marjanović, Barbara Matić, Lara Cvjetko, Dominik Družeta, Marko Kumrić, Robert Klačar, Ivana Maranić, Andreja Đaković, Karla Prodan, Iva Oberan, as well as many other students, whose academic education is accompanied by winning of medals at European and world championships, thus making themselves the best promotors of this demanding yet beautiful Olympic and student sport.

INITIATION OF THE JUDO SECTION AND THE JUDO CLUB IN SLAVONSKI BROD

Prof. Dr. Ivan Samardžić, Rector of the University of Slavonski Brod is a well-known former judo player winning medals at the Croatian championships during the 80s of the last century. His love for judo and the desire to assure the best conditions for physical education of students through practicing of various sports encouraged him to initiate the Student Judo Section in Slavonski Brod. At the beginning, the Student Judo Section did not attract significant number of members nor did it have adequate spatial conditions for organisation of trainings.

Figure *1a & 1b. Existing sports hall at the University of Slavonski Brod*

Trainings were led by Professor Samardžić, who also trained himself. Improved quality of trainings as well as the growing number of trainees encouraged the Section to get in touch with the Chair for Martial Sports of the Zagreb Faculty of Kinesiology and the Croatian Judo Federation to ask for support. In order for the Section to develop more significantly, it shall be equipped with necessary material resources, such as new mats covering larger space than currently available. Such new mats, softer and of better quality than those currently available shall provide better training experience of all trainees practicing judo in the Student Judo Section in Slavonski Brod, regardless of whether they are complete beginners or experienced judo players. On new mats, all of them would be enjoying judo techniques, such as falls, throws, techniques on the ground, holding grip technique, leverage technique, choking technique, etc.

Figure *2. Sports hall of the Faculty of Kinesiology Zagreb as a model for construction of a new sports hall in Slavonski Brod*

Referring to the student population, judo as a recreational sport is not striving to achieve great officially recognised sports success. The primary objective of judo trainings is to improve anthropological characteristics of players, as well as to promote active lifestyle among students. In addition, judo is extremely useful in everyday life when it comes to falls, as it provides certain level of skills in automated movements required to land safely and to absorb a sudden fall from a standing position, walking, running or from any other more complex situation that may happen in everyday life.

DETERMINATION OF REQUIRED MATERIAL AND HUMAN RESOURCES

In order to provide for a high-quality judo training, a judo club shall dispose of a hall of 15 x 15 meters, allowing a fighting area of 14 x 14 meters to fit inside, which refers to a minimum allowable size of a competition area padded with tatami mats. Judo trainings and matches take place on a padded area of at least 8 x 8 meters in size with additional 3 meters of safety zone covered with mats on each side of the competition area. An additional meter around the mat is required for provision of easy access to every part of the competition area *(tatami)*.

Figure *3a & 3b. free space for a new judo hall*

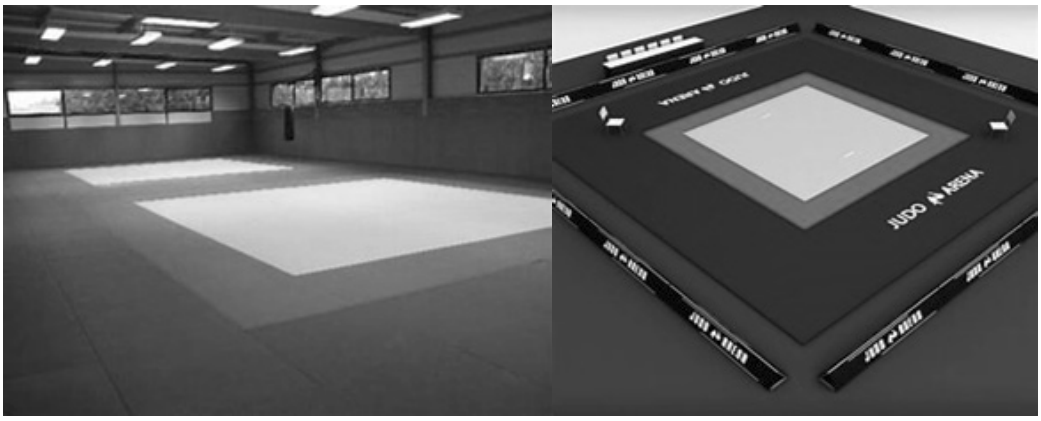

Figure *4. The 8 x 8-meter tatami mat with 3-meter safety zone*

In order to assure high quality judo training, it is necessary to engage a judo coach who preferably holds a university degree in kinesiology and has been experienced in practicing judo. Desired profile of a judo coach shall involve formal education in kinesiology with a focus on judo and personal experience in judo competitions. As there are not many individuals of such profile, a judo club shall hire a dedicated coach with a degree in kinesiology who has completed a university course in judo. Follow-up education and practicing judo is desirable by a hired coach in order to provide for professional development by reaching higher KYU and DAN ranks.

Within the study programme delivered by the Faculty of Kinesiology Zagreb, each student is obliged to attend a course in judo that lasts for 75 teaching hours *(lectures and practices)*. According to the judo course syllabus, each student shall be able to perform 6 falls *(4 rolling and 2 acrobatic falls)*, 15 throwing techniques and 39 techniques on the ground *(Sertić and Segedi, 2013)*. Students who perform the mentioned techniques perfectly and also prove excellent knowledge of judo in theory, i.e. students who pass the exam in judo course with an excellent grade are automatically awarded the 3rd KYU or the green belt, as determined by the regulations of the Croatian Judo Federation and following the agreement with the Faculty of Kinesiology Zagreb. Upon completion of the study, such a master of kinesiology is competent to work with children at primary or secondary school education level, or with students at a higher education level involved in judo sections at a university or in a judo club. Exactly this segment of mutual activities is highlighted in the ongoing cooperation between the Faculty of Kinesiology of the University of Zagreb and the University of Slavonski Brod. The cooperation is established with the primary aim to educate kinesiologists who will live and work in Slavonski Brod after graduation. Such educated professional will be offered opportunity for part-time employment or even a permanent job position as a teacher of physical education and a leader of the Student Judo Section at the University of Slavonski Brod.

Within the established cooperation with the Croatian Judo Federation, the University of Slavonski Brod is expected to receive organisational support and equipment, i.e. donation of tatami mats to the Student Judo Section. Since there is still no registered judo club in Slavonski Brod, Student Judo Section is considered as a beginning of organised judo sport in Slavonski Brod, which has a potential to develop into a judo club in which an aforementioned coach would start working with students and later on also with children as judo beginners. Along with assurance of necessary material and legal conditions, Croatian Judo Federation would support the University of Slavonski Brod to establish the Student Judo Section first, and later on, to register a judo club that shall become a full member of the Croatian Judo Federation. Future prospects of judo in Slavonski Brod are reflected in the possibility of offering structured judo training to all those who practiced judo prior to their enrolment to the University of Slavonski Brod, at which they would be supported in pursuing their sports careers during studies.

Successful cooperation between the Croatian Judo Federation and the Faculty of Kinesiology Zagreb shall result in establishment of a judo club in the city of Slavonski Brod, which would be providing a possibility for students to engage in judo and to promote this sport among the University students.

Increasing popularisation of judo achieved by excellent promotional activities of the European Judo Union and the International Judo Federation, high-quality work and well-directed managerial and administrative activities of all members of the Croatian Judo Federation, well-functioning cooperation between the University of Slavonski Brod and the Faculty of Kinesiology Zagreb are contributing to assurance of conditions for practicing judo in Slavonski Brod and motivate both children and older beginners *(University students)* to engage in this sport.

CONCLUSION

Dedicated work, cohesion of knowledge and efforts invested by several institutions, i.e. Croatian Judo Federation, the University of Slavonski Brod and the Faculty of Kinesiology Zagreb into promotion of judo sport in Croatia and beyond contribute to wider recognition of judo as a lifestyle and a quality physical and metal exercise, thus fully reflecting the EJU motto Judo is more than sport. Joint efforts and organised promotional activities of judo in Croatia can raise judo as a sport to a high-quality level in all its aspects and offer great training conditions to recreational and professional judo players. This paper shall serve as an encouragement to other Croatian, as well as European higher education institutions to consider their options for establishing and developing judo sections and clubs in their academic and social communities, with the long-term intention to make judo represented in their home institutions, as well as in primary and secondary schools, cities and wider regions.

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HYPOHYDRATION IN JUDO ATHLETES: A SHORT NARRATIVE REVIEW

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ABSTRACT

Hypohydration is a common and even chronic condition in combat sport athletes. It has a negative impact on athletes' health and performance. Hypohydration has been linked to lower plasma volume, alertness, and psychomotor function. Similar effects of hypohydration on performance and its high incidence have been seen in competitive combat sports athletes. Judo athletes are known to lose weight prior to competitions and are exposed to hypohydration. This narrative review presents an inside into hypohydration in judo athletes before, during, and after competition and during the training period. The results show that judo athletes from different age categories and competitive level present high level of hypohydration during competitions and trainings, even during a weight-stable period. Therefore, immediate precautions should be taken by national and international federations, a broad hydration education should be given to all athletes from all age categories and competitive levels and hydration-check before competitions can also be suggested to preserve athletes' health.

Keywords: hydration, *combat sports, performance, health, weight-classified athletes*

INTRODUCTION

Hypohydration is a significant concern in athletic performance, particularly in sports that involve intense physical exertion and high metabolic demands *(Casa et al., 2000; Coyle, 2004)*. Judo, a combat sport that requires explosive power, endurance, and technical skill *(Franchini et al., 2011)*, places considerable physiological stress on athletes *(Ceylan & Balcı, 2018)*. As a result, maintaining optimal hydration status becomes crucial for the overall performance and well-being of judo practitioners. Hypohydration during training and competition can adversely affect various physiological and cognitive functions, leading to decreased athletic performance *(Ceylan, Kons, et al., 2022)*, an increased risk of injury *(Kim & Park, 2022)*, and compromised health *(Goulet, 2012)*. Athletes are exposed to hypohydration due to the rapid weight loss *(RWL)* immediately before competitions *(Ceylan et al., 2023)*. Therefore, understanding the prevalence and impact of hypohydration on judo athletes and exploring effective strategies to optimize hydration becomes paramount for coaches, sports scientists, and athletes themselves.

In this narrative review, we aimed to provide a comprehensive analysis of the current literature on hypohydration in judo athletes. The current situation of hydration habits of judo athletes during competition and trainings, how hydration status can be monitored, and strategies for maintaining optimal hydration in the judo population were investigated. By examining the existing research, we hope to offer valuable insights and practical recommendations for judo athletes, coaches, and sports practitioners involved in the field.

Hydration status assessment

Hypohydration is defined as the state of fluid deficit. Exercise-induced hypohydration typically ranges between 2 and 5% of body weight and is associated with enhanced plasma osmolality, reduced plasma volume, and increased urinary biomarkers such as urine specific gravity *(USG)* and urine osmolality *(UO) (Cheuvront & Kenefick)*. Urine is made up of water and various other compounds, the concentration of which increases as the volume of water decreases *(Zubac et al., 2018)*. USG, UO, and urine colour *(UC)* could be used to determine urinary hydration. However, UO involves an intrusive approach, expensive measuring equipment, and skilled staff *(Fernández-Elías et al., 2014)*. Thus, USG is a reliable and non-invasive technique to assess athletes' hydration status. It is tested by placing a tiny amount of urine sample on a refractometer and comparing the urine density to pure water *(specific density=1.000)*. A result more than 1.020 is generally accepted hypohydration *(Zubac et al., 2018)*. UC is a subjective assessment of urochrome in urine that employs

a Likert scale. UC becomes whiter when more water is expelled, and darker as less water is excreted *(Fernández-Elías et al., 2014)*. However, caution should be applied while measuring hydration via urine samples as they can be affected by fluid consumption, food *(e.g., electrolyte intake)*, medicines *(e.g., alcohol or caffeine)*, and/or sickness *(e.g., diabetes or renal disease) (Zubac et al., 2018)*. As a result, recent consumption or medical circumstances must be considered when determining hydration by urine. Moreover, within-individual comparisons should be used to assess athletes' hydration changes *(Cheuvront et al., 2015)* despite 1.020 described as cut-off to determine hypohydration. Urine measurements could be supported with body weight changes which are highly correlated with hydration status changes *(Casa et al., 2000)*. Urine measurements, therefore, are advised to be accompanied by body weight changes to increase reliability.

Relationship between the acute weight-loss and hypohydration

Athletes in nearly all combat sports are categorized according to body mass to make contests more equal in terms of body size, strength, and agility *(Burke & Cox, 2009; Langan-Evans et al., 2011)*. Many athletes, nevertheless, drastically lower their body mass in order to obtain a competitive advantage upon competing against lighter, smaller, and weaker opponents *(Barley et al., 2018; Ceylan et al., 2023)*. Despite the well-documented negative effects of RWL on health status, the prevalence of aggressive and harmful RWL procedures is very high in most combat sports *(Barley et al., 2018; Berkovich et al., 2019; Ceylan et al., 2023; Kim & Park, 2022; Steen & Brownell, 1990)*. Several studies have found a significant incidence of RWL *(60-90%)* in athletes from different combat sports *(Barley et al., 2019; Steen & Brownell, 1990)*. In judo, a similar pattern was discovered, with 90% of athletes *(heavyweights excluded)* reporting that they had already lowered body weight before a competition, and a slightly smaller percentage reporting that they have reduced body weight before competing on a regular basis *(Artioli et al., 2010)*. Regarding the extent of weight loss, whereas most athletes lose 2-5% of their body weight, a significant fraction *(i.e., 40%)* loses 5-10% of their body weight *(Artioli et al., 2010; Ceylan et al., 2023)*. Such reductions are commonly implemented in the days leading up to contests *(Ceylan et al., 2023)*.

Body weight changes were related to changes in hydration status, and 5% weight loss was regarded as severe hypohydration *(Casa et al., 2000)*. Previous research has clearly demonstrated how athletes who want to compete in a lighter weight category resort to acute body water loss and hypohydration immediately before official weigh-ins by using sweat suits, excessive exercise, fluid restriction, and extreme environments *(Ceylan et al., 2023; Jetton et al., 2013; Kons et al., 2017)*. Thus, most of athletes in weight-category sports are exposed to hypohydration due to the RWL immediately before competitions.

Hydration status of judo athletes during weight-stable period

A few studies investigating hypohydration in judo athletes during training, especially weigh-stable period indicated high prevalence of hypohydration in judo athletes from different age categories and competitive levels. For example, Ceylan and Santos *(2020)* investigated hydration status, body mass change and fluid intake of U-15 judo athletes. The authors indicated high prevalence of hypohydration in athletes in the morning and pre-post training during a weight-stable period. 81.82% of the athletes presented hypohydration and 18.18% of them were hydrated in the morning. They rehydrated before training *(63.6% hypohydrated and 36.4% hydrated)*, but most of the athletes *(77.3%)* were hypohydrated following the training despite fluid availability. Athletes' weight change was in line with the hydration status, it significantly decreased following the exercise. Likewise, Stefanovsky et al. *(2019)* monitored hydration status of young judo athletes during a weight-stable 5 day training camp. The authors indicated a high level of hypohydration for the first two morning urine specific gravity *(USG)* measurements *(USG<1.020)*, but athletes improved their hydration status, decreasing them under 1.020 during the next two USG measurements. In another study where Moussouami et al. *(2022)* researched the effect of wearing a judogi in a hot environment on hydration status of judo athletes, the authors stated athletes with hydrated state presented hypohydration *(USGpost-training=1.032)* following a training session with judogi compared to without judogi *(USGpost-training=1.019)*. Rivera-Brown and De Félix-Dávila *(2012)* also monitored hydration status of heat acclimatized adolescent judo athletes in a hot environment. They, as in the previous studies, indicated high level of hypohydration *(significant hypohydration; USG 1.021-1.030)* in the athletes despite availability of fluid intake. In a current study, Ceylan, Taşcan, et al. *(2022)* investigated elite judo athletes' hydration status, body weight change, and fluid consumption throughout an international training camp during which they were not required to decrease or manage their body weight. Surprisingly, athletes presented high level of hypohydration during six different measurements including two morning and two pre-post training measurements. The studies above were implemented

on young and inexperienced judo athletes. However, the latter study was implemented on Turkish national judo team and the athletes kept their hypohydrated state even during a weight-stable period despite their competitive level. Fluid equal to 150% of weight loss during training should be consumed following a training session to rehydrate *(Shirreffs et al., 1996)*, but these athletes' total fluid consumption was 4.1±1.8 while their body weight significantly decreased from pre to post training in the morning and evening.

Table 1. The summary of the studies found related to hydration status of judo athletes during competitive period and training.

Author and year	Study participants	Study environment	Athletes' hydration values (USG and/or UC)	Athletes' hydration status
Ceylan et al. (2020)	**Elite women** and men	**European Universities** Games-2018	**Pre-match=1.021±0.007 Post-match=1.019±0.004**	**Pre-match: 66.6%** hypohydrated vs 33.3% hydrated; post-match: 55.6% hypohydrated vs 44.4% hydrated
Ceylan and Santos (2020)	**U-15 boys** and girls	**Club training**	**Morning= 1.022** ± 0.005 Pre-training= 1.023 ± 0.004 Post-training=1.024 ± 0.004	**Morning: 81.8%** hypohydrated vs 18.2% hydrated; Pre-training: 63.6% hypohydrated vs 33.4% hydrated; post-training: 77.3% hypohydrated vs 22.7% hydrated
Ceylan et al. (2023)	**Elite men**	**European Championship**	**A week** pre= 1.023±0.002, (UC=4.6±0.9) Official weigh-in= 1.030±0.001, (UC=6.0±1.4), 24h post= 1.017±0.007, (UC=3.8±1.8)	**7 athletes** out of 8 were hypohydrated both a week before and at the official weigh-in, 5 was hydrated and 3 was hypohydrated 24h post
Ceylan and Balci (2021)	**Elite women** and men	**National Championship**	**Official weigh-in=** 1.027±0.005, Pre-match= 1.025±0.005 (men); Official weigh-in= 1.027±0.007, Pre-match= 1.024±0.006	**Official weigh-in:** 37.1% serious hypohydration, 54.3% significant hypohydration, 8.6% minimal hypohydration; pre-match: 17.1% serious hypohydration, 60% significant hypohydration, 22.9% minimal hypohydration (Men); Official weigh-in: 33.3% serious hypohydration, 53.3% significant hypohydration, 13.4% minimal hypohydration; pre-match: 13.3% serious hypohydration, 53.3% significant hypohydration, 33.4.4% minimal hypohydration (Women)
Ceylan, Taşcan, et al. (2022)	**Elite women** and men	**International training** camp during a weight-stable period	**Athletes' mean** USG values were higher than 1.020 cut-off which indicated hypohydration	**1st morning:** 77.8% hypohydrated, 22.2% hydrated, 2nd morning: 92.6% hypohydrated, 7.4% hydrated
Stefanovsky et al. (2019)	**Youth male** athletes	**Off-season training** camp	**1st morning=1.023,** 3rd day=1.025, 4th day=1.019, 5th day=1.017	**1st measurement:** two athletes were minimally hypohydrated and four were hypohydrated; 2nd measurement: three athletes were severe hypohydrated, 1 was hypohydrated and 2 was minimally hypohydrated; 3rd measurement: 2 athletes were hypohydrated, 4 athletes were hydrated; 4th measurement: 1 athlete was seriously hypohydrated and the rest was minimally hypohydrated
Moussouami et al. (2022)	**Trained senior** judokas	**8-week training**	**Baseline=1.016±0.002, post-training=1.032±0.005** (with judogi); Baseline=1.016±0.003, post-training=1.019±0.005 (without judogi)	**N/A**

Ceylan et al. (2021)	**National men** judokas	**National Championship**	**Judokas presented** higher mean USG values than 1.020 cut-off before both official weigh-in and pre-match.	**Official weigh-in:** 37.2% serious hypohydration, 48.1% significant hypohydration, and 14.7 minimal hypohydration; pre-match: 18.6% serious hypohydration, 62.9% significant hypohydration, and 18.5% minimal hypohydration
Pettersson and Berg (2014)	**Elite men** and women athletes	**Different competitions**	**Judokas were** classified as morning weigh-in group and presented a mean USG of 1.031±0.005	**53.1% seriously** hypohydrated, 43.8% significantly hypohydrated, and 3.1% minimal hypohydration
Rivera-Brown and De Félix-Dávila (2012)	**Adolescent judokas**	**Training in** the heat	**All athletes** presented higher mean USG values than 1.020 cut-off pre, post and 24h post training. UC values were also higher than 5.	**Athletes' USG** values indicated that most of the athletes had significant to serious hypohydration at pre, post and 24h post training.

Hydration status of judo athletes during competitive period

Considering the studies mentioned above, it would not be surprising that judo athletes also present hypohydration during competitive period. Because they resort to acute weight loss immediately before competition, it is inevitable that they suffer from hypohydration before, during and following the competition. This was proved by some studies investigating hydration status of judo athletes during competitive period *(Ceylan et al., 2020; Ceylan & Balci, 2021; Ceylan et al., 2023; Ceylan et al., 2021; Pettersson & Berg, 2014)*. The first study monitored hydration status of elite judo athletes during a competition day via USG and UC and the authors stated high level of hypohydration in athletes pre-match compared to post-match *(Ceylan et al., 2020)*. In another study *(Ceylan & Balci, 2021)*, hypohydration and rapid weight gain of men and women athletes were compared before an official judo match. Although there were no differences in weight gain between sexes, all athletes were hypohydrated despite 15h of recovery between official weight-in and start of the competition. A recent study by Ceylan et al. *(2023)* investigated changes hydration status via USG and UC in judo athletes before and after European Championships and the findings are also desperate. Athletes presented hypohydration a week before the competition, they were also hypohydrated at the official weigh-in with higher USG and UC values. However, 24h following the competitions most athletes were classified as hydrated. The authors also monitored weight loss methods of the athletes. Most of the athletes used hypohydration-induced weight loss methods *(i.e. restricting fluids, increased exercise and training with rubber/plastic suits)*. Ceylan et al. *(2021)* investigated the effect of weigh-in time on hydration status between judo athletes and wrestlers. Although athletes from both sports presented hypohydration just before the official weigh-in, judo athletes were still hypohydrated despite 15h recovery compared to wrestlers who had only 2h for recovery between the weigh-in and start of the matches. The last study by Pettersson and Berg *(2014)* assessed prevalence of hypohydration in different combat sports with different weigh-in times and concluded that judo athletes who were classified as morning weigh-in group at that time presented high USG values. These studies clearly indicate the hydration habit of the judo athletes has not changed since the first study held in 2014 despite 15h of recovery provided later for rehydration between official weigh-in and start of the competition.

CONCLUSION AND RECOMMENDATIONS

The aim of the this short narrative review was to demonstrate hydration habits of judo athletes from different age categories and competitive levels during both training and competitions as well as non-invasive hydration check measurements. The current study concluded that judo athletes from children to senior categories and even from high level presented hypohydration during competitions and weight-stable training period. In order to preserve athletes' health some acute precautions should be taken. Comprehensive educational programs should be given to athletes and coaches related to healthy way of weight loss and the importance of hydration on health and performance and hydration-check before weigh-ins can be implemented by authorised federations. Moreover, any effort should be paid to encourage athletes gain a sufficient hydration intake habit and consume sufficient fluid during and in-between trainings.

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BENEFITS OF PRACTICING JUDO IN A POPULATION WITH INTELLECTUAL DISABILITIES. DIFFERENCES BETWEEN INCLUSION AND ISOLATION: A PILOT STUDY

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ABSTRACT

This study examined the effects of Judo lessons on people with intellectual disabilities *(ID)* and compared the effects of inclusive versus isolated situations. The results of the study indicated that both groups showed improvements in motor skills as measured by the Test of Gross Motor Development-3 *(TGMD-3)* over the control group, and there were no significant differences between the two groups that participated in Judo lessons in terms of improvements in motor skills. The study suggests that Judo is a beneficial activity for people with ID and that both inclusive and isolated situations can be effective for motor skill development. The results of the study are important because they suggest that Judo can be an inclusive activity for people with ID and that it can be an effective way to improve motor skills. The study also has implications for clinical practice and physical education. The results suggest that health professionals and physical educators may consider Judo as an activity to improve motor skills in people with ID. Furthermore, the results suggest that both inclusive and isolated situations can be effective for motor skill development. In summary, the pilot study suggests that Judo is a beneficial activity for people with ID and that both inclusive and isolated situations can be effective for motor skill development.

Key words: *Adapted judo, inclusive practice, isolated practice, motor skills, mental handicap.*

INTRODUCTION

The benefits of participation of children and adolescents with intellectual disability *(ID)* in specific organised sports programmes have long been investigated, e.g. swimming and aquatic exercise programmes *(Fragala-Pinkham et al., 2011; Pan, 2011)*, participation in an adapted basketball programme aimed at improving physical fitness and social skills *(Cai et al., 2020)*, programmes based on adapted football games *(Regaieg et al., 2020)* or the effect of swimming on body composition in people with Down syndrome *(Suarez-Villadat et al., 2020)*.

The practice of judo is perfectly adapted to the population with ID, as it is an activity that integrates moderate to vigorous intensity of activity with an added cognitive and emotional component, such as concentration and self-control *(Garcia et al., 2019)*. The systematic review developed by *(Pečnikar et al., 2020)* highlights the improvements in health parameters and social skills through the inclusion of people with ID in adapted judo programmes. This type of activity has been shown to be attractive to young people with ID due to the repetitive structure of its exercises *(Bell & Allen, 2016)* and a recent study even demonstrated the feasibility of a family-based adapted judo programme for children with ASD *(Garcia et al., 2022)*. The practice of judo has shown positive results in short-term programmes, with improvements seen in repetitive behaviours, social interaction and communication, and emotional response *(Morales et al., 2021)*. This is evidenced by the improvements reported in an eight-week intervention study *(Rivera et al., 2020)*, which found a reduction in aggressive behaviour in children with ASD who participated in an adapted judo programme. On the other hand, other research has demonstrated the feasibility and effectiveness of this type of programme, with high rates of acceptance and enjoyment found, and a high desire to continue the practice after the programme *(Tomey, 2017)*.

Recent studies have demonstrated improved motor skills in children with ID who participated in an adapted judo programme over the course of a school year *(Morales et al., 2022)*. This is particularly relevant as people with ID demonstrate difficulties in the motor domain *(Colombo-Dougovito, 2015; Crucitti et al., 2020)*, which can impact on their ability to successfully interact and participate in the environment and social life *(Bodison, 2015)*. There is considerable

evidence of deficits in motor skills, with studies finding poorer development in children with ID in various motor domains, such as balance, postural control and general coordination *(Downey & Rapport, 2012)* or impairments in gait, laterality and fine motor skills *(Kaur et al., 2018)*.

Traditionally, learning opportunities for people with ID have taken place in artificially segregated contexts and isolated sheltered workshops with the intention of better serving them *(Thorn et al., 2009)*. Current trends seek to include people with disabilities in a fully normalised environment, where they are educated in the same space and under the same conditions as people without disabilities. Before proceeding with this argument, it is necessary to clarify the terms integration and inclusion, recognising that they can be interpreted differently in different languages and often even in the same language *(Sandri, 2014)*.

In the Anglo-Saxon culture, the concept of integration is interpreted as the adaptation of the person with a disability to the school context, where the content is adapted to facilitate learning and thus access to education, usually in spaces where all participants need adaptations. Inclusion, on the other hand, takes into account the right of everyone not to be excluded and advocates the timely integration of people with ID into the same educational environment as people without ID *(Sandri, 2014)*. Grandisson et al. *(2012)* examined various factors involved in the sports integration of adolescents with intellectual disabilities alongside non-disabled athletes and concluded that inclusive sports can generate many benefits for people with intellectual disabilities, their parents and non-disabled athletes.

In the case of judo, there are no studies that compare the effects of judo programs on people with ID based on the grouping of participants. The observation of different experiences shows that in many cases the training of people with ID in judo sessions is done in isolation, that is, the participants are exclusively people with ID, on the other hand, it is also possible to find numerous experiences in which people with ID are trained in the same sessions as people without ID. The main objective of this study is to compare the effects in the motor domain of the participation in judo sessions of people with ID in isolation or in inclusion with people without ID, it is hypothesized that the group that participates in inclusive sessions will obtain better results.

METHODS

Participants

Twenty-one boys and girls with aged 13.41 *(± 1.56)* years, with a height of 159.91 *(± 13.79)* cm and a weight of 59.03 *(± 18.61)* kg from different associations of families of children with ASD and schools for children with special needs participated in the study. All participants had been diagnosed with ASD according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition *(DSM-V)*, and their ID was rated as low to moderate. Individuals were excluded if they had a medical condition that precluded physical activity. All participants participated on a voluntary basis, and parents or guardians signed an informed consent form, and children signed a consent form explaining the aims and development of the programme. This research complies with the requirements specified in the 1975 Declaration of Helsinki and its subsequent revisions. This study has been approved by the Research Ethics Committee of the Universitat Ramon Llull with file number CER URL_2019_2020.

Procedure

A three-month longitudinal study was designed with pre- and post-intervention measures. The intervention consisted of participation in a judo programme with different methodologies. A convenience sample was used that had been participating in an adapted judo programme exclusively for people with ID for one year. This group was divided into an inclusion group *(n=7)* to participate in regular judo classes with children without ID and an isolated group *(n=8)* that participated in judo sessions exclusively for children with ID. In parallel, a control group *(n=6)* was recruited who did not engage in any physical activity or participate in any sports programme. Each participant was assessed twice, at the beginning of the programme and at the end of the programme, under stable conditions in the same room where the judo sessions took place.

Intervention

The groups that participated in the judo sessions were provided with volunteer support staff for the development of the practice who were instructed to act only in case of need. The sessions were held twice a week with a duration of 1h in a dedicated judo facility with a tatami surface of 120 m2 and with all the elements that preserved the safety of the practitioners. The main content of the sessions included: Falling techniques, judo analytical techniques and judo games, ground control techniques and throws, and repetitions of basic movements in different forms *(pulling, pushing, holding, lifting)*.

Assessment Instruments

All participants were assessed twice, at the beginning and at the end of the six-month intervention, with the Test of Gross Motor Development *(TGMD-3) (Ulrich, 2019)*.

The primary function of the TGMD-3 is to identify delays and deficits in gross motor development in children and to serve as a research tool to explore and compare the gross motor development of both typically developing children and children with atypical movement function. The assessment includes two subtests of locomotor skills and ball skills representing fundamental motor skills. After analysis, the scores of the locomotor subtest and the ball skills subtest were summed to provide a raw score.

Statistical analysis

All descriptive data for the dependent variables are presented as mean ± standard deviation *(SD)*. The normal distribution of each variable was tested using the Shapiro-Wilks test. To test the hypotheses, a one-way ANOVA test was used to compare the variation in the results of the three groups. When univariate contrasts showed statistically significant effect, pairwise comparisons were made using the Tukey correction The variation in scores was calculated in absolute terms by subtracting the pre-test scores from the post-test scores. All statistical analyses were performed using the Statistical Package for Social Science version 24.0 *(SPSS, Inc., Chicago, IL, USA)*. A significance level of $p < 0.05$ was used for all tests.

RESULTS

The application of the one-way ANOVA test shows that there is an effect depending on the judo practice group in the variation of the pre-post-test results of the TGMD-3-Locomotion variables $(F(2,18)=20.39$; $p<0.01)$ and TGMD-3-Total $(F(2,18)=13.03$; $p<0.01)$, while the variable TGMD-3-Ball did not show any significant effect. Table 1 shows the descriptive statistics and the comparison between pairs of the post-hoc tests. The pairwise comparison shows that the groups that participate in judo sessions have statistically better results than the control group in the results of locomotion skills and the result of the total score of the TGMD-3. The group that participates in inclusive judo sessions does not show significant differences in any of the variables compared to the group that participates in exclusive sessions for children with ID.

Table 1. Descriptive statistics

	Group	N	Mean	SD
TGMD-3-Locomotion	Inclusion	7	2.143*	0.690
	Isolated	8	2.625*	0.518
	Control	6	0.667	0.516
TGMD-3-Ball	Inclusion	7	1.043	0.690
	Isolated	8	0.750	0.463
	Control	6	0.667	0.516
TGMD-3-total	Inclusion	7	3.286*	0.756
	Isolated	8	3.500*	0.926
	Control	6	1.333	0.816

***** *means significant differences (p<0.05)*

DISCUSSION

This study aimed to analyse the benefit of practicing judo in a population with ID in the motor domain, comparing the possible difference between judo lesson in inclusive situation versus isolated situation. In general, all judo students are improved in motor skills and the results are similar to those found in our previous work following an intervention over the course of a school year *(Morales et al., 2022)* and confirm the benefits of a systematic participation in judo. The comparison between the two situations study results don't confirm the initial hypothesis that the group participating in inclusive sessions would obtain better improvement, as most indicators showed progresses in both experimental group's scores after participating in the adapted judo program, only the control group did not display any significant changes. After the judo intervention, the ASD students in the two experimental groups recorded developments in motor skills, as measured by the total score on the TGMD-3 and the Locomotor Skills subscale. Those is possible probably because the organization of the Judo classes created enough motor stimuli in both learning situations. In inclusion lesson teacher teaches and neurotypical developmental students collaborate directly with ID peer during the exercises. In the isolated lesson, the teachers often work directly with the ID students to help the learning process, and because of the teacher skills the difficulties of ID students are compensates quicker and effectively comparing the inclusive situation, where peer must find a unknown solution to help the ID partner. The inclusive situation helps the neurotypical to learn to be collaborative but slow the rhythm of the activities compared with the traditional one.

Several previous studies have argued that inclusive practice can have many benefits for people with intellectual disabilities, their parents, and nondisabled athletes *(Grandisson et al., 2012; Townsend & Hassall, 2007)*. To our knowledge, studies evaluating inclusive practice have done so from the perspective of the social competence of participants, both with and without disabilities, and have typically focused on how participants view intellectual disability, which has important implications for enhancing social inclusion and informing positive attitudes *(Albaum et al., 2021)*, but not on differences from isolated practice.

The inherent limitations of this study as a pilot study call for a more comprehensive approach in the future, with a much longer intervention period, a larger number of participants, more behavioral domains analyzed, and control for participants' level of disability.

CONCLUSION

This pilot study suggests that judo is a beneficial activity for people with ID and that both inclusive and isolated situations can be effective in developing motor skills.

Previous studies have mostly focused on improving social skills but have not compared the benefits in other areas. The limitations of this study call for a broader approach in the future to compensate for the lack of results in this area.

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THE SYMMETRY OF BILATERAL ASHI-WAZA THROWS EXECUTION IN YOUTH U-14 CATEGORY JUDOKAS

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ABSTRACT

Objective. In judo, highly skilled judokas pose a higher bilateral quality of arm and leg movements. This study aimed to examine the quality of bilateral throw execution of the selected Ashi-Waza *(leg throwing)* techniques in the youth U-14 age group judokas. **Methods**. Execution of 3 judo throws from Ashi-waza *(O soto gari, O uchi gari and Uchi mata)* was evaluated by three raters on the dominant and non-dominant body side on a sample of 5 judokas *(age 13.12 ± 0.46, height 165.82 ± 8.37 cm, weight 58.36 ± 8.25 kg, years of training 6.4 ± 0.55)*. Paired samples T-test was used to analyse symmetries in performance with statistical significance set at $p \leq 0.05$. **Results**. There were no significant differences between the throw quality on the dominant and non-dominant sides in all leg throwing techniques. However, all scores are lower on the left side, which is also the non-dominant side. Furthermore, the best score among the group of leg throwing techniques was with the Osoto-gari throw, while the Uchi-mata throw attained the lowest score. **Conclusion**. Findings demonstrate that youth judokas competing in the U-14 age group perform the Ashi-Waza techniques symmetrically; however, the trend of lower quality on the non-dominant side is noted. The Uchi-mata is the throw with the worst quality in the U-14 age group. Therefore, additional attention should be given to bilateral throw execution in the U-14 age group as the literature suggest that the transition between U-14 and U-16 age groups is crucial and where the significant bilateral differences start to occur.

Key Words: *Combat sports, techniques, symmetry, functional laterality, development*

INTRODUCTION

In judo, It was reported that highly skilled judokas pose higher symmetry of arm and leg movements *(Mikheev et al., 2002; Sterkowicz et al., 2010)*. Consequently, the strength factors are equally exhibited by both sides of the body *(Detanico et al., 2012)*, which positively impacts the symmetrical development of the body. Therefore, symmetrisation is of great importance for judokas, and it is a process that involves balancing motor abilities on both sides of the body *(Simenko, 2019; Sterkowicz et al., 2010)*.

Recently a study presented a significantly better performance in youth judokas' on their dominant side via the Special judo fitness test *(SJFT)*, while additional important associations between the competition performance and bilateral judo performance were also noted *(Šimenko & Hadžić, 2022)*. Ashi-waza techniques are the most used throwing techniques in top-level judo competitions like Paris Grand Slam, with a high-efficiency index *(Lampe et al., 2022)*. Therefore, this study aimed to examine the quality of bilateral throw execution of the selected Ashi-Waza *(leg throwing)* techniques in the youth U-14 age group judokas.

METHODS

Participants

The sample included five male youth judokas. The study participants were 13.12 ± 0.46 years old; their body height was 165.82 ± 8.37 cm, body weight was 58.36 ± 8.25 kg. Hand dominance was used as an indicator of judo dominance, where the participants were asked which hand they used to write, draw, and throw a ball, as previously used *(Šimenko et al., 2022; Šimenko & Hadžić, 2022)*. All of them were right-hand dominant. They have been training judo for an average of 6.4 ± 0.55 years with a belt degree of 3 kyu *(3 judokas)* and 1 kyu *(2 judokas)*.

Data collection

The quality of Ashi-Waza judo throws O soto gari, O uchi gari and Uchi mata was evaluated. Throws were recorded with the Panasonic FZ200 camera from a distance of 5m in the participants' clubs. The throw execution was done to the dominant and non-dominant sides. Participants randomly chose the starting side. Video recordings were later assessed by three judo experts with a minimum of 5 DAN belt degrees involved in the elite level of judo. They graded the throw execution on a 6-grade scale from 0 – 5 *(Sertić et al., 2007)*. The average score of their marks was taken into further analysis.

Statistical analysis: Data were analysed using the SPSS 28.0 software for Windows. We used descriptive statistics to analyse the variables. Shapiro-Wilks test was used for the test of normality. Paired samples T-test was used to evaluate the bilateral throw quality asymmetries. The statistical significance was set at $p \leq 0.05$.

RESULTS

Table 1. Descriptive statistics and Paired samples T-test of throws scores

	Group								
	RIGHT SIDE		LEFT SIDE		95% CI				
Variables	Mean	SD	Mean	SD	Lower	Upper	df	t	p
Osoto-gari	4.00	0.41	3.60	0.28	-0.28	1.09	4	1.633	.178
Ouchi-gari	3.93	0.43	3.73	0.49	-0.17	0.57	4	1.500	.208
Uchi-mata	3.26	0.72	2.8	0.56	-0.29	1.22	4	1.709	.163
AVERAGE	3.73	0.42	3.38	0.34	-0.75	0.79	4	2.291	.084

Table 1 presents that there are no significant differences between the throw quality on the dominant and non-dominant sides in all leg throwing techniques. However, all scores are lower on the left side, which is also the non-dominant side. The best score among the group of leg throwing techniques was with the Osoto-gari throw, while the Uchi-mata throw attained the lowest score. The average score of leg throws on the dominant and non-dominant sides is close to the $p \leq 0.05$ significance value with p=0.084, where the higher quality is achieved on the dominant side.

DISCUSSION

Our findings demonstrate that youth judokas competing in the U-14 age group perform the Ashi-Waza techniques symmetrically. They also highlight that the youth judokas perform the Osoto-gari technique with the best quality, while the Uchi-mata throw attained the lowest score. The average score of leg throws to the dominant and non-dominant sides also shows symmetrical performance; however, the significance level is very close to the 5% significance cut-off point with p=0.084.

Through youth athletes' sport-specific practice in youth age categories, judokas develop physical abilities and important technical-tactical parameters for the specific requirements of a judo fight *(Detanico et al., 2020; Miarka et al., 2012)*. Our results are encouraging as they show that youth athletes show good symmetrisation of specific judo movements. Furthermore, the importance of bilateral movement development and good execution of the throwing techniques for youth judoka's dominant and non-dominant body sides has been highlighted as it is associated with greater competition performance for a maximum all-year-round result *(Šimenko & Hadžić, 2022)*.

A large number of repetitions might explain the good quality of Osoto-gari and Ouchi-gari, as these two techniques are learned early in the judo curriculum. Ouchi-gari is learned for the 7 kyu and Osoto-gari for the 5 kyu. However, the Uchi-mata is learned later for the 4 kyu belt degree. Additionally, the Uchi-mata is a motorically more demanding throw as athletes need a high level of coordination, strength, power, balance, and correct timing/movement of the second step to perform the throw efficiently *(Takanori et al., 2017)*. Therefore, the Uchi-mata needs more time to master, especially if we strive to be performed bilaterally at the same level. Literature also reports that anthropometric dimensions of

a judoka are crucial for efficient throwing technique performance *(Sertić et al., 2007)*. Therefore, further studies are needed to explore morphological traits and their connection to throwing performance in youth judokas.

Despite the good bilateral performance, a trend of better performance on the dominant side is noted. In the higher age group of U-16 judokas, significant bilateral asymmetries in judo-specific performance have been identified *(Šimenko & Hadžić, 2022)*. This might imply that the transition between U-14 and U-16 age groups is essential, as this is when intensive training and specialisation programmes start. It was reported that in Japan, specialisation starts in female judokas at an average age of 14.2 years, while male athletes start at an average age of 16.3 years *(Narazaki & Watanabe, 2021)*. Therefore, further research is needed in a broader sample to understand the complexity of maturation and specific bilateral movement development in judo. Additionally, it highlights the importance of maintaining high levels of bilateral throw execution in higher age groups. Especially, this is important for judokas special techniques *(tokui-waza)* where coaches should strive to equalise the difference in the quality of throw execution between their dominant and non-dominant sides, as this can have multi-dimensional effects *(Šimenko & Hadžić, 2022)* like to increase athletes technical and tactical chances of success and assists in the symmetrical morphological development of youth athletes.

CONCLUSION

The study presents the quality of bilateral throw execution of three Ashi-Waza throwing techniques. Findings demonstrate that youth judokas competing in the U-14 age group perform the Ashi-Waza techniques symmetrically; however, the trend of lower quality on the non-dominant side is noted. The Uchi-mata is the throw with the worst quality in the U-14 age group. Therefore, additional attention should be given to bilateral throw execution in the U-14 age group as the literature suggest that the transition between U-14 and U-16 age groups is crucial and where the significant bilateral differences start to occur. However, further research in a broader sample, preferably in the form of a longitudinal study, is needed.

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BURNOUT IN JUDO: A NARRATIVE REVIEW

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ABSTRACT

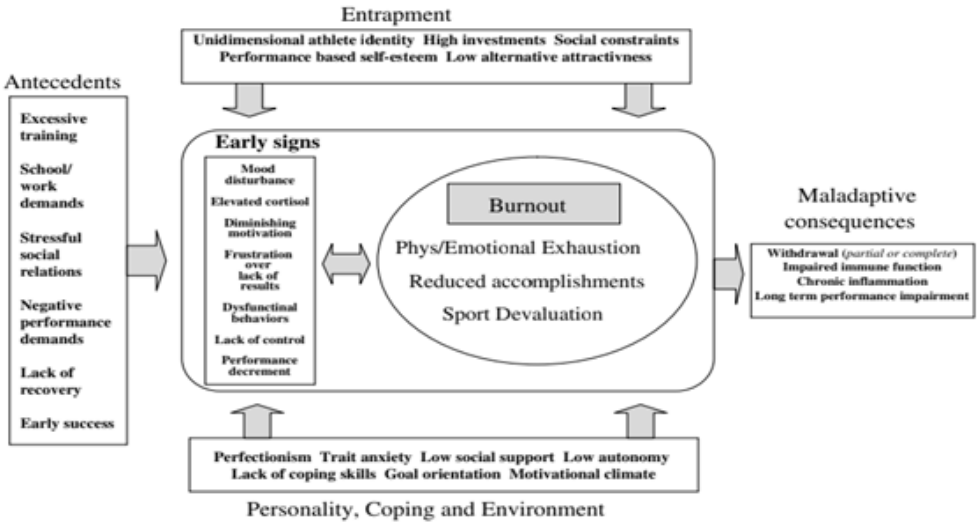
In judo, the execution of technical and tactical actions, besides physiological demands, puts a high psychological and emotional load on judo athletes. The urgent need for the increase of the research of burnout in sports is evident. The aim of this review is to discuss the issue of burnout in judo and provide suggestions for potential future research. The Athlete Burnout Questionnaire is the most widely conducted tool for measuring the level of burnout in judokas. Based on available data, judokas *(athletes and coaches)* reported moderate to low burnout, that is not influenced by gender or weight category. The potential for future research is wide since we need far more gender, age, weight, level, and experience-dependent research on the subject. In addition, since no articles examining their level of burnout in referees were found, it would be interesting to investigate whether the results will be any different from the athletes and coaches.

Keywords: combat *sports, judokas, burnout, sport devaluation.*

INTRODUCTION

Burnout in sports is a subject of high importance because of the enormous number of people that are connected to competitive sports. Japan, the home of judo, reported a dropout by half *(to 120.000 judokas)* from 2004 to 2022, as bullied and burned-out children quit *("Judo hits crisis point in Japan as bullied and burned-out children quit", 2022)*. The urgent need for the increase of the research of burnout in sports is evident. The first studies on burnout were conducted among a population of working professionals. Maslach *(1982)* defined it as a construct of three dimensions: emotional exhaustion, depersonalization, and reduced personal accomplishment. After 15 years Raedeke *(1997)* adapted it and put it in the sport context. In his article, burnout is characterized by physical and emotional exhaustion, sport devaluation, and a reduced sense of accomplishment. Physical and emotional exhaustion is explained as a consequence of the emptying of physical and emotional resources during training and/or competition. Athletes are negative toward their sports achievements and abilities *(reduced sense of accomplishment)* which leads to a cynical attitude connected to sports participation and sports as a whole *(sport devaluation) (Gustafsson, DeFreese, & Madigan, 2017)*. Burnout is somewhere used interchangeably with the term "overtraining syndrome", which is defined as a "series of psychological, physiologic, and hormonal changes that result in decreased sports performance"*(Small, 2002)*. Brenner, & Council on Sports Medicine and Fitness *(2007)* stated that burnout is a serious sequel of overtraining syndrome. A holistic approach to the problem of burnout was provided by Gustafsson, Kenttä, & Hassmén *(2011)* in their integrated model *(Figure 1)*, which incorporates major antecedents, early signs, entrapment, personality, coping and environment, key dimensions and consequences.

Figure *1 An integrated model of athlete burnout Gustafsson, Kenttä, & Hassmén, (2011)*



Note. *Reprinted from "Athlete burnout: An integrated model and future directions" by Gustafsson, H., Kenttä, G., & Hassmén, P., 2011, International Review in Sport and Exercise Psychology, 4, p10.*

Monitoring and measurement of burnout are of high importance in elite sports. Self-report questionnaires are often used for that purpose. The Athlete Burnout Questionnaire is the most widely conducted tool, with documented good reliability and validity in athletes *(Raedeke, & Smith, 2001; Raedeke, & Smith, 2009)*. Somewhat similar, the Maslach Burnout Inventory-General Scale is used to detect burnout symptoms in coaches *(Madigan, Gustafsson, Smith, Raedeke, & Hill, 2019)*.

Judo is a highly demanding combat sport that relies on all three metabolisms. A constant effort that is always starting with grip dispute *(the anaerobic lactic system)*, continuing with the attempts of technique application *(anaerobic alactic system)*. During the whole match, there are short breaks of recovery *(aerobic system)* after each action is stopped by the referee *(Franchini, Artioli, & Brito, 2013)*. Execution of technical and tactical actions, besides physiological demands, puts a high psychological and emotional load on the judo athletes *(Santos, Fernández-Río, Almansba, Sterkowicz, & Callan, 2015)*. Thus, it is of high importance to avoid overtraining and overcompeting, especially in the younger age groups, since it can lead to burnout characterized by fatigue, lack of enthusiasm about practice or competition, and problems during completing usual routines or difficulty with successfully completing usual routines *(Brenner, & Council on Sports Medicine and Fitness, 2007)*.

The aim of this review is to discuss the issue of burnout in judo and provide suggestions for potential future research.

Burnout in judo athletes and coaches

After conducting the research it is obvious that there is scarce scientific literature related to burnout in judokas. The level of burnout in the literature ranged from moderate to low. Recent research provided by Pires, & Ugrinowitsch *(2021)* followed burnout and coping of judo athletes throughout the entire season. In this study, 10% of the judokas had some degree of burnout in all four measurement points, which was in line with multi-sport research that, above others, also included judokas *(Gerber et al., 2018)*. Still, the hypothesis that burnout will significantly increase through the season was not confirmed. Authors discuss that this result may have been caused by the fact that the most important competition was in the time of second and fourth, and less important *(lower level)* in the time of the third measurement checkpoint, which enabled the easing of the physical, technical, and psychological load.

A sample of Uruguay national and international judokas of different ages *(from 15 to 35 years, mean 19.95 ± 5.34)* showed a moderate presence of burnout *(García, Vallerino, & Montero, 2014)*. Even though the overall score is not significant, Uruguayan judokas do have some type of symptomatology related to three dimensions observed *(40.9%*

of the sample had emotional exhaustion, 39.5% had a score on depersonalization item, and 25% had a sense of reduced personal achievement). In addition, results show that resilience has a significant negative relationship with symptoms of burnout, which is important since 38% of judokas presented high resilience.

A resistant personality has also been found to influence burnout, the higher the resistant personality the lower physical and emotional exhaustion, and devaluation of sports practice *(Ponce Carbajal, López Walle, & Méndez Sánchez, 2021)*. Contrary to the previous research cited, low burnout of judokas was found in this one. This was to be expected since the sample consisted of international-level seniors and veterans, aged between 18 and 70 years *(M = 32.56, SD = 11.48)*, athletes that endure all the difficulties and stay committed to sport and competition. They value their sports practice, overcome exhaustion, physical or mental, and stay motivated for many years. The longer they practice and compete at a high level, the more positive attitude toward sport is expected. Junior athletes are feeling less prepared than senior athletes *(Noce, Costa, Szmuchrowski, Soares, & de Mello, 2014)*.

When compared to other martial arts, judo does not differ significantly from Karate and Taekwondo *(Katkat, 2015)*, having in mind that those are striking combat sports, while judo is a throwing combat sport. A total of 336 athletes *(142 females, 194 males)* competing in the 17th Mediterranean Games conducted the questionnaires to collect data regarding their levels of anxiety and burnout. The mean level of anxiety was relatively high and a significant positive correlation between burnout and anxiety was determined, which was in line with the results of Vealey, Armstrong, Comar, & Greenleaf *(1998)*. Given level of anxiety was explained by the importance of the event since it was an official international high-level competition.

In judo, competitors are divided by gender, age, and weight category. Available research didn't show a significant difference according to weight *(Kumar, 2016)*, or gender *(Katkat, 2015)*. Still, additional research is more than necessary.

To the author's knowledge, only two articles address the issue of burnout in judo coaches. The level of burnout found in this research ranged from moderate *(Gencay, & Gencay, 2011)* to low *(Aktas, Karakoç, & Karakoç, 2021)*. Gender differences were not reported, while different findings were provided when coaching level/experience is taken into account. It should be emphasized that the more recent investigation was conducted during a COVID-19 Pandemic when coaches were not able to work, which certainly influenced the obtained results *(low burnout)*.

CONCLUSIONS

The overall conclusion is the small number of published articles connected to burnout in judo. To be able to adequately generalize the findings, it is necessary to have more quality investigations published in high-quality scientific journals. Based on available data, judokas *(athletes and coaches)* reported moderate to low burnout, that is not influenced by gender or weight category.

The potential for future research is wide since we need far more gender, age, weight, level, and experience-dependent research on the subject. Even if the referees are an unavoidable and significant part of the judo sport, no articles examining their level of burnout were found. Thus it would be interesting to investigate whether they are any different from the athletes and coaches.

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BACKTESTING KRUMER'S FORMULA

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ABSTRACT

The aim of this paper was to evaluate the validity of winning probability formulas calibrated by Krumer in the field of professional judo. We used goodness-of-fit, namely the Hosmer-Lemeshow test, to backtest Krumer's models from both out-of-time and out-of-sample data. We show that the accuracy is good when the model is tested on the same type of competitions it was calibrated on *(i.e. out-of-time)*. However, the accuracy is low when the model is not applied to the same type of competitions. This exhibits a new dimension in representativity analysis, the fact that athlete results do not depend on skills only and that motivation or preparation can be considered as relevant hidden variables for prediction.

Keywords: Judo, *sport competition, winning probabilities, backtesting, Hosmer-Lemeshaw test.*

INTRODUCTION

Because the contest history of each pair of athletes in professional judo is limited to a few observations at most, pairwise winning probabilities are estimated by using statistical models calibrated upon datasets of previous tournament results. Krumer *(2017)* has estimated contest winning probabilities from the ranking of athletes and other features such as home advantage and history in head-to-head fights. Other studies *(Breviglieri et al., 2018; Courel-Ibáñez et al., 2018; Julio et al., 2013)* have focused on the judo world ranking as a predictor of individual judo contests and have led to the conclusion that the higher the ranking, the better the performance. Recently, Maçaneiro et al. *(2021)* have also confirmed that the judo world ranking was a good predictor for mixed team match outcomes.

Krumer *(2017)* has proposed 8 different logit regression models for both male and female athletes. Nothing has been done in the literature so far to assess the accuracy of such formulas, but it is a necessary step before using them safely for providing further predictions. For instance, Brunel *(2022)* has used Krumer's model to make predictions about the impact of ranking and seeding in the result of a competition. Such predictions are useful for athletes and coaches to design their training and competition strategy to reach their performance objectives. In other contexts, such as financial risk management or churn models for instance, backtesting is a necessary and mandatory step to gain a competitive advantage from using models *(Lima et al., 2011)*.

The main objective of this paper was to backtest Krumer's formulas and the gap in the literature. We used out-of-time and out-of-sample datasets including competitions results posterior to Krumer's calibration data. We computed the statistics of the Hosmer-Lemeshow *(2000)* goodness-of-fit test to assess the robustness of three models calibrated by Krumer *(2017)*.

We ran the out-of-time backtest for major tournaments *(World Championships and Olympic games)* and the out-of-sample backtest for Grand Slams. The main hypothesis of this paper was to assume that contest outcomes were independent.

METHODS

Reference data sets

In his paper, Krumer *(2017)* calibrated his formula from the data of all the fights that took place in major tournaments including World Championships, Olympic Games and Masters Tournaments between 2010 and 2013. For this study, we collected the data of all the fights that took place in the following competitions from the International Judo Federation *(IJF)* website *(www.ijf.org)*:

- 2015, 2017, 2018, 2019 World Championships,
- 2016 Olympic Games of Rio de Janeiro,

- Grand Slam tournaments of Tokyo (2016, 2017), Osaka (2018, 2019), Paris (2016 - 2020) and Dusseldorf (2018 - 2020).

Ranking lists prior to each of these competitions were kindly provided by the IT team of the IJF. Head to head data were collected from the whole competition database not limited to the above sample.

The World Championships and Olympic Games dataset contained 3,632 fights, and the Grand Slam dataset 4,902 fights. Some data were lacking on rankings and the associated fights have been removed from the database, taking valid fights down to 3,432 fights *(2,030 male fights, 1,402 female fights)* for World Championships and Olympics, and to 4,545 fights *(2,701 male fights, 1,844 female fights)* for Grand Slam tournaments. The total number of fight observations used in our study is finally equal to 7,977 valid fights *(4,774 for men and 3,203 for women)*.

Models backtested

In this study, we provided an out of time and out of sample backtest of several models calibrated by Krumer *(2017)*:

- Model 1: Corresponds to Model 1 in Table 3 (for male) and Table 4 (for female) of Krumer's (2017) paper. The winning probability is a logistic function of the log rank difference. The parameter β is calibrated separately for male and female.
- Model 2: Corresponds to Model 1 in table 6 of Krumer's (2017) paper. The winning probability is a logistic function of the log rank difference, head-to-head and home advantage. The coefficients of the model are calibrated separately for male and female.
- Model 3: Corresponds to Model 2 in table 6 of Krumer's (2017) paper. The winning probability is a logistic function of the log rank difference, head-to-head and home advantage.

We didn't go into the details of Krumer's five other models because they are of similar nature as Model 3. Additionally, Model 1 outperforms all the other models, as we shall see.

Backtesting methodology

For each contest, the favourite is the athlete with the higher rank, the other one being the underdog. All winning probabilities are the probabilities that the favourite wins and are therefore in the range [50%,100%].

We backtested Krumer's formulas on major competitions on one side *(World Championships and Olympic Games)* and on Grand Slams on the other side. The first perimeter *(major competitions)* was similar to the calibration dataset used by Krumer, except that it covers a different time period: Krumer calibrated his formula based on 2010 - 2013 data and we tested his formulas on the period 2015 - 2020. It is an "out-of-time" backtest. The second perimeter was different from Krumer's calibration perimeter. We aimed at assessing the validity of Krumer's formula on an extended perimeter, in this case the Grand Slams. It is an "out-of-sample" backtest.

Statistical indicators

We assessed the accuracy of Krumer's *(2017)* formulas with the Hosmer-Lemeshow test, which is a mainstream approach to assess the validity of logistic regressions *(Hosmer & Lemeshow, 1980; Hosmer et al., 1997; Hosmer & Lemeshow, 2000; Paul et al., 2012)*. After computing winning probabilities, we created groups of fights having similar winning probabilities and we compared, for each group, the average winning probability to the observed winning rate in the group. The Hosmer-Lemeshow statistics is defined as:

$$HL = \sum_{j=1}^{G} \sum_{k=0}^{1} \frac{(O_{kj} - E_{kj})^2}{E_{kj}} \qquad (1)$$

where G is the number of groups, O_kj is the observed number of occurrences of event k in group j and E_kj is the expected number of occurrences of event k in group j. The statistics HL follows asymptotically a $\chi_{(G-2)}^2$ distribution.

There are many ways to construct the groups, and the most current approach is to use percentile groups, if the sample size does not exceed 25,000 *(Paul et al., 2012)*. The authors suggest taking at least 10 groups and use the following optimal number of groups to balance the power of the test *(which depends on the number of groups)* and the population in each group:

$$G^* = \max\left[10;\ 2+8\left(\frac{N}{1000}\right)^2\right] \qquad (2)$$

We have computed the Hosmer-Lemeshow statistics for G=10, G=25, G=35, G=60 and G=G^*. Depending on the value of the number of contests, the value of G^* may be close or equal to one of the other values of G we have tested.

RESULTS

We have computed the total p-value for the Models 1 and 2, Model 3 being excluded because it applies at weight category only. We used different numbers of groups, namely G=10, G=25, G=35, G=60 and the optimal number of groups G^*=2+8⟦*(N/1000)*⟧^2.

Table 1. Total p-values for three models calibrated by Krumer (2017) estimated on major competitions (World Championships and Olympic Games).

	Model 1		Model 2	
	Male	Female	Male	Female
Population	2030	1402	2030	1402
G*	35	18	35	18
10 Groups	56,5%	18,5%	58,9%	4,2%
25 Groups	79,8%	20,0%	25,3%	17,2%
35 Groups	85,7%	15,0%	5,1%	5,3%
60 Groups	77,5%	38,2%	15,3%	6,8%
optimal	85,7%	81,1%	5,1%	2,4%

The results for major competitions *(World Championships and Olympics Games)* are displayed in Table 1. We didn't display the results for Grand Slam because all p-values were found equal to 0 for male as well as for female. The results depend on the weight category. We computed the p-values for each weight category in each model. As the population in each category is in the range 165 to 324, we considered 10 groups for measuring the p-values.

Table 2. p-values for major competitions per weight category (G=10).

	Population	Model 1	Model 2	Model 3
Male -60 kg	283	56,5%	73,1%	68,9%
Male -66 kg	323	44,1%	41,7%	34,1%
Male -73 kg	324	65,7%	20,3%	85,2%
Male -81 kg	320	51,1%	57,1%	70,5%
Male -90 kg	317	37,5%	0,5%	0,1%
Male -100 kg	259	1,0%	98,3%	99,0%
Male +100 kg	204	55,8%	6,6%	1,8%
Female -48 kg	184	18,5%	13,0%	14,5%
Female -52 kg	226	21,0%	69,1%	69,1%
Female -57 kg	245	54,9%	49,6%	62,7%
Female -63 kg	211	73,6%	8,4%	7,1%
Female -70 kg	206	1,1%	21,2%	15,0%
Female -78 kg	165	31,9%	4,5%	45,3%
Female +78 kg	165	34,2%	65,6%	55,7%

DISCUSSION

In this research, we conducted a backtest of Krumer's *(2017)* formulas of winning probabilities based on the Hosmer-Lemeshow statistical test. It was show that Model 1, i.e. the most simple model having only one explicative variable, had the highest p-values. We see from Table 1 that Model 1 performs better for male compared with female. In particular, the number of groups given by Eq. *(2)* is not always the one leading to the highest p-values. The formula of Eq. *(2)* outperforms the other values of G for Model 1 only. Nonetheless, the results clearly confirm the validity of Model 1 on the scope of major competitions. Models 2 exhibits the same performance, and we observe that adding features to the simplest model *(Model 1)* deteriorates the performance. It is a surprise that previous head to heads and home advantage are not relevant in Model 2, but the way these features are accounted for in Krumer's models does not seem accurate.

On the contrary, the results show without any ambiguity that the three models are not valid on the scope of Grand Slams since all "out-of-sample" backtests fail and lead to p-values equal to 0. Clearly, champions target major events such as World Championships or Olympic Games and may underperform in other tournaments. This is what is shown in some studies, for instance in Franchini et al. *(2017)*. Some top champions may use Grand Slam tournaments as an intermediate step to prepare major events. Finally, Table 2 shows that the models remain quite accurate when used on

a given weight category, except for male -100 kg and female -70 kg. These two categories may be more balanced than the others *(Krumer, 2017)*.

Recent studies such as the one of Bertolini et al. *(2000)* show that the HL test is to handle with care and may not be accurate in some special circumstances. Judo data are rather scarce and accurate analytics may be difficult to compute. Instead, we prefer to see Krumer's approach as a valid procedure to group athletes into homogeneous groups and the logit formula as an interpolation formula for pairs of athletes belonging to the same group or to two different groups.

CONCLUSION

Winning probabilities estimated from professional judo contests pass out-of-time backtests, in particular for the simplest model involving log rank orders only. However, they don't pass out-of-sample backtests since athletes prepare specifically to some competitions depending on their level. Coping with more explicative variables than the log rank orders seem challenging. We observed that the backtests were less accurate when additional variables such as past head-to-heads or home advantage were added to the basic model. It is important to assess the quality of predictions, even if tests are not a guaranty of validity. It may open new research area, for instance to find better ways of coping with additional features in the models. Acknowledgement: we are grateful to Elisabetta Frattini from IJF for her kind help in the data collection process.

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LONG-TERM IMPACT OF RAPID WEIGHT LOSS ON THE HEALTH STATUS OF FORMER JUDO ATHLETES

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ABSTRACT

The primary aim of this study was to investigate the long-term effects of rapid weight loss on the health of former judokas. The sample included 85 former judokas, and a modified version of the CSPCHQ questionnaire was utilized for data collection. The selected variables focused on determining weight reduction methods during the athletes' sports careers, their current health status, and their subjective assessment of their health on a scale of 0-10. Basic statistical parameters, such as the arithmetic mean and standard deviation, were calculated for all variables measured on the scale. Correlation analysis revealed statistically significant correlation coefficients between weight reduction methods and current health status *(r = 0.23, R2 = 0.05, p = 0.04)*, as well as between current health status and subjective health status assessment *(r = -0.66, R2 = 0.43, p < 0.001)*. However, no statistically significant correlation was found between weight reduction methods and subjective health assessment *(r = -0.07, R2 = 0.00, p = 0.54)*. Based on the findings from the studied sample of participants, it can be concluded that the frequent use of acute weight loss methods has had a negative impact on their health status.

Keywords: combat *sports, questionnaire, rapid weight loss*

INTRODUCTION

It is common for judo athletes to employ various methods to reduce their body mass in order to compete in lower weight categories, aiming to gain a competitive advantage in motor skills over opponents in the same category *(Reale et al., 2020)*. There are two main strategies for weight reduction: chronic and acute. However, pursuing the lowest possible weight category can negatively impact performance and lead to adverse health consequences if chronic energy deficiency develops *(Rankin, 2002)*. The acute effects of weight loss practices in judo are well-documented *(Franchini et al., 2012)*. However, there is a noticeable lack of studies that have analyzed the long-term effects of chronic weight reduction in former judokas and former athletes of other martial arts. One such study by Marquet et al. *(2013)* examined the post-career body mass index *(BMI)* of former elite combat athletes and concluded that constant changes in body mass during their sports careers did not have a significant impact on their post-career BMI. The researchers suggested that the greater physical activity of these former athletes might have contributed to the relatively stable body mass despite frequent fluctuations. Similar findings were reported by Nitzke et al. *(1992)* in a study involving 60 former collegiate wrestlers. Based on the existing research, it can be concluded that the effects of constant changes in body mass on human health have not been sufficiently investigated in the population of former martial arts athletes, including judo athletes. Therefore, the primary objective of this research is to assess the long-term impact of rapid body weight reduction on the health status of former judokas.

METHODS

The sample for this study consisted of 85 former judokas, with an average age of 40.5 years, including some who had won medals at continental and world championships. The researchers utilized a modified version of the Combat Sports Post-Career Health Questionnaire *(CSPCHQ) (Krstulović et al., 2022)* for this research. The selected variables included weight reduction methods during the athletes' sports careers *(RWL)*, current health status *(CHS)*, and the subjective assessment of the participants' health condition on a scale of 0-10. Data collection was conducted through the online survey tool SurveyMonkey. For variables presented on a ratio scale, basic statistical parameters such as the arithmetic mean and standard deviation were calculated. Frequency and percentage were used to represent results for nominal

variables. To determine the relationship between the variables, the Pearson correlation coefficient was employed, along with the coefficient of determination *(R2)*. The magnitude of correlations was assessed using a modified scale based on Hopkins *(2000)*: r ≤ 0.1 *(trivial)*, 0.1-0.3 *(little)*, 0.3-0.5 *(moderate)*, 0.5-0.7 *(large)*, 0.7-0.9 *(very large)*, and ≥ 0.9 *(almost perfect)*.

RESULTS

Table 1 shows the descriptive parameters of the variables for evaluating weight reduction methods and the current health status expressed in arbitrary units, as well as the variables for the subjective assessment of health status

Table 1. Descriptive parameters of variables for evaluating weight reduction methods and current health status expressed in arbitrary units, and variables for subjective assessment of health status (n = 85).

	mean	(SD)	Min	Max
RWL (a.u)	5.2	(3.1)	0	16
CHS (a.u)	3.5	(2,9)	0	12
Q57	7.4	(1.6)	3	10

Legend: SD – standard deviation; Q57 – How would you rate your health-related quality of life on a scale of 1-10; a.u. – arbitrary units

Table 2 shows the subjects' weight reduction methods during their careers. It can be noted that the most used methods were "reduced fluid intake" and "increased exercise *(more than usual)*", while the participants used "taking diet pills" and "vomiting" the least.

Table 2. Reported methods of weight reduction methods in participants (n = 85)

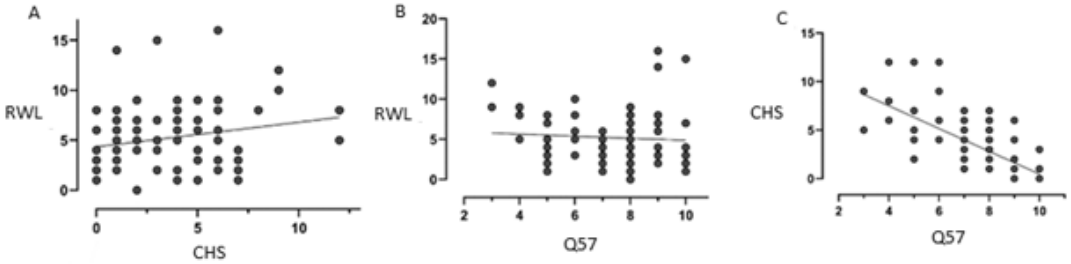
	n	(%)
Gradual dieting (weight loss in 2 or more weeks)	55	(64.7)
Skipping 1 or 2 meals	54	(63.5)
Fasting (all day without meals)	45	(52.9)
Restricting fluid ingestion	62	(72.9)
Increased exercise (more than usual)	60	(70.6)
Training intentionally in heated training rooms	38	(44.7)
Sauans	55	(64.7)
Training with rubber/plastic suits	52	(61.2)
Use winter or plastic suits all day and/or night (without exercise)	21	(24.7)
Spitting	24	(28.2)
Laxatives	7	(8.2)
Diuretics	14	(16.5)
Diet pills	4	(4.7)
Vomiting	4	(4.7)
Hot tube	24	(28.2)
Water overloading	10	(11.8)

Table 3 shows information about the current state of health of the participants. The participants reported that they have the most problems with breathing during sleep *(snoring, apnea)*, then with elevated fats in the blood *(cholesterol, triglycerides)*, and with the skin *(dermatitis, psoriasis, acne, etc.)*. The participants had the fewest health problems with liver and thyroid function and osteoporosis. Only one subject was diagnosed with cancer.

Table 3. Information on the current state of health of the participants (n = 85)

	n	(%)
Do you have high blood sugar?	6	(7.1)
Do you have elevated blood fats (cholesterol, triglycerides)?	16	(18.8)
Do you have high blood pressure?	7	(8.2)
Do you suffer from any heart disease (heart rhythm disorders, angina pectoris, heart attack)?	4	(4.7)
Do you have sleep-disordered breathing (snoring, apnea) and/or increased daytime sleepiness?	27	(31.8)
Do you have problems with liver function?	1	(1.2)
Do you have problems with kidney function?	6	(7.1)
Do you have problems with thyroid function?	1	(1.2)
Do you have stomach problems (heartburn, gastritis, stomach ulcer)?	12	(14.1)
Do you have problems with stool regulation (constipation, diarrhea, etc.)?	13	(15.3)
Do you have skin problems (dermatitis, psoriasis, acne, etc.)?	16	(18.8)
Do you have osteoporosis?	1	(1.2)
Do you have mental health problems (feeling depressed and/or anxious)?	8	(9.4)
Have you been diagnosed with cancer?	1	(1.2)

Graphs 1-3 show the relationship between weight reduction methods, current health status expressed in arbitrary units, and subjective assessment of the health status of the participants. Correlation analysis revealed statistically significant positive and negative correlation coefficients between weight reduction methods and current health status *(r = 0.23, r2 = 0.05, p = 0.04)* and between current health status and subjective assessment of health status *(r = -0.66, r2 = 0.43, p < 0.001)*, respectively. No statistically significant correlation was found between weight reduction methods and subjective health status assessment *(r = -0.07, r2 = 0.00, p = 0.54)*.



Graph 1. The relationship between (a) weight reduction methods and the current health status of the participants: (B) weight reduction methods and the subjective assessment of the health status of the participants and (C) current health status and the subjective assessment of the health status of the participants.

DISCUSSION

The obtained results indicate that the majority of participants gradually reduced their body mass throughout their careers and employed less hazardous methods, such as reduced fluid intake, increased exercise, and skipping meals. However, it was also observed that some participants resorted to highly dangerous methods of acute weight reduction,

which can lead to severe health consequences and even death *(Crighton et al., 2016)*. Comparing these results with previous research is challenging since this study is the first to analyze the results obtained through the CSPCHQ questionnaire. It was interesting to examine the relationship between weight reduction methods, current health status, and the subjective assessment of participants' health *(graphs 1-3)*. Correlation analysis confirms a statistically significant positive and negative correlation between weight reduction methods and current health status *($r = 0.23$, $r2 = 0.05$, $p = 0.04$)* and current health status and subjective assessment of health *($r = -0.66$, $r2 = 0.43$, $p < 0.001$)*, respectively. However, no statistically significant correlation was found between weight reduction methods and subjective health status assessment *($r = -0.07$, $r2 = 0.00$, $p = 0.54$)*. The results reveal that former judokas who frequently employed rapid weight reduction techniques, particularly those using more dangerous methods, exhibited poorer health statuses compared to others. Previous research has predominantly focused on the acute effects of rapid weight loss in judo *(Artioli et al., 2010; Brito et al., 2012)*. There is no doubt that acute weight loss has negative effects on physiological, psychological, and general health parameters. This study stands as one of the first to demonstrate the long-term adverse effects of rapid weight loss on certain health status parameters in former athletes. The primary limitation of this study is the absence of a control group comprising non-athletes or athletes from other sports, which could have helped identify potential differences between the observed subject groups.

CONCLUSION

Based on the analyzed sample of participants, it can be assumed that the frequent use of acute weight reduction methods negatively affected their health status.

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THE BRITISH JUDO COACH EDUCATION PROGRAMME: INTRODUCING JUDO TO AN OLDER POPULATION- FOR SAFER FALLING AND AGEING WELL

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ABSTRACT

This case study highlights the education of the British Judo Association's *(BJA)* coaches to apply their skillset to a new demographic, that of an older population. All the population have the potential to fall, however those that are over 60 years old suffer the greatest number of fatal falls and 30% of people aged 65 and over fall at least once a year, this rises to 50% of all those aged 80 and over *(Public Health England, 2017; WHO, 2021)*. The implications of this data show that falls are a global public health problem, with the costs from falls in the United Kingdom *(UK)*, estimated at more than £2.3 billion per year for the National Health Service *(NHS) (NICE, 2013)*. Dr Katrina McDonald and Dr Mike Callan were asked to consult with the BJA to co-produce a three-hour coach education module, that could be used as a revalidation event, where coaches were educated on utilising their current coaching skills with an older population. The module consists of two PowerPoint presentations, two practical tatami-based sessions and a supporting course handbook document. In the two practical sessions, a suitable syllabus was presented with 18 different exercises, that have been identified, grounded by evidence-based research, as suitable and relevant for an older population *(Kamitani, 2018)*. Feedback from the participants on the initial pilot course, was "it was excellent" and participants observed how to adapt their coaching for an older population. Future recommendations are to offer this course to all current BJA club coaches and to offer support to assist with this exciting new initiative.

INTRODUCTION

It is predicted that by the year, 2050 there will be over 1.5 billion people over the age of 65, with all regions seeing an increase in the size of their older population between 2020-2050 *(United Nations, 2020)*. This age group suffers the greatest number of falls, with an estimated 684,00 individuals dying each year from a fall *(WHO, 2021)*. Age is a key risk factor for falling, with older people experience higher risks in part due to physical, sensory and cognitive changes associated with ageing *(WHO, 2021)*. Falling has micro and macro factors of impact, specifically for those that fall, but also to their wider family but also significant societal factors with an estimated cost to the NHS at over £2 billion a year and over 4 million bed days *(Fenton, 2014)*. Reducing the number of falls and the impact of the falls is important for maintaining the health, wellbeing and independence of older people. The World Health Organization *(WHO)* defines a fall "as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level." In the sport of judo one must throw their opponent flat on their back to win, yet the International Judo Federation *(IJF) (2007)* suggests that judo is more than a sport and thus can offer society assistance with the development of safer falling for an older population.

As part of the sport of judo, ukemi are taught, as the ultimate way to win in judo is to throw one's opponent flat on their back. Ukemi are breakfalls, coaches teach participants how to fall as part of the initial lesson so that they can safely participate in the class. The average age of people who participate in judo varies depending on country and regions, however Franchini *(2011)* reports that competitive judo ranges from 15 years old to masters *(>30 years of age)*, yet there is very limited data captured to adequately report on the number of participants outside of competitive judo. However, as a sport, judo have started to look to wider societal problems to see how the sport could be utilised as part of its founding pillars, Jita Kyoei: Mutual Welfare and Benefit *(IJF, 2007)*.

Several studies have taken place utilising judo to combat safer falling and ageing well. Programmes and countries of origin include the Netherlands Nijmegen Falls Prevention Program *(Weerdesteyn et al., 2006)*, Italy *(Ciaccioni et al., 2020)*, Japan Yawara Chan Taiso *(Sakuyama, et al., 2021)*, Spain Adapted Utilitarian Judo programme *(JUA) (Toronjo-*

Hornillo et al., 2018), and Sweden Judo4Balance programme *(Arkkukangas et al., 2021)*. What is yet to be captured is how to educate all judo coaches to work with this older population, and with more than 200 national federations, across five continental unions, judo has a workforce ready to focus on this societal challenge.

CONTEXT

The British Judo Association *(BJA)* is the National Governing Body *(NGB)* for judo in the UK and their role is to be the custodian and guardian of their sport *(Taylor and O'Sullivan, 2009)*. Having recognised the potential benefits to an older population of learning safer falling principles from judo, the BJA asked Dr Katrina McDonald and Dr Mike Callan to write a coach education module for their coaching workforce, so that they can point the workforce at the social problem of ageing. As judo coaches, it should be recognised that they are already experts in teaching safer falling, with ukemi being utilised as an integral part of a novice participants lessons.

Coaches are teaching safer falling by emphasising three main aspects: maintaining alignment and ensuring that the head does not make contact with the floor; distributing the force of the impact by making a large surface area; and by reducing the velocity by teaching the participants to use rolling to dissipate the force and to time when to initiate the first two aspects. New to coaches, is the difference that this demographic brings to learning safer falling through judo principles. Vacha-Haase et al. *(2009)* suggests that awareness needs to be made to the influence of age-related changes on the older people, including mental and physical changes, but also the impact of age-related developments changes, whilst being mindful of the varying group dynamics in this cohort. What this means is that the coaches needed to be made informed of the differing approach that was needed. The main differences being: 1) conducting an adaptation of The Physical Activity Readiness Questionnaire for Everyone *(PAR-Q+) (Bredin et al., 2013)*; 2) Using micro-progressions for each exercise which are small tweaks to skills; 3) recognising that mobility of the participants is as important as their age.

METHODOLOGY/ PROPOSED SOLUTION

For the initial delivery of the coach education course, Introducing Judo to an Older Population- for Safer Falling and Ageing well, experts from across the BJA coach membership were asked to participate. This included coach developers, physiotherapists, social workers, national coaches, and those that currently work with an older population.

The pilot workshop was delivered over one day but future delivery will be as a coach revalidation three-hour face-to-face module. The workshop consisted of two PowerPoint presentations, two practical tatami-based sessions and a supporting course handbook document. In the two practical sessions, a suitable syllabus was presented with 18 different exercises, that have been identified, grounded by evidence-based research, as suitable and relevant for an older population *(Kamitani, 2018)*.

Coach education course content

The coach education course has aims and objectives:

Learning Aims

1. Delivering to a new population (What)
2. Sport Development of how to deliver to the population (How)

Learning Objectives 1

- Understanding the population: health concerns.
- Small progression steps for adapting to this population.
- Inclusivity: including language, respectful, adaptability.
- Awareness of limitations so participants can work at their own pace.

Learning Objectives 2

- Forms to fill in to support medical guidance. PARQ Plus adaptation
- FFQ-R (6 questions)

PowerPoint 1-Theory behind safe falls for the elderly

- Welcome and introductions, domestics etc
- Structure of today's programmes
- Understanding the health concerns of the population
- Costs of Falls
- Size of the problem
- Other global solutions
- The role of judo
- Safer falls vs falls prevention
- FFQ-R

PowerPoint 2 – Sports Development initiatives

- Specific needs of the population – differences of working with this age group
- Inclusivity, language, respectful, adaptability
- Micro-progressions
- Awareness of limitations
- Funding models
- Funding for the elderly in the UK
- PARQ+
- Benefits to individual, club, association, judo family

Course Content Practical

Ne-waza		Tachi-waza	
1	Yoko-ukemi	10	Getting up
2	Ball roll sideways	11	Squat
3	Ushiro-ukemi	12	Steering to yoko ukemi
4	Ball roll backwards	13	Seoinage
5	Shoulder bridge	14	Calf raises
6	Bridge and reach	15	Uchimata
7	Bicycle kick	16	De-ashi-barai
8	Threading the needle	17	Tsugi-ashi
9	Mae-ukemi	18	Tai-sabaki

DISCUSSION

The pilot delivery of the coach education course was successful, with a comprehensive delivery of both presentations and mat based sessions. The participants of the coach education expressed how useful the course was in adapting their current skillset to a different demographic and in giving them confidence as judo coaches to apply their skillset

to an older population. Acknowledgement was made to the differences that are significant to this demographic, such as altering the language utilised and the opportunity to be inclusive in delivery by utilising micro progressions as well as regressions of each exercise. Based on feedback from the participants some small tweaks were made to the course handbook to add coaching points to each practical exercise. A few weeks after the course, several participants emailed the course tutors and had started to utilise the skills that they had been taught in the class with a varying demographic than they had previously worked with. The tutors and authors of the course acknowledge the initial barriers that need to be removed by recognising that judo coaches are experts in teaching participants ukemi and therefore the principles of safer falling. But also identifying the transferability of this skillset to different demographics and sports.

CONCLUSION

The case study of the BJA's Coach Education Programme: Introducing Judo to an Older Population- for Safer Falling and Ageing well is a change of focus for coaches, pushing them to examine a global challenge and permitting them the opportunity to assist in reducing the number of falls and the impact of the falls.

The initial delivery of this course was successful, and the three-hour workshop will be offered as a re-validation event to coaches across the UK. Focusing 200 national federations, with their coaching workforce at this global problem could impact the health, wellbeing and independence of older people. It could also offer national federations an opportunity for different revenue opportunities to help support this initiative, whilst also bringing a different demographic into the judo family, who will also bring a different outlook and perspectives. The impact of this work from judo offers the potential to assist national health services and reduce the cost of falls to the wider community. It is epitomes' Jita Kyoei and is an area that needs greater development and support.

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DEVELOPMENT OF A GUIDELINE FOR MENTAL HEALTH IN YOUTH ELITE SPORTS FOR THE GERMAN JUDO FEDERATION

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ABSTRACT

Background: Mental health in competitive sports is gaining more and more media presence. At the same time, for the first-time athletes dare to talk about their problems, including in the sport of judo. Judo is a very training-intensive weight class sport, which carries some risks for mental health. Currently, most federations lack concrete prevention concepts to support athletes with problems or even to protect them from such risks, including the German Judo Federation *(DJB)*. The aim of this paper is to develop a systematic guideline for the maintenance of mental health for the German Judo Federation, as well as to highlight the hurdles of implementation and to suggest initial solutions. **Methodology**: To answer the research questions, a multi-method approach was chosen in the form of a quantitative study, an as-is analysis, and expert opinion. 213 junior judoka *(> 24 years with a min. state squad status)* participated in the online survey with eleven items. The action guide is underpinned with three theoretical approaches, the Intervention Mapping Approach, Trans-theoretical Model and Normative Process Theory. **Results**: The responses indicate that there is a need for more support as well as education among junior judokas. 67,6% of the interviewed athletes stated that they had already had a disturbance once and 35,2% of the athletes don't know who they can turn to when problems occur. According to the guidelines for the DJB, there are three concrete areas of support: 1. destigmatization, 2. prevention, early intervention and 3. personal development. **Conclusion**: Further research and implementation in the field of mental health are important to preserve the mental health of athletes in the long run. The federation should be obligated to fulfill its duty of care to avoid the negative effects of impaired mental health.

Keywords: mental *health, prevention, high level sport judo*

INTRODUCTION

The issue of mental health among elite athletes is becoming increasingly relevant. While a healthy body is a necessary basis for success in sport, pushing physical limits to achieve peak performance in elite sports can make athletes particularly vulnerable to mental health problems *(Thiel, 2014)*. As an Olympic judoka and member of the German national team, I have personally witnessed concerns about inadequate mental strength for sports among myself and

my colleagues, often leading to leaving the sport. There is a lack of comprehensive and concrete support for the mental health of young judo athletes in Germany.

Psychological problems among young elite athletes are a growing problem in many countries, including Germany. Mental illnesses are as prevalent among athletes as in the general population, with varying risks depending on the sport, such as eating disorders in gymnastics or ski jumping *(Ströhle et al., 2020)*. Due to the pressure to perform, elite athletes appear to be particularly susceptible to psychological problems such as depression *(Frank et al., 2013)*, anxiety and eating disorders *(Rohrer et al., 2017)*. In judo, rapid weight loss due to weight classification is common, with 4% of surveyed athletes reporting self-induced vomiting, 10% reporting the use of laxatives, and 8.5% reporting the use of diet pills *(Filaire et al., 2007)*. Furthermore, athletes report more negative feelings about their physical appearance and greater dissatisfaction with their bodies compared to the control group *($p < 0.01$ or $p < 0.05$)*. Globally, many judo athletes' psychological problems even end in suicide, indicating the importance of this issue *(Hammond et al., 2013)*.

Mental well-being, alongside innate disposition, and physical training, has a significant impact on elite sports performance *(May et al., 2016)*. High performance requires the optimal interplay between physical training, tactics, technique, and mental health. Athletes who are able to effectively manage their mental health can better meet the demands of the sport, handle competitive pressure, recover from setbacks and injuries, and maintain a positive attitude, increasing their likelihood of success. In contrast, restrictions on the mental health of elite athletes can significantly affect their physical

performance. Psychological problems such as anxiety, depression, and stress can impair an athlete's ability to focus, concentrate, and perform at their best.

The possible causes of psychological problems among young German judo athletes are not yet fully understood, but many factors have been identified that may contribute, including physical and psychological pressure to succeed, the competitive environment, and inadequate support from coaches or other sports personnel. Thiel *(2014)* states that "the more authoritarian the sports environment is, and the more pressure is exerted, the more young athletes tend to ignore physical and psychological complaints until they can no longer be ignored."

The present study aims to develop a sport-specific framework for prevention in Judo. The focus is on young athletes to form healthy athletes in the long term. Measures for psychological development need to be created for the sports association and its members, which will ultimately lead to performance optimization of the athletes - a relationship that needs to be made aware of. Furthermore, the study aims to find ways to overcome barriers and stigmatizations to enable optimal implementation and health literacy.

METHODS

At the beginning of the research, the problem statement and identification of needs were carried out using a systematic review of existing literature by searching the PubMed and Google Scholar databases from 01.05.22 to 20.09.22 *(cut-off date)*. The search terms used were related to mental health, depression, sports, elite athletes, and prevention in both German and English. Additional literature was identified using the snowball method. Expert opinions and personal experience were also used to supplement the literature. Additionally, a search was conducted on the websites of important sporting institutions to identify existing health programs and structures. A quantitative online survey was also conducted to determine the need for mental health prevention plans among young judokas. The survey consisted of 11 items and included questions about mental health, knowledge, and occurrence, as well as demographic information. The survey was conducted using the online platform Survio and was tested with four athletes before being distributed to a sample of young judokas who were members of a German state team and under 24 years old. A total of 213 athletes completed the survey out of the 741 who accessed it. The survey was promoted via Instagram, WhatsApp group chats, and the German Judo Association's website. Three theoretical approaches, namely the Intervention Mapping Approach, Trans-theoretical Model, and Normative Process Theory, provide the theoretical foundation for the development of the guideline.

RESULTS

This study highlights the lack of comprehensive and targeted mental health models that can effectively support the mental health needs of elite athletes. The study analyzes mental health support services offered by major German sports organizations, including the International Olympic Committee *(IOC)*, the Federal Institute of Sports Science *(BISp)*, and the German Olympic Sports Confederation *(DOSB)*. The IOC has a dedicated Athlete 365 section that includes a Mentally Fit category, providing confidential support services for mental health and wellbeing, including a Mentally Fit Helpline available in over 70 languages. The IOC website also includes psychoeducation, expert advice, and video materials on mental health topics, as well as a 100-page Mental Health in Elite Athletes Toolkit that addresses mental health disorders, symptoms, barriers, and structures, and identifies the roles and responsibilities of all stakeholders. The BISp's “MentalGestärkt” initiative aims to promote and maintain mental health in elite sports and prevent and identify psychological problems such as stress, depression, or burnout. DOSB provides information on sports psychology on its website. The study notes the importance of these resources in building and improving support networks to normalize discussions around mental health *(Purcell et al., 2019; Reardon et al., 2019; IOC, n.d.; BISp, n.d.; DOSB, n.d.)*.

The results of the survey reveal the following results, in terms of the athletes' living situation, 128 out of 213 athletes *(60.1%)* reported living at home with their family, while 33 *(15.5%)* lived in a shared flat. Few athletes lived with their partner *(20)*, alone *(16)*, or in a sports dormitory *(16)*. The majority of the participating athletes, 146, were part of the national team, while 35 were part of the junior team, 18 were part of the prospective team, and eight were part of the Olympic team. Six athletes belonged to the supplementary team. The personal importance of the following life areas was rated as follows: family, health, athletic success, education *(school, training, university)*, and private life. Private life

was rated the least important. Of the 213 athletes surveyed, 155 *(72.8%)* knew the difference between mental health and mental strength, while 58 *(27.2%)* did not. Of the surveyed athletes, 144 *(67.6%)* reported experiencing at least one of the listed mental health issues. More than half of the athletes reported having had a mental health problem before. In terms of knowing whom to turn to when experiencing problems, the majority of athletes *(64.8%)* knew where to seek help, while 35.2% did not. Finally, regarding mental health conversations, 141 athletes *(66.2%)* reported having spoken to someone about their mental health, while 72 *(33.8%)* had not. The reasons for not seeking help were fear of consequences *(60 athletes)*, not recognizing the problem *(56 athletes)*, difficulty expressing oneself *(55 athletes)*, lack of time *(52 athletes)*, fear of having a problem *(47 athletes)*, fear of the impact on performance *(45 athletes)*, lack of belief in the effectiveness of help *(43 athletes)*, never having a problem *(39 athletes)*, lack of access to help *(30 athletes)*, and lack of knowledge about available resources *(28 athletes)*. Suggestions for improving mental health support in judo included education *(42 mentions)*, accessibility *(18 mentions)*, more counseling *(30 mentions)*, sensitizing coaches *(19 mentions)*, destigmatization *(21 mentions)*, making help available to all athletes *(6 mentions)*, proactively offering help *(11 mentions)*, starting earlier *(9 mentions)*, and individualized suggestions *(8 mentions)*.

The guideline for the mental health, which results from the research, the survey and the expert opinion, purposes three concrete action fields for the German Judo Association based on funding priorities: destigmatization, prevention and early intervention, and personality development. To promote destigmatization, measures should be taken to increase awareness about mental health issues among all stakeholders, including short anti-stigma interventions, educational programs, and promotion of expression of emotions and normalizing conversations around mental health. Prevention and early intervention should be integrated into the daily work of the association. This includes the use of screening tools such as the IOC Sports Mental Health Assessment Tool, support for athletes during injury recovery, and the provision of a routine and emergency referral system for psychological problems. Additionally, the use of monthly online questionnaires such as the WHO 5 is recommended for monitoring athletes' mental health status and identifying potential issues early on. In terms of personality development, training should be provided to athletes to increase their resilience and coping skills. The proposed action fields align with sport psychology and should help to improve the mental health of athletes in the German Judo Association.

DISCUSSION

This chapter provides a critical discussion of the research methodology used for the needs analysis, development of the action guide, and its limitations. The literature review and quantitative survey were used for the needs analysis. However, the limited data available required the addition of subjective expert insights. While these provided important insights, they lacked systematic research methodologies and may be affected by personal biases. Additionally, the varying data collection methods and instruments used in the literature review made comparison difficult. The online survey was designed to be self-explanatory and easily completed to minimize participant dropout rates. While online surveys have their limitations, they were deemed suitable for this project due to budget constraints. As online surveys target a younger audience. Demographic and performance data were collected to ensure inclusion criteria were met. Overall, the methodology used in this study has limitations, but provides valuable insights into the topic of mental health in youth sports.

Finding help online for athletes is also difficult. Sports psychology in Germany primarily focuses on performance optimization rather than health promotion, and measures for mental health promotion, early detection, and treatment of mental disorders in German elite sports and junior competitive sports are lacking. The prevalence of mental health problems among athletes emphasizes that existing sports psychological support is still not sufficient. Furthermore, sports psychological support is not extensive enough even in the national team, and the measures are currently scattered with little holistic work. The "Athlete 365" website provides a good example of discussing the topic, but these aids are not known to young athletes.

CONCLUSION

The real world of athletes appears to be different than what is generally assumed. Athletes are professionals in suppressing emotions and can have low self-esteem despite a successful career. Therefore, mental health is essential

and researchers and practitioners of sport psychology should be inspired to make greater contributions to a long-lasting, successful, and healthy career of athletes in sports and in life. Athletes *(and coaches)* are not exempt from mental disorders such as anxiety, depression, burnout, and eating disorders. There are different risk factors, as well as various barriers that athletes must overcome to seek help. A prevention plan, which can cover the needs of young judokas also in the field of sport psychology, will be implemented in the DJB. In summary, the hypotheses were confirmed by the literature review and survey. There were no existing prevention plans or structured measures to maintain the mental health of German young judokas. The literature agreed with the survey that there is a high need to address the issue and a desire for change. The intervention aims to raise awareness of mental health, overcome barriers and stigma, and create optimal implementation and health literacy. The intervention should also involve the athlete's environment. The importance of mental health is evident by the increasing research rate in the psychological field. Due to the topicality of this issue, there are hardly any evidence-based/evaluated concepts.

In future studies, the implementation and evaluation of the intervention can be examined. The aim is to prevent more severe negative effects of mental health at an early stage, which doesn't mean that competitive sports are harmful to health. The association and coaches should also be surveyed to determine the current situation. The long-term goal is to normalize the importance of mental health across all sports and provide support to athletes to prevent depression, which poses a high risk of suicide. Associations should be aware of the high importance of mental health because enough athletes suffer in silence and suicide is the greatest risk of depression. The number of athletes suffering from mental disorders is likely higher than reported. The more opportunities are created, the more athletes can open and seek help.

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TEACHING VALUES THROUGH JUDO PRACTICE

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ABSTRACT

People are aware of the importance of values for good education and the transmission of culture between generations. We have the judo moral code. Jigoro Kano left the basic ethical principle, Jita kyoei. In judo, we have a carefully developed methodology for teaching each technique. No one in the literature on Judo known to us or in the education of Judo coaches has offered a recipe or methodology for teaching values from the Moral Code or otherwise. Unfortunately, an important part of judo philosophy and the educational moment is left to the coaches themselves, who have not been educated in this field, to try to follow the words of Jigoro Kano themselves, based on their knowledge and creativity. Even though ethics and values are an important part of judo, which makes it different from other sports, we do not have a model of teaching these values. In the sports association GIB with partners we created an Erasmus + project, Jita kyoei 1 and 2, and we will try to create a methodology of value teaching and organize education. We created a programme »Mediator of inclusive judo values« and education for Coaches of Mediators and Coaches of Coaches of mediators. Just as some already separate "traditional" and "sport" judo, it may happen that we will separate the principle of Jita kyei and Moral code. In reality, these are two sides of the same coin. They are like Uke and Tori, who can be two different people or two roles *(states)* within the same person. We live in the age of "youth and the phone". Young people are different, their way of receiving information is different and their view of the world is different. Therefore, our methodology must also be different. The first step should be to transfer the values from the posters that adorn the walls of our dojos to tatami and into life. Judo is neither virtuous nor educational in itself. It is all the more exposed to the excesses of sport as its originality and specificity in this matter are based on a neglected cultural and historical background and a weakened collective imagination.The values of judo exist only if they are taught. There are values only in the teaching act and in the human relationship between the one who transmits and the one who receives *(Brousse 2019)*.

Key words: *Values, ethics, education, self-realization, Jita kyoei, Moral code, Mediator of inclusive judo values, Erasmus+ project Jita kyoei 1 and 2, DO and JITSU, MIND project, EJU.*

INTRODUCTION

The article is a presentation of the topic of the Erasmus + project, which is still ongoing.

Judo values, what is that? We all talk about them, some can name all the 8 values from the »Le code moral« *(Courage, Respect, Modesty, Friendship, Honour, Sincerity, Self-control and Politeness)*, created in the 80s by French coach *(Brousse, 2021)*. The European Judo Federation *(EJU)* named it “Moral code” *(http://www.eju.net/activity/moral-code)*, whereas the International Judo Federation *(IJF)* refers to it as “Judo moral code” *(https://www.ijf.org/moralcode)* .Moral code could refer to Jita kyoei *(mutual prosperity for self and others)*, one of the basic principles of judo, but it is an ethical principle. An average coach in an average club *(with 100 members of both sexes and all ages)* he could be does not really care whether it is ethics or moral. They know what the »Moral code« is, they can name some values, they know that they can be asked about them at the exam for judo belts and that is it. Of course, it varies from country to country, but from conversations with our partners from the project, we learned that we all have similar experiences in this area.

I know from my own experience that teaching values is a problem and the "Moral Code" does not give me a recipe for how to teach it. In judo, we all talk about values, but in fact no one has a methodology for teaching them, or it is unknown to me.Ethics, one of the most important areas of judo that makes it different from other sports, is not really studied within the judo organization. While researching the literature for the project, we found nothing tangible on this topic.

In specialized literature we *(Hawkes)* can read that one of the methods of »teaching« values is »being an example«, this means that younger members learn from older and more experienced ones. In our case these are coaches. I put

»teaching« into brackets, because literature says we do not teach values, but the attitude to values. This means that we have to understand the situation and behave in the proper way. Behaviour or the response to the situation is an indicator of our values.

Severe rules and penalties for inappropriate coach behaviour, used on low-level and high-level competition, show the behaviour of coaches, who are an example for young judo players. With the Erasmus projects Jita kyoei 1 and 2 we tried to create a methodology of teaching values. We chose values *((respect, altruism, solidarity (mutual aid)*, cooperation, responsibility towards people and things *(listening to others and mindfulness to oneself)*, courage - you do what is right, duty, inclusion, integration) and created a programme of teaching, to which we added also other for us important issues. They are: peer violence, vandalism and responsibility. We added also trust, self-realization and social activity, based on Jita kyoei, Kano's principle about cooperation and mutual benefit.

We created the programme »Mediator of inclusive judo values«. We created a study plan for judo players, who want to achieve this title. It includes theory, practical work and exam questions about values, behaviour in different life situations and problem solving in the local community, represented by the club and the school. We discovered that the problem is not only methodology, but also coaches. Because of that, we also prepared a self-reflection questionnaire for coaches. Education programmes for Coaches of Mediators and Coaches of Coaches of mediator are also being prepared.

Our hypothesis is that it is possible **to improve the knowledge and use of values** in every judo club in all the countries inside the European Judo Federation and the International Judo Federation, using the methodology of teaching values entitled »Mediator of inclusive judo values«. The programme will offer young judo players, who do not want to participate in a competitive sport, **one more possibility** to remain in judo, become Coaches Mediators, teach values and take care of the social commitment of the club in the local community. In this way we could get closer to Kano's ideal and aim of judo; self-realization and social commitment of every judo player.

Can judo get better thanks to teaching values *(and later with huge advertising)* and **get advantage on the other sports,** which advertise their projects as »No racism and Fair play«, while their players offend and spit each other and there are fights among their public? Research on similar projects and literature about teaching values was done in the internet. The methodology of teaching was created with our partners in the workshops of the Jita kyoei 1 Erasmus + project.

METHODS

In the research, we used the keywords: judo education, teaching values, Judo moral code, Jita kyoei and teaching values through sports. Above all, we wanted to find out which methods of teaching values are recorded in the literature. Research on how to teach values began on Slovene web pages. We learnt what values are, how to divide them, we learnt about the programme »ethics and values« in a Slovene Elementary School. We also learnt about the »Institute for ethics and values« *(Inštitut za etiko in vrednote Jože Trontelj | Ljubljana | Facebook)* of Slovenia. We discovered the existence of a »European ethics and values framework« *(EOEV)*. https://www.researchgate.net/publication/344592807_Evropsko_ogrodje_etike_in_vrednot_EOEV We passed form Slovene web pages to Italian ones. We focused on videos. We studied videos created by prof. Emanuele Isidori for his students of kinesiology *(https://youtu.be/5VghQaa7PXk)*. The videos were about philosophy and sport ethics. They included only the basics and a lot of sport history from Ancient Greece onwards. Nothing or barely nothing about teaching values.

While studying English literature online, we found »The values-based school« *(https://www.valuesbasededucation.com)*, founded by the British pedagogist Neil Hawkes. We checked the web page UNESCO and studied their project »Values Education through Sport« Values Education through Sport *(unesco.org)*

We checked also the web sites of the European judo union *(EJU) (http://www.eju.net/activity/moral-code)* and of the International judo federation *(IJF) (https://www.ijf.org/moralcode)* and discovered what these two key organization say about values. An important source of information for judo players is Jigoro Kano's philosophy and the Jita kyoei principle, guardian of the judo tradition, the Kodokan institute. *(http://kodokanjudoinstitute.org/en/doctrine/word/jita-kyoei)*. We also studied the MIND project of the All Japan Judo Federation *(https://www.judo.or.jp/what-is-judo/judo-mind/)*.

We got a lot of information about values in judo from the French author Michel Brousse *(Brousse 2019 and 2021)*. We got a lot of information about values in judo from the French author Michel Brousse *(Brousse 2019 and 2021)*. But still, all the information obtained was more of a historical outline, a criticism of the current existing system in judo, which is

increasingly just a sport and moving away from the basic ideas of the founder of Kano. Through this research, we got little information about the teaching of values.We did not find specialized articles *(university researches and similar)*. Probably because as non-professors we do not have access to specialized data bases. But we could create a basic study plan with the accessible information and knowledge. We included also a book; Frankl, Viktor, E. *(Man's search for ultimate meaning)* Človekovo iskanje najvišjega smisla/Viktor E Frankl/ translation Rudi Meden; /appendix Viktor E Frankl…et al./- Celje: Mohorjeva družba, 2020 – *(Zbirka Smisel)*.

RESULTS

The result of studying these texts was learning the general knowledge of values. A historical development of values from Ancient Greece *(Emanuele Isidori)* to nowadays. We learnt the values are abstract and individual concepts, that everyone has his/her own value hierarchy and that values are achieved with education, they are culturally coditioned. An example of value hierarchy is that two individuals in TOP 10 have exactly the same values, but for one money is the most important, for the other fairness. The first will try to get money from every situation, whereas the other a fair result for everyone. Values are passed to the younger generation through education. An important message is that there are other models *(parents, teachers, coaches, friends...)*, who pass their values to the younger generation. A model has to be an example of integrity and do what he/she says. If he/she speaks about respect, he/she has to be respectful. We do not teach values, but our attitude to them. An indicator of value knowledge is the behaviour in a given situation. The response to a given situation can be positive or negative, it depends on the values of the individual. Every positive value has its negative contrary and such can be the response to a given situation. The sport itself is neutral, it is not good or bad, »users« give it the positive or negative connotation with behaviour *(Emanuele Isidori)*.

Young players learn the meaning of a single value, the correct behaviour, in which situations the value appears and how to react. They learn theory through discussions, writing stories and similar. Theory is followed by practice; role play, models *(imitating behaviour)* of other important figures, theatre, actions such as »Value of the months« and behaviour *(responses)* in real life situations in schools, clubs or on the street.

DISCUSSION

According to the mass media *(Bukovec and Černoga 2007)*, new generations do not have values, there is a lot of peer violence and other forms of violent and disrespectful behaviour. School teachers and coaches in clubs agree. According to them, every next generation is »more unpolite«, pedagogists have more work with discipline than teaching. Given this situation in society, we assumed that we would find many useful solutions among professional articles and other databases on the Internet.

Our conclusion after checking accessible web pages is that people talk a lot about values, but no one gives a »recipe« how to teach them. The key judo organizations themselves *(the European Judo Federation and the International Judo Federation)* have the Moral code on their web sites, but judo players are left to their own knowledge and creativity. Not even the All Japan Judo Federation went further than making posters with slogans. Today's youth is different. Young people's worldview, behavior and values are shaped by videos and information from the Internet. That is why we need to change the way of teaching and education. We have to move the values from the posters, on the tatami to the dojo. At the same time, we must not forget the education of the coaches either, because they, as important others, have a very important influence on the education of new generations of judokas.

The hypothesis of the project is that an appropriate methodology and organization of teaching values can improve the recognition and knowledge of values and stimulate a good behaviour. The programme »Mediator of inclusive judo values« offers young members, who do not want to participate in competitive judo, one more possibility to stay and be active in judo. Thanks to such an active programme of teaching values judo is even better than the other sports in the field of ethics and education. The hypothesis, which had been set before studying literature available on the internet *(a methodology of teaching values and the title »Mediator of inclusive judo values« can improve the knowledge and positive use of values in every judo club in all the countries inside the European Judo Federation and the International Judo Federation. The programme »Mediator of inclusive judo values« offers young members, who do not want to participate in competitive judo, one more possibility to stay and be active in judo)* is confirmed.

Unfortunately, judo, which was created as an education in which we develop the body, mind and spirit by practicing attack and defense, has become a competitive sport. Coaches and clubs are "hypnotized" by medals and results. They are ready to sacrifice entire generations of young judokas for a medal. In this way, judo loses its educational potential, which places judo among other sports. Even the training of coaches is focused on competitive judo and less on the educational aspect that judo carries in its essence.

The creation of champions should be left to the national associations. In recent years, large international competitions have been organized for 15-16 year olds. With such an early competition system, it is practically impossible for clubs to focus on the education of young judo players and follow the main objective of judo, which is, according to Jigoro Kano: self-realization and active cooperation in the development of the society.

Competitions affect judo training. Teaching judo techniques mostly depends on the competition rules and which techniques and holds are prohibited at that moment. The quantity of competitive training does not allow young judo players to focus on the other parts of judo: kata, philosophy, theory, history of judo and other techniques, forbidden in competitions. The technical part of judo is in some way forgotten; basic techniques are not being taught. The width of judo *(kogi judo)* is being lost; many young judokas in this age period are not able to or do not want such a competitive sport and for this reason they leave judo *(Noriko 2019)*.Judo as a sport is gradually going back to the past. DO *(path)* is coming back to Jitsu *(technique)*. The technique is becoming more important than education and spiritual growth of the single player.

In conclusion, everyone talks a lot about values and their importance. But nobody tells how to teach them. In the Erasmus project Jita kyoei, we created a methodology of teaching values and the title Mediator of inclusive values, which can improve the understanding and teaching of values and help young judo players to be educated in the spirit of Jita kyoei and help in the development of society. We must be careful not to teach Jita kyoei and moral values separately, because they are different sides of the same coin. They are like Uke and Tori, who can be two people or two roles *(states)* within the same person.

The objective of judo is »being better today than yesterday«, that is self-realization and active cooperation for the wellbeing of the society, development of the local and global environment. This means values, humility, respect and responsibility, and this is what a judo organization should give its members.

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JUDO UKEMIS: A TOOL FOR PROTECTING THE HEALTH AND QUALITY OF LIFE OF CHILDREN. SAFE FALL-SAFE SCHOOLS©

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THE IMPORTANCE OF FALLS IN MODERN SOCIETY

The World Health Organization *(WHO)* identifies falls as the second leading cause of death worldwide due to accidental or unintentional injuries. In this scope it is remarked that prevention strategies should emphasize education, training, creating safer environments, prioritizing fall-related research and establishing effective policies to reduce risk *(WHO, 2021a)*. Recently, safely recommendations *(WHO, 2021b)* have been published providing evidence-based strategies to prevent and manage falls for children and other target-groups.

The importance of this issue has long been pointed out by the World Health Organization. This organisation has presented the following data that show us the reality of this serious social problem *(WHO, 2021a)*. This will provide an opportunity to look at a global health and safety problem of which we are often completely unaware. For example, unintentional falls are the second leading cause of death in the child population; they are second only to road traffic accidents. Worldwide there are 37.3 million falls requiring medical attention, 684 000 of them result in death and an estimated 172 million more are left with short or long-term disability. Within this data, children are one of the populations at risk identified by the WHO.

Contextualising this issue further, children between the ages of 4 and 16 will die today in Europe as a result of an unintentional fall; the WHO *(2021)* reports 14 children. Tomorrow another 14 and so on until the end of the year. But this is only the tip of the iceberg. Two thousand two hundred and forty are hospitalised. Twenty-eight thousand emergency room attendances. These truly outrageous figures must be added an economic and life-year cost that in countries such as the United States is estimated at 50 billion dollars a year. And finally, let us not forget another very important aspect, namely the disabilities and psychological problems associated with falls. Different studies show the relevance of the topic and how, in addition, this problem does not seem to have a tendency to disappear, on the contrary, it is continuously increasing. In this context, the most recent Eurosafe data presented last November *(2022)*, which for the first time shows that falls are higher than traffic accidents for this population.

Obviously, the WHO could not remain indifferent to this important social and economic problem. In this sense, it challenges the different institutions, pointing out the need and importance of education and research in relation to falls in two target populations: children and older adults.

And what has been the response of the scientific community to this challenge launched by the WHO? Regard this, we can find preventive programmes and educational programmes. Preventive programmes have been proposed, which, although necessary, do not solve the problem, as children continue and will continue to fall. On the other hand, proactive action is proposed in response to the fall. Two programmes are presented here: Vallen is ook een sport *(Nauta et al., 2013)* and Safe Fall-Safe Schools© *(DelCastillo-Andrés, et al., 2017)*.

Both are based on combat sports to carry out their intervention in a population of school children. But, the difference between these two programmes is that, the first, Nauta and colleges, found no significant differences between the experimental and control groups. However, the data obtained in the Safe Fall-Safe Schools© programme found significant differences in all its interventions.

Safe Fall-Safe Schools© becomes the first programme, worldwide, adapted to the school context for the proactive treatment of falls. At this point, we can establish a convergence between the demand shown by the World Health Organization, and other international organisations, and the proactive proposal of Judo through the Safe Fall-Safe Schools© programme. The programme consists in providing trainings on falling prevention and falling skills based on the

Ukemi Judo skill to physical education *(PE)* teachers for them to apply in their classes *(not only when teaching Judo, but seeking the fall prevention in any other sport, like gymnastics, volleyball, football, parkour, roller-skating, etc., or physical exercise situation)*.

To understand the Safe Fall-Safe Schools© programme, it is necessary to see judo not only as a sport. We must see it with the philosophy with which Jigoro Kano created it, in his proposal of a judo at the service of society. This social proposal of Judo will be directed towards improving the health and quality of life of two target populations: older adults and children. It is on this second population, children, that the development of the Safe Fall-Safe Schools© programme is focused, specifically on unintentional falls related to this period of life.

What is Safe Fall-Safe Schools©?

Is an educational programme based on Judo, methodologically developed through scientific research, to teach children how to fall safely and securely. As it is easy to deduce, Judo presents, in its Ukemis, a perfect tool to address this World Health Organization challenge; Safe Fall can respond to WHO, in a consistent and objective manner.

To continue, a brief overview of the programme's background is provided. Knowing the past gives us a better understanding of where we are going. In 2016, during the European Judo Union Congress, held in Porec, we put forward the idea of developing the slogan judo more than sport. For this, as you can see, the concepts, judo for education, judo for heath and judo for society should be related. With the purpose of training children and youth and prevent falling and learning how to fall, the European Judo Union *(EJU)* and the University of Seville *(US)*, with the support of the Andalusian Federation of Judo and Associated Disciplines *(FANJYDA)*, are developing, since 2016, the programme Safe Fall-Safe Schools© at schools.

To carry it out, the University of Seville, the EJU and the Andalusian Judo Federation signed an Agreement of Collaboration, and began to carry out research and to improve the Safe Fall-Safe Schools© programme. Two years later, in view of the promising results of the research carried out, the World Health Organization invited us to a meeting in Copeinaiguen to present our project and the data obtained so far. In this way, our ultimate goal will be achieved: Judo, through its Ukemis, to become, first, a promising program for the World Health Organization and, subsequently, for it to recommend judo for the proactive treatment of falls. This will respond to the social demands of the WHO.

The programme has been structured as follows. A progressive teaching method is established, adapted to the school context, looking for developing the falling skill. Therefore, we have four classification criteria that have been used to establish the design and progression of the exercises proposed in Safe Fall-Safe Schools©. The first of all, Centre of gravity height, will lead to the establishment of the different levels *(initial, average and advanced)*. We will always start with the initial level where the centre of gravity is in contact with the ground. Secondly, the number of axes of rotation. We can establish falls on the longitudinal, transverse and sagittal axes.

The more axes combined, the greater the difficulty of the exercise. Third, number of participants and level of uncertainty in decision-making *(first we will pose exercises in which the person decides when to fall. Then a partner will decide when to fall and finally, among several partners, we will not know who will cause the fall)*. Fourthly, we will propose exercises from lower to higher speed and inertia in order to progress in difficulty. And finally, we have the direction of the fall. We will use Ushiro, Yoko, Mae and Zempo Kaiten. The progression of the exercises will be adapted to the methodology and didactic principles of Physical Education.

Based on the above, the combination of all the above variables has allowed us to design, so far, more than 129 specific exercises to teach children to fall in a safe and secure way. So, from our point of view, the overall vision of the programme has enough identity and coherence to consider including a new motor skill in the school context, “the falling skill”.

Moreover, in this way, we would bring Judo closer to the school, thus highlighting its educational and social potential.

What have the countries involved in the program done so far?

The programme is currently being developed more intensively in Hungary, Italy, Denmark, Croatia and Spain. In these terms, 48 world and international congresses have been atended, 4 doctoral thesis on proactive fall prevention based on Judo was published, and 17 Master's theses were completed. Likewise, the following have been published 15 papers in high academic impact, 11 book chapters have been written and, presented the programme at 4 international seminars, reaching out in training to more than 15 countries in the European and worldwide context.

What are the material and infrastructure needs for Safe Fall-Safe Schools©?

In relation to the programme, the answer is that we don´t need any additional material to what the centres have for their Physical Education class. We believe that this is a great strength. Another great strength is its transferability to all sports.

What are the benefits for Judo from the Safe Fall-Safe Schools© programme?

To answer this question we must look again to the World Health Organisation. Through the Safe Fall-Safe Schools© programme, Judo could be recommended by the WHO as a useful tool for the proactive treatment of falls in their target populations. This would put Judo at the forefront as a healthy sport for children, with the potential increase of Judo practitioners worldwide.

This perspective, Judo will be seen as an activity committed to protect the health and safety of children. This will enhance the image of Judo further, from a social perspective. Includes a wide range of exercises to work on ukemis in the clubs, interesting to motivate our students.

CONCLUSION

In conclusion, we can say that Safe Fall-Safe Schools© is a useful programme to reduce the harmful consequences of falls. The Safe Fall-Safe Schools© programme can be easily introduced in physical education clasess and could visualise Judo at school for students, teachers and parents.

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CONTRIBUTION TO SUSTAINABLE DEVELOPMENT: 'DIFFERENCIA SPECIFICA' OF JUDO

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INTRODUCTION

There is no doubt today that sport is world-wide socio-economic phenomenon with many impacts on global and local levels. Although we do not always have *(quantitative)* evidence on effects of practicing sport, many studies confirm social and economic values of this phenomenon. It has also been proved that many sports contribute to this position with its global media presence and great number of practitioners all over the world that has been often emphasized on the web pages of majority of international sport federations. A sport that is proud to be a visible and important part of world sport success is – judo - with more members/countries that practice judo than United Nation has members *(204 members of the International judo federation, www.ijf.org)*.

Sport has many 'sides' that makes it difficult to investigate and make conclusions on its strengths or weaknesses. From the social viewpoint, sport is a 'public need' meaning that its health benefits are very important for the health of nation giving the impetus for development of all activities for children and young ones that are not necessarily competition oriented. On the other hand, every sport and judo as well, is just a commodity – product that must be attractive to wider audience, different media and sponsors, supporting the competitive side of sport.

In competitive world that we live in, among the most important issues is to define what is 'differencia specifica' of the sport and to answer the question - what attributes contribute to success? Having in mind all the values of judo due to legacy of its founder Jigoro Kano *(Kodokan Judo Institute, 2009; www.ijf.org)* it is easy to conclude that judo in many ways contribute to sustainable development and community wellbeing, although, practicing judo every day, we may not be aware of that. In era of experience economy and proliferation of sports, the ability to use all the arguments of contribution of judo to sustainable development goals for creating development policies in many countries, could be vital. In this short communication I would just like all judo practitioners and judo fans to become aware of relations of judo values and already internationally identified sustainability development goals and to use them.

METHODS

United Nation publication “Transforming our World: The 2030 Agenda for Sustainable Development” *(UN, 2015)* is a collection of seventeen interlinked objectives designed to help achieving peace and prosperity.

World Tourism Organization *(2019)* also illustrated the contribution of sport to realization of 17 Sustainable Development Goals *(SDGs)*. Interpreting the Agenda, International Olympic Committee *(IOC)* in its publication “Olympism 365: Strengthening the role of sport as an important enabler for UN Sustainable Development Goals *(SDGs) (2021)* defined alignment in 10 SDGs:

- SDG 3 Good health and well-being,
- SDG 4 Quality education,
- SDG 5 Gender equality,
- SDG 8 Decent work and growth,
- SDG 10 Reduce inequality within and among countries,
- SDG 11 Sustainable cities and communities,
- SDG 12 Sustainable consumption and production patterns,
- SDG 13 Take urgent action to combat climate change,
- SDG 16 Peace, justice and sustainable institutions,

- SDG 17 Partnerships for the goals.

The main aim of the paper is to define group of SDGs and relate them to values of judo.

ANALYSIS AND DISCUSSION

As an Olympic combat sport with history noted down including technique elaboration as well as principals and moral code, judo with all its values contribute to realization of those SDGs *(Brousse and Messner, 2015)*. In the following section, links between the groups of SDGs and different values of judo is elaborated through the activities and projects of the International Judo Federation *(IJF)* including its membership, national judo federations.

Health and wellbeing *(SDG3)*: Improving health and wellbeing of individuals and communities are among 'core' values of judo as Jigoro Kano as its founder defines: „By practicing judo, the student will be able to acquire the benefits of physical education, become versed in methods of combat, and concurrently nurture their intellect and morality" *(Kodokan Judo Institute, 2009)*. Many studies showed the advantages of practicing judo during childhood, but also the during lifetime – safe-fall projects of many sport and kinesiology universities in Europe, MIND project in Japan, judo moral code applied in France and many other countries keep proving such contribution.

Many projects where judo is used for improvement of social skills of pupils in primary schools – judo has proven as suitable method against violence between young ones, against use of drugs, against hyperactivity; judo helps achieve better concentration needed for learning, improve social skills and have other positive impacts on *(Smolders, 2021; Gabriel, 2021)* health and wellbeing of the practitioners.

Quality education *(SDG4)*: Back to origins of judo – again Jigoro Kano developed judo primarily as an educational tool and IJF Academy's web starts with Jigoro Kano's quote: "Nothing under the sun is greater than education. By educating one person and sending him into the society of his generation, we make a contribution extending a hundred generations to come."

The IJF Academy is founded with the mission of giving the same chances all those who would like to learn more, who need to have diplomas for various knowledge levels *(instructor, coach, undergraduate diploma)*, but having in mind professional education in all sectors of judo, harmonization and high level of knowledge regardless of position/level. Establishing an international scientific journal - „The Arts and Sciences of Judo" - as a new academic communication platform, it is contributing to sharing a knowledge on important aspects of judo and research audience all over the world *(https://academy.ijf.org)*.

Education structure of the IJF Academy is offering basic instructor courses but also undergraduate and bachelor's degrees and in collaboration with the University of Hertfordshire, the students can continue their education toward masters and PhD degrees.

Inclusion and equality *(SDG5 and SDG10)*: Judo clubs for people with disabilities are not rare cases, giving chances to practice judo to all regardless of age, sex or disabilities. "BeInclusive EU Sports Award for 2018" went to judo club "Fuji" *(Croatia)* for exceptional efforts in offering possibilities for children without and with disabilities to practice judo and grow together. Judo is practiced in developed and underdeveloped countries and regions, equally in big metropolitan areas and in remote communities.

Giving the same chances on 'tatami' to both genders *(joint international championships, same prize money, same competition rules, mixed teams)* judo is still male dominated regarding the leadership positions. But progress is visible – during Congress 2019 in Tokyo, IJF changed the Statute, with the 25% of women at the Executive Board *(https://www.ijf.org/ijf/documents/3)*, so it can be expected that the national judo federations will follow and start activities, giving the same chances to both genders. Two conferences under the title Together we are stronger" were supported by the audience from many countries followed by the "Gender Equality Strategy" *(https://www.ijf.org/ijf/documents/14)* with the main goal of raising the percentage of women in judo and gender statistics that has been registering yearly progress.

Environmental and sustainable economic growth *(SDGs 8, 11, 12 and13)*: IJF in celebration of World Judo Day *(28th of October, birth day of Jigoro Kano)* is promoting different topics under the umbrella of judo values and for 2019 it was – „Plant a tree"- and judoka all over the world planted thousands of trees, contributing to nature protection, as one of the SDGs showing also the strengths of judo community around the globe. System of competition throughout the

year *(IJF World Tour and continental competitions)* and different events *(camps and festivals)* are giving local economies opportunities for growth of visitors flows and increased spending, promotion of host towns and countries along with increased international visibility, again giving opportunities for new cultural and/or economic investments.

Sustainability is of special concern of the IJF that adopted Sustainability Policy and implement it through measuring carbon footprint of several IJF Tour competitions and evaluating the sustainability activities of all the competition hosts together with continuing educational activities *(Judo for a Sustainable World; An Initiative of the International Judo Federation)*.

With all the values, judo is contributing to realization of corporate social responsibilities in the case the company is sponsoring judo club or federation. It also gives a platform for defining company strategy based on judo principles *(Yoffie and Kwak, 2001)*.

Peace, justice and sustainable institutions *(SDG 16)*: Peace and justice all over the world and in all sectors depend on strong institutions and organizations. Therefore, it is of utmost importance for judo to have strong leadership on international as well as on national levels. IJF Congresses during the last decade gave clear evidences of the progress and arguments for activities that has to be changed. With support of IJF anthem that contributes to experience of identity of judo as sport, IJF team during championships gives possibility of inclusion of all those judoka that suffer from the unfavorable position of their countries. Judo and Peace project*(s)* involve countries that had histories of conflicts and support the mission of building a better world through judo.

Partnership for for the goals *(SDG 17)*: With hierarchical sport organization, from clubs to national federations, continental unions to international federation, judo gives a plenty of possibilities for creating partnerships. One example from Europe is organization of Judo Festival in Porec *(Croatia)* with the main task of giving possibilities to judoka of all ages and all expertise levels and fields to train and learn from each other through different activities *(from OTC camp to various age categories camps, judo and family gathering, judo research conference, kata activities, improve the club and coach seminars, kata activities, etc.)*. This event like many others gives a lot of chances for judo 'activists' from different countries to learn about their cultural differences.

CONCLUSION

Sport can be considered as foundation of the wealth of nation*(s)*, and judo with the blessing of its roots and many features that correspond with sustainable development goals, must be envisaged as a sport with the leading role in every sporting community *(Brousse and Messner, 2015)*.

This paper gave just a few evidences of judo's contributions to the SDGs and there are still plenty of evidences throughout the world about the positive impacts of judo on personal lifes as well as on communities. It is the responsibility of all judoka and all those promoting judo values to use them in a way, that the founder, J. Kano explained and showed to the world more than a century ago. Judo values recognized throughout the judo community have positive impacts contribute sustainability goals, distinguishing judo among sports andcreating a great part of its 'diferencia specifica'.

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HOW ARE SOCIAL INCLUSION PROGRAMS IN SPORT FINANCED FROM PUBLIC FUNDS? AN EXAMPLE FROM THE FIELD OF JUDO

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ABSTRACT

Social inclusion in sports is a fairly new concept in this field, which everyone understands differently. Better known and with a long tradition, the concept of inclusion is used in education and in the field of support jobs. Decision makers are usually content to support the Paralympic sports programs. Coaches in sports clubs include people of diverse abilities, but if only they are not involved in competitions, they do not receive system funds for them. Many athletes who need support when participating in sports activities are actually still excluded and do not have the opportunity to participate in sports programs. Even parents of children, young people and adults with intellectual disabilities and/or other psychophysical challenges or socially more difficult circumstances interpret the concept of social inclusion in a different way. The Meter Matters project *(ERASMUS-SPORT-2021-SCP, ID:101050372)* is therefore looking for measurable criteria for the co-funding of inclusive sports programs. Data will be obtained with the help of *(1)* a literature review, *(2)* existing co-financing criteria in partner countries *(Hungary, Portugal and Slovenia)*, *(3)* focus groups with athletes, coaches, social workers, volunteers, managers and *(4)* interviews with experts. In a similar way, with the help of the focus group of inclusive judo players, coaches and parents results, the funds of the Mercator company's promotional charity campaign were successfully distributed in 2021 by the Slovenian Judo Federation.

Key words: *measurable criteria, diverse abilities athletes, funding model, inclusive judo, focus groups*

INTRODUCTION

Equal involvement of all people in sports activities is, in terms of national and international guidelines, enshrined in some conventions and strategies in the field of sports, as well as human rights, social security, physical and mental health, architecture, environment and also public administration like White Paper on Sport *(2008)*, Convention on the Rights of Persons with Disabilities *(2006)*, Union of Equality: Strategy for the Rights of Persons with Disabilities *(2021)*.

Based on some research in the field of inclusion in sport and the successful Erasmus project Promoting Social Inclusion of Persons with Mental Disabilities through Sport *(2017)*, some important facts are already known: *(1)* Which are the groups of people involved in various inclusive sports programs like people with diverse abilities, people with mental health challenges, former elite athletes, senior athletes – veterans, etc., *(2)* what types of inclusive sports programs exist like rehabilitation, recreational, competitive and *(3)* the different implementation areas of inclusive sports programs like sports, social clubs, health centres, business environments, etc.

In practice, the providers of inclusive sports programs are already recognised. Also, national legislation that supports inclusive participation could be found. In 2018, interesting research was carried out entitled Mapping access to sports for people with disabilities, where a lot of useful information was found for the new Meter Matters project, ERASMUS-SPORT-2021-SCP, ID:101050372 *(Meter Matters)*. Among other things, it is noted that the complex range of resources and different leadership and management have made it difficult to determine the overall levels of funding for the participation of diverse abilities people in sports. There is also considerable variation across the EU in the levels of funding allocated to sport participation programmes. A gap between the practice and EU guidelines in terms of sustainable support for inclusive sports programs in the form of co-financing by state and local resources has been noted. Also, considerable opacity in the regulation of the field has been observed. Given that there are both, *(1)* relevant programs and *(2)* inclusive legislation and policies, it is believed that the reason for the missing article is reflected in the undeveloped criteria for measuring inclusion in sports.

Major sports programs are usually co-financed on the basis of crowds *(number of involved athletes)* and performance *(sports score)*. In the field of inclusion in sports, the criteria cannot be the same, as it is basically a smaller population. An estimated 1.3 billion people experience significant disability, which represents 16 % of the world's population.

It should be emphasized that the possibility of equal inclusion, or the non-exclusion of vulnerable people, is first and foremost important for social inclusion in sports. The possibility to compete is of secondary importance, but of course not unimportant. Thus, the new criteria must primarily follow the first meaning.

The obvious development of social inclusion is also noticeable in Slovenian-inclusive judo. The year 1994 is considered to be the start of planned development, although master Anton Tonček Kos started working with judo for the blind, which is a Paralympic discipline, already in the 1960s. An important milestone is the year 2017 when the first national championship of inclusive judo was held under the name of 1st Jože Škraba's judo festival for all. Based on this, in 2019, the event was systematically co-funded by the state. It is to cover the cost of renting the hall, where the national championships are held. Thus, in 2022, as many as three national championships took place within the framework of the festival: for inclusive judo, for veterans and the team. Such a large event was soon recognizable and interesting for sponsors. In 2021, the Slovenian Judo Federation cooperated with the company Mercator, which collected funds for inclusive judo through the Involved in Life campaign. In order for the funds to be fairly distributed among the implementers of inclusive programs, a similar but much smaller procedure was carried out.

Thus, the Meter Matters project investigates the field of inclusion in sports with the aim of proposing measurable criteria and a model for funding programs that include diverse abilities athletes in mainstream sports organizations.

METHODS

The Meter Matters project is methodologically divided into two steps. In the first step, the literature review on the topic of social inclusion in sports with the aim of formulating a definition of this concept was carried out. When preparing for the application of the project, it was clear that a definition of sport does not yet exist *(Christiaens & Brittain, 2021; Coalter, 2015)*. Since the partners of the project come from three different EU countries *(Hungary, Portugal and Slovenia)*, in the first step the existing situation was scanned and the criteria that relate to the co-funding of social inclusion programs as well as to para-sports and sports in general was checked.

The aim of the project is focused on finding measurable criteria for co-funding inclusion in sports, which represents the second step. In order to formulate new criteria, three focus groups will be held in each partner country, namely with: *(1)* coaches, parents, social workers, volunteers and others who actively participate in inclusive sports programs in regular sports clubs, *(2)* diverse abilities athletes and *(3)* club managers. Further, the interviews with experts on social inclusion in sports will deepen and establish a framework of realistic possibilities for the new criteria implementation.

Based on the proposals for measuring inclusion in sports, a simple model for co-funding inclusive sports programs at the national level will be suggested. To make the model as useful as possible, so-called weights will be added to the selected criteria. Based on the latter, decision-makers will be able to easily include new criteria in public national and local tenders in the field of sports.

[1] *The Included in Life (slo. Vključeni v življenje) campaign took place in 2021 with the cooperation of three partners: the company Mercator d. d., Slovenian Judo Federation and Slovenian Olympic Committee.*
Source: https://www.mercator.si/projekti/inkluzija-v-sportu/ & https://judoslo.si/article/2108

RESULTS

As the Meter Matters project is still ongoing, the results are not yet known. At this point, we would like to present the distribution of sponsorship funds from the Mercator company, which in 2021 supported the inclusive judo of the Slovenian Judo Federation through the promotional campaign Included in Life. It was necessary to distribute the collected funds as fairly as possible among the seven participating Slovenian judo clubs. *Fig*ure 1 shows how the Slovenian Judo Federation, for the purposes of distributing the collected funds of the Included in Life campaign, created criteria. The authors *(Pečnikar Oblak & Ljubotina, 2021)* based on a focus group with coaches and managers of inclusive judo clubs, prepared the criteria for the sponsor, which included: 1) the number of registered members in inclusive judo programs, 2) the number of years of continuous activity in the field inclusions, 3) the number of community actions, 4) the number of announcements about inclusion in the public media, 5) the inclusion of younger and older inclusive judokas, and 6) the number of competitors at the Jože Škraba Judo for All Festival.

Figure *1 Criteria for the distribution of donation funds of the Included in Life campaign*

Merila za sofinanciranje inkluzivnih programov JZS - DONACIJA MERCATOR 2021

MERILO ŠT.	OPIS MERILA	POJASNILO MERILA	MAX ŠT. TOČK	MERILA/TOČKE							
1	**Število registriranih članov** v programih inkluzivnega juda.	Množičnost	40	1 do 10 članov	**10 točk**	11 do 20 članov	**20 točk**	21 do 30 članov	**30 točk**	31 in več članov	**40 točk**
2	**Število let** neprekinjenega inkluzivnega delovanja.	Izkušenost; Trajnost	20	1 do 5 let	**5 točk**	6 do 10 let	**10 točk**	11 do 15 let	**15 točk**	16 in več let	**20 točk**
3	**Število skupnostnih akcij.** Naštejte in kratko opišite skupnostne akcije IJ v obdobju od 1.1.2019-31.12.2020 (glejte pojasnila).	Spodbujanje inkluzije, povezovanje članov kluba	15	1 sk. akcija	**2 točki**	2 do 5 sk. akcij	**5 točk**	6 do 10 sk. akcij	**10 točk**	10 in več sk. akcij	**15 točk**
4	**Število inkluzivnih objav v javnih medijih** od 1.1.2019-31.12.2020 (tv, radio, tiskani mediji, e-mediji).	Spodbujanje inkluzije navzven, zunanji partnerji kluba	5	1 objava	**1 točka**	2 do 5 objav	**2**	6 do 10 objav	**3**	10 in več objav	**5**
5	**Vključevanje mlajših in starejših inkluzivnih judoistov** (do 12 let, 12+).	Podmladek, medgenracijsko sodelovanje, vseživljenjskost	10	vsaj 1 član IJ mlajši od 12 let	**5 točk**	vsaj 1 član IJ starejši od 12 let	**5 točk**				
6	**Število udeležencev tekmovalcev** na Festivalu juda za vse Jožeta Škrabe	Spodbujanje sodelovanje na nivoju JZS, veterani, slovenski praznik prijateljstva.	10	1 do 10 tekm.	**vsak 1 točka**	11 in več tekm.	**vsak dodatne 0,5 točke**				
			100								

DISCUSSION

With the created criteria for the co-financing of inclusive programs, the Slovenian Judo Federation encouraged inclusion in such a way that, in addition to the multitude, it also emphasizes the experience of the coaches and leaders of the inclusive clubs, the sustainability of the inclusive programs, the association of club members through community events within the club and the association with external partners, and that promoted in the media. It also highlights the importance of youth and intergenerational cooperation, the importance of the life-long learning of athletes *(Tomažin, 2022)*, and emphasizes cooperation through inclusive sports events at the federation level.

It is expected that the criteria proposals of the Meter Matters project will be broader, more detailed, realistic and, above all, measurable, as they will be formulated in three EU countries *(Hungary, Portugal, Slovenia)*. The goal of the future, proposed, simple model of co-funding inclusive sports programs is, that it will be at least partially applicable to all European countries. It could represent the start of systemic support for social inclusion in sports or a starting point for further research.

CONCLUSION

Inclusion in sports means a modern European approach that covers the widest possible group of vulnerable people. It is about inclusion in mainstream sports processes based on weekly training. Inclusive programs can be recreational, competitive or just socializing. Coaches in sports clubs feel the increasing desire of diverse abilities athletes to exercise regularly, but they are often unable to adjust the exercise processes accordingly *(Christiaens & Brittain, 2021, Geidne & Jerlinder, 2016; Hammond, 2022)*. Therefore, there is an increasing need for systematic co-funding of such programs. The example of fair charitable funds distribution in the Slovenian Judo Federation inclusive judo clubs proves, that it is possible to measure inclusion in sport. The results of the Meter Matters project will contribute to this to a large extent.

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Appendix 1.

[1] The Included in Life (slo. Vključeni v življenje) campaign took place in 2021 with the cooperation of three partners: the company Mercator d. d., Slovenian Judo Federation and Slovenian Olympic Committee.
Source: https://www.mercator.si/projekti/inkluzija-v-sportu/ & https://judoslo.si/article/2108

LEVEL OF REGULATION AND MANAGEMENT OF EMOTIONS IN JUDO IN PRIMARY SCHOOL CHILDREN IN THE PROJECT "JUDO IN SCHOOLS" IN CROATIA

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ABSTRACT

The research of self-control and emotional intelligence in children aged 11 to 14 who actively participated in judo training organized in elementary schools was conducted with the aim of understanding how this sport can influence the development of these qualities. Self-control and emotional intelligence were assessed through a validated questionnaire that measured the ability to recognize and manage their own emotions and the emotions of others. The results were compared with the official norms prescribed for elementary school children in the field of psychology. Results showed that children who trained in judo also showed a higher level of emotional intelligence compared to the official norms prescribed for elementary school children. The higher results demonstrate that children who practice judo have a positive influence in the regulation and management of emotions segment compared to the prescribed norms and suggest that judo training can have a positive impact on the development of self-control and emotional intelligence in children. This research indicates the importance of integrating judo into children's programs to promote overall development, including self-control and emotional intelligence. Coaches and parents can recognize judo as a potentially beneficial activity that can contribute to children's emotional and social development.

Key words: *judo, children, emotional intelligence, self-control*

INTRODUCTION

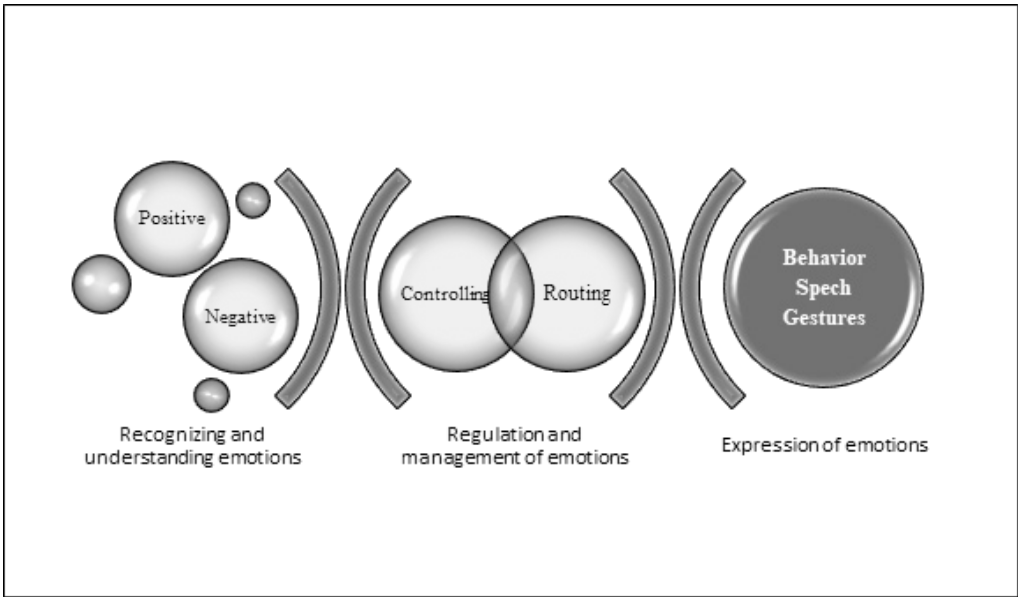
Emotional intelligence in children is critical because it refers to their ability to recognise, understand and manage their own emotions, as well as the emotions of other people. This type of intelligence plays a key role in their social and emotional development and has a long-term impact on their success in life *(Goleman, 1995)*. The idea of judo founder Jigoro Kano is based on achieving goals through judo to develop the physical, intellectual and moral abilities of man who thus maximally contributes to his social community *(Kano, 2005)*.

Judo was introduced in Croatia as an organised extracurricular school activity in 2013 through the project "Judo in Schools" *(Bradić, 2015)*. One of the fundamental reasons was the beneficial effects on the development of psychological characteristics that positively affect behaviour in children *(Đonlić et al., 2015)*. The research of respondents involved in the project "Judo in schools" in the emotion regulators segment aims to prove judo exercise's positive impact on behaviour through self-control. Emotional intelligence helps children establish quality interpersonal relationships *(Duckworth et al., 2014)*. Through understanding their own and other people's emotions, children become more aware of other people, develop empathy, and learn how to deal with conflict positively. Mechanisms activated through judo exercise are associated with different emotional states and their recognition, control and direction through specific judo activities *(Bradić & Callan, 2018)*. Through self-regulatory, emotional intelligence helps children learn how to control their emotions and impulsive behaviour.

The development and functioning of emotions conditions the development of behaviour in children through regulating emotions *(Takšić et al., 2015)*. Emotionally intelligent children cope better with stress, adapt more quickly to changes, and can face challenges. Emotionally intelligent children often perform better in school because they can concentrate better, have more motivation to learn, and can cope with school demands *(Eisenberg & Morris, 2002)*.The connection between the different psychological mechanisms activated and developed through exercise is judo and a form of emotional intelligence *(Smojver-Ažić et al., 2016; Takšić, 2002)*. Also, emotional intelligence encourages the development of creativity and critical thinking. Emotional intelligence plays a key role in preventing mental problems in children. Emotional intelligence helps children understand and respect other people's different perspectives, cultures, and values.

This promotes inclusivity, tolerance and understanding of diversity, crucial for building harmonious societal relationships *(Smojver-Ažić et al., 2016)*. The link between judo activity and emotional intelligence is reflected in behaviour in different situations in which emotions and emotional regulators are activated, and their action affects the mechanism of self-control.

Figure *1 Overview of the process of transformation of emotions*



This figure shows the process of emerging, detecting, and understanding emotions, controlling, and directing them, and manifesting them through behaviour, speech, or gestures. The first stage of recognition and understanding is essential for their further guidance and reflects emotional literacy. The second stage of control and direction occurs through emotional regulators, who, with their development, can influence how emotions manifest. The last stage is not always necessary because emotional regulators can prevent expression through activation through behaviour, speech, or gestures. This chain of action also presents the mechanism of self-control.

Research Aim

The goal of the research is to detect the impact of judo activities on children on emotions through scientific exploration of emotional regulators and their comparison with the prescribed norms for children of the same biological age in primary schools. Emotional regulators are parts of the mechanisms that, together with the recognition and naming of emotions, make up emotional intelligence *(Takšić et al., 2009)*. Emotional regulators are the immediate part that transforms emotional states into speech, gestures, or behaviour. It follows that they are one of the key factors influencing self-control *(Takšić, 2003)*. Therefore, the test results will show the level of emotional regulators of children who actively and continuously practice judo and, through comparison with the norms of other children, show the possible impact of judo on the development of self-control.

METHODS

The research includes respondents who engage in judo activities through the “Judo in Schools” project and practice judo as an extracurricular activity in Croatia. Respondents are holders of student belts in which the regulations for passing student belts *(kyu)* defined the minimum age for each belt and the minimum distance between exams for belts. In the research, the sample of respondents is associated with the level *(colour)* of the judo belt. This is one of the test control mechanisms because the age of children is limited by age according to the belt regulations of the Croatian Judo Federation. Also, the level of the belt achieved shows the time presence in judo activities and thus is an indicator of the

technical level of mastering judo techniques and principles, and through questionnaires in the research it also shows us the possible influence of judo on the level of emotional development in certain segments.

The study was conducted on 138 respondents according to the questionnaire for the Questionnaire on Emotional Skills and Competence "Cross-cultural validation of the emotional skills and competence questionnaire *(ESCQ)* - ESQ-45". ESCQ evaluates various aspects of emotional intelligence, including emotional self-awareness, emotional self-control, empathy, social competence, and personal impact. The questionnaire consists of a series of claims related to these aspects, and respondents evaluate the level of agreement or frequency on the scale *(Takšić, 2003)*. The results are then used to assess an individual's emotional intelligence in different areas.

The questionnaire was chosen because of the intercultural validation of the Emotional Skills and Competence Questionnaire *(ESCQ)*.

The questionnaire consists of forty-five items divided into three subscales and is classified as a measure of "trait of emotional intelligence "or "perception of emotional intelligence ":

observation and understanding of feelings *(PU)*,

expression and labelling of feelings *(EL)*

management and regulation of feelings *(MRI)*

Components that valorise the level of regulation and management of emotions *(MRI)* were extracted from it through the Identification of Individual UEK-45 subscales. The test is relevant with several constructs in the Croatian, Portuguese, Finnish, Swedish, Slovenian, Spanish and Japanese contexts. This has proven value in a study within the framework of emotional intelligence from the framework of Mayer-Salovey *(Brackett & Salovey, 2006)*. *(Brackett & Salovey, 2006)*The test has relevant connections in real life according to criteria in the school achievement segment, different health risk behaviours and determining leadership quality *(Takšić et al., 2009)*

Table 1 ESCQ questions related to the regulation and management of emotions.

RB	Question
1.	I can maintain a good mood even if something bad happens.
2.	I can maintain a good mood, even when the people around me are in a bad mood.
3.	Unpleasant experiences teach me how not to behave in the future.
4.	When someone praises me, I work with more enthusiasm.
5.	When I dislike someone, I find ways to let them know.
6.	It is hard for me to break my mood when I am in a good mood.
7.	When I am in a good mood, every problem seems solvable.
8.	When I am with someone who always treats me well, I watch how I act.
9.	I learn best when I am in a good mood and happy.
10.	If I really want to, I will solve a problem that may seem unsolvable.
11.	I have no difficulty convincing a friend that there is nothing to worry about.
12.	I try to control unpleasant emotions while strengthening positive ones.
13.	There is nothing wrong with how I usually feel.
14.	I do my tasks as soon as possible rather than think about them.
15.	I try to maintain a good mood.
16.	As far as I am concerned, it is normal for me to feel the way I do now.

Sample

The subjects of the research are children aged 11-14 who are involved in organized judo training as part of the Judo in Schools project. The children included in the research belong to the four largest judo regions in Croatia. Eastern, Central,

Western and Southern. The focus is on the research of children who train exclusively in primary schools because the obtained results will be compared with official norms for the same parameters for primary schools in Croatia.

Due to the research of children and their age, for ethical reasons a research method was chosen that includes parents and responsible persons in charge of children. Ethical approval *(protocol number: LMS / PGR / UH / 04302)* was obtained by the Health, Science, Engineering and Technology Ethics Committee at the University of Hertfordshire, in accordance with the principles outlined in the Declaration of Helsinki.

Parents filled out questionnaires instead of the children for the following reasons:

Cognitive ability: younger children may have the limited cognitive ability to understand and express their opinions and experiences in the way required to complete questionnaires. Parents provide a better understanding and interpretation of the child's experiences.

Language skills: Parents have better-developed language skills and can articulate their child's experiences in an understandable and research-appropriate way.

Logistics and efficiency: Given logistics, parent questionnaires can be more efficient and convenient for data collection.

Better perception and perspective: Parents can provide important insight into a child's behaviour, emotional state, and other aspects of emotional intelligence from their perspective as a person close to the child. They can often spot and perceive specific patterns or changes in the behaviour and emotional development of the child. *(Newman & Covrig, 2013)*

The obtained results are coordinated with the official norms of elementary school students on emotional factors belonging to the field of official psychology of primary schools in Croatia. The official norms of elementary school students on emotional factors are one of the unique scales that arise from implementing certain activities between competent universities with psychology studies and institutions that take care of educational processes, such as the Ministry of Education.

Table 2 Official norms of primary school students on emotional factors

Abilities	Minimum	Median	Maximum
Observing and understanding emotions (escq_pu)	35.00	55.00	74.00
Expressing and naming emotions (escq_el)	25.00	44.00	63.00
Regulation and emotion management (escq_rm)	40.00	57.00	74.00

Table 3 Median of official norms of primary school students on emotional factors

Scale	Median population
PU	54.0
EL	48.0
MR	59.0
UEK-45	162.5

Official norms for primary school children in Croatia are standardized for students' emotional competence. The connection between the Emotional Skills and Competences Questionnaire test and official norms is a guarantee of reliability for comparing results. The average values obtained according to individual scales will be compared with the obtained results of the questionnaire.

These standards were obtained based on research and activities of monitoring the impact and action of the educational system on children. These norms are compatible with the study and measurement of subjects because they are the same as the questionnaires used in this study in the segment of morphological, biological, and psychological values of the subjects.

RESULTS

A total of 138 questionnaires were successfully processed. After assessing the subjects through a questionnaire distributed with the Qualtrics application, the presented test results were additionally processed by extracting the necessary parameters. The Qualtrics application is set up so that the required elements are listed, and all elements are by the required values specified in the submitted questionnaire. All the resulting parameters are extracted and prepared for further processing. The results were then transferred to the format for further processing in the SPSS program, from which the most important parts were extracted, which show a picture of emotional states and their control. The results obtained are presented by the minimum, average and maximum values of the results.

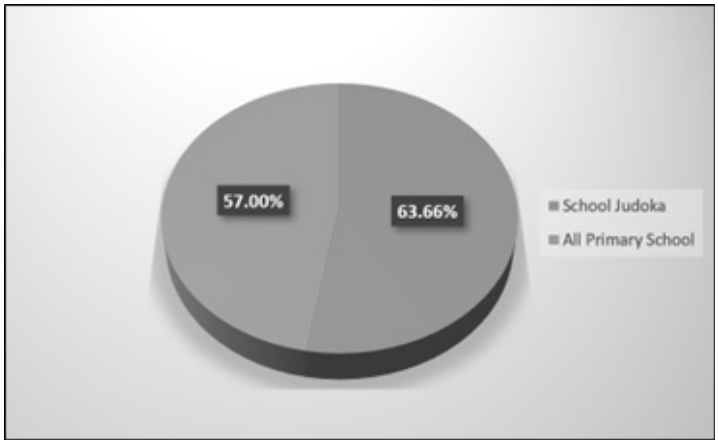
The cross-section of the average values of the obtained results is listed in the following table, which shows the answers to questions from the Emotional and regulation group.

Table 4 ESCQ_MR Emotional scale regulation and management

Value	School Judoka	All Primary School
Minimum	20.00	40.00
Median	63.66	57.00
Maximum	79.00	74.00

A comparison of the obtained values between children practising judo and official norms for emotional intelligence is presented through a diagram.

Figure *2 Emotional scale regulation and management ability scale: Comparison of normative values for schoolchildren and judo children*



For the connection of emotional states and behaviours, a significant impact has the value of the scale of e regulation of feelings and the ability to manage. The degree of development of regulators and emotion management is visible in the results of 6.66 or 11.7% in favour of judo subjects. The difference in favour of the judo population of respondents significantly shows the possible impact of judo activity on children in the regulators and emotion management segment. Given the correlation of this element with self-control, it can be concluded that the answers in the questionnaire showed particularly satisfactory results.

Emotional regulation and the ability to manage the results achieved are significantly higher in favour of judo respondents. As is the expression itself, is significantly higher in the judo population than in other subjects; there is argumentative evidence of the impact of judo activities on children. As a factor that is one of the keys to influencing behaviour, emotional regulation, and the ability to manage, it significantly demonstrates the development of self-control mechanisms.

DISCUSSION

The research results showed a higher value of children included in the judo program than the prescribed norms for elementary school students.

Selected respondents showed significant development in understanding and managing emotions on the questionnaire. The results of the subjects showed that judo as an activity in children positively affects the processes of emotional states in the segment of regulation and management. High scores on individual issues detect mechanisms that recognise, control, and manage different emotional states. The study showed that judo activity in elementary school positively affects behaviour, confirmed in previous studies that included behavioural *(Smojver-Ažić et al., 2016)*.

The average and highest values are in favor of the judo population that was investigated through questionnaires. The average value of 63.66 children engaged in organized judo activity is higher than the average of the prescribed norms, which is 57.00. The highest value is in favor of the judo population in the ratio of 79.00 to 74.00. The lowest value is in favor of the officially prescribed values of elementary schools, which may be a consequence of the small sample size of the judo population and their characteristics. But if the smallest value is viewed from the point of view as a starting point, the size of the mean and maximum values shows a much greater progression than those that have officially prescribed norms for elementary school children. The increased values of 6.66 for the average and 5.00 in relation to the highest values in favor of the judo population show dominance in the regulation and management of emotions.

The result can be significant for the judo community, but the biological age of the children must also be considered. At the age of the respondents, maturation and development processes are still present, and the results can be taken as guidelines for further development. Emotional intelligence, emotional control and emotion regulators explain the mechanisms that occur during organized judo practice. Emotional state, which refers to a momentary emotional reaction, is related to emotional control. Self-control is another continuation in the chain of emotion functioning mechanisms. It includes a broader concept of control, including control over one's behavior, thoughts, impulses, and emotions. Emotional states, emotional control and self-control interact and influence each other through different mechanisms such as emotional regulators. The influence of emotional states on emotional control is significant under the influence of intense emotional states such as aggression, fear, anger, etc. The ability to reason and make decisions can be destroyed by awakening emotions at elevated levels. This can result in an influence on behavior in the form of an impulsive manifestation.

Judo activity in its exercise structure and technical-tactical elements contains different emotional states caused by different methods and situations. Regular training develops mechanisms for regulating emotional states through emotional control through emotional regulators. People with greater self-control can refrain from impulsive reactions and manage their emotions in an adaptive way. Self-control can be considered the basis of emotional control because it requires conscious effort and regulation to maintain a desired emotional response. This connection indicates the development of emotional intelligence and effective management of emotions.

This is one of the key elements in which a person practices learning to control emotions in extreme emotional states and focusing on controlled behavior through self-control.

CONCLUSION

The importance of emotional intelligence through their recognition, management and direction is related to the impact on behaviour. This process is conducted through self-control. Thus, it can be concluded that subjects engaged in judo positively influence behaviour and follow the rules due to the immediate connection of mechanisms of recognising, controlling, and directing different emotional states.

The research on emotions in children in primary schools has expanded the platform's foundations that deal with judo's indirect and immediate impact on behaviour. Further research should be focused on understanding the development of the emotional components of respondents. The research should focus on segmented parts and the relationship between judo activities and respondents.

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THE USE OF MICRO-PROGRESSIONS AND MECHANICS IN TEACHING UKEMI TO OLDER PARTICIPANTS

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ABSTRACT

This paper concerns the introduction of judo-based safe falling practices to older people. There are four clearly acknowledged ukemi techniques identified by the Kodokan; yoko-ukemi, ushiro-ukemi, mae-ukemi and mae-mawari-ukemi. Two cohorts of older people took part in adapted judo sessions for up to 9 weeks. Two coaching approaches were applied to teach these techniques to these cohorts; coaching the three principles underpinning the mechanics of ukemi and the effective coaching of micro-progressions to develop technique. The three principles underpinning the mechanics of ukemi are; maintaining proper alignment, distributing the force of impact and reducing the velocity of impact. Participants who followed the programme for 8 or 9 weeks were observed by the experienced coaches satisfactorily performing two specific ukemi exercises from a standing position; mae-mawari-ukemi and ushiro-ukemi. It was found that by utilising the two coaching approaches outlined in this paper, the older participants were able to progress confidently in their judo lessons focussed on ukemi. This approach provides the underpinning pedagogical method advocated by the British Judo Association in their coach education initiative 'Introducing judo to an older population – for safer falling and ageing well'.

Key words: *judo, ukemi, older people, pedagogy, coaching*

INTRODUCTION

There is a growing body of work concerning the introduction of judo-based safe falling practices to older people *(Campos-Mesa et al., 2020; Ciaccioni et al., 2021; Groen et al., 2007; McDonald et al., 2022; Sakuyama et al., 2021)*. The benefits include reduced fear of falling *(Callan et al., 2022; del Castillo Andrés et al., 2020)*, and improvements in participants feelings of wellbeing, choice reaction time and strength *(Arkkukangas et al., 2020; Negoro et al., 2005)*. The actual delivery of sessions to teach safe falls centres around the teaching of ukemi exercises. There are four clearly acknowledged ukemi techniques in judo identified by the Kodokan; yoko-ukemi, ushiro-ukemi, mae-ukemi and mae-mawari-ukemi *(Kodokan, 1955)*. The continued development of initiatives around safe falls for the elderly relies on judo coaches clearly understanding the technical underpinning of how ukemi work to reduce impact during falling, and also how to coach these techniques to a specific cohort, an elderly population. This understanding and coaching method covers understanding the three principles underpinning the mechanics of ukemi and the effective coaching of micro-progressions to develop technique. This paper covers those two approaches.

The three principles underpinning the mechanics of ukemi

Ukemi work due to the principles of biomechanics *(Koshida et al., 2017)* which is founded on the laws of physics and Newtonian Mechanics. When a person is thrown or falls, their body is subject to high forces as they hit the ground. These forces can cause injury if the body is not prepared to absorb them properly through the use of ukemi techniques.

The technical judo literature *(Lockhart et al., 2022; Mifune, 1956)* emphasises three distinct principles of effective ukemi. All are built on medical or bio-mechanical concepts. These are:

1. Maintaining proper alignment
2. Distributing the force of impact
3. Reducing the velocity of impact

Maintaining proper alignment: Maintaining proper body alignment reduces the risk of injury during a fall. Correct ukemi technique involves keeping the head, neck, and spine in a neutral position, with the arms and legs extended to absorb the impact. In particular the chin should be tucked in so as to ensure that the back of the head does not impact on the ground.

Distributing the force of impact: When the person hits the ground, the force of the impact is distributed across the area of the body that contacts the ground. Correct ukemi technique involves spreading out this force over a larger surface area, rather than allowing it to concentrate on a single point, such as the proximal part of the hand, or the acetabulofemoral *(hip)* joint.

Reducing the velocity of impact: The speed at which a person hits the ground can also contribute to the likelihood of injury. Successful ukemi involves reducing the velocity of impact by gradually slowing down the body's movement as it approaches the ground. Rolling techniques contribute to this as they direct the velocity of the body mass in a horizontal direction, rather that allowing the body mass to accelerate vertically to the ground.

By incorporating these three principles, judo ukemi can effectively reduce the risk of injury during falling, thus reducing the likelihood of subsequent medical intervention or hospitalisation.

The coaching of micro-progressions to develop technique.

Micro-progression is a training approach used in sports coaching that focuses on making small, incremental improvements in an participant's technique, physical abilities, or mental skills over time. The goal is to gradually build on small successes and refine the participant's performance, ultimately leading to significant improvements in their overall performance *(Warner & Kanamaru, 2018)*. This approach involves breaking down complex skills or movements into smaller, manageable parts, and then practicing each component until it is mastered before moving on to the next stage. By continuously refining each element, participants can develop a strong confidence in the skills they have mastered.

METHODS

Two cohorts of older people took part in adapted judo sessions for up to 9 weeks. The total number of participants completing the courses was 15. The mean average age of the participants was 75.4 years. The sessions were led by two experienced judo coaches. The technical content followed was an adaptation of the Yawara-chan-taiso judo-based safe falls programme developed in Japan by Dr Takeshi Kamitani *(Kamitani, 2018)*.

The coaching methodology applied focussed on a blend of two approaches:

1. The coaching of three principles underpinning the mechanics of ukemi.
2. The use of micro-progressions to develop technique.

RESULTS

Participants who followed the programme for 8 or 9 weeks were observed by the experienced coaches performing two specific ukemi exercises; mae-mawari-ukemi and ushiro-ukemi. Both exercises were performed from a standing position by the participants. The observations confirmed that the coaching methodology applied had been successful in facilitating the participants to perform the techniques.

DISCUSSION

The key finding was that by applying the two coaching approaches it was possible to teach safe falls from a standing position to an elderly population over a period of nine, 45-minute sessions.

The coaching of three principles underpinning the mechanics of ukemi.

During the sessions the three distinct principles of effective ukemi were continually reinforced as coaching points.

Maintaining proper alignment, was reinforced by reminding participants to “tuck in your chin”, “look down at your legs” and “don’t let your head touch the mat”. The aim was that if they remembered only one thing from the practices, it would be this point.

Distributing the force of impact, was explained by a number of devices, the most important of which was to emphasise the importance of slapping the mat with the whole arm and the palm of the hand. The coach explained that the purpose of this was to increase the surface area of the body in contact with the ground. Other encouragements included teaching that for yoko-ukemi and mae-mawari-ukemi, the side of the thigh should contact the ground, again to distribute the load over a larger area. Coaching points included explaining that the pressure under a stiletto shoe with a small surface area is greater compared to the pressure under an elephants’ foot, which has a greater mass, but larger surface area.

Reducing the velocity of impact was applied by explaining that if participants could take longer to fall, they would reduce the speed of the fall. This is based on the formula that s = d/t where s is the speed of impact, d is the distance travelled, and t is the time taken.

Additionally, by understanding that velocity is speed in a particular direction, participants could understand that by moving their centre of mass horizontally during a fall, they would reduce the velocity of the fall in a downward direction. This can be achieved by rolling and so exercises were introduced that encouraged the participants to be confident to roll.

The use of micro-progressions to develop technique.

Each exercise was taught in a number of small steps, with care taken to ensure competence in one step before moving on to the next small step. In this way the coaching developed confidence and participants were able to achieve each progression. An example was the number of micro-progressions required to teach mae-mawari-ukemi as outlined in table 1.

Table 1 Micro-progressions for mae-mawari-ukemi

Step	Exercise
1	Lying on back in correct end position for yoko-ukemi
2	Raising and lowering arm to slap the mat
3	Rocking from side to side to slap the mat
4	Increasing the magnitude of the rocking, starting from lying on the side
5	Start from lying on front, roll onto back and finish with yoko-ukemi
6	From on all fours position reach one arm under your other armpit along the mat (threading the needle)
7	From threading the needle position, reach as far as possible to look up at ceiling and place shoulder blade on floor
8	Progress from step 7 to roll sideways and end with yoko-ukemi
9	From step 6 position, partner stands at the side and pulls the arm to create a sideways roll ending in yoko-ukemi
10	Progress from step 8 to raise one knee in start position.
11	Progress from step 10 to start from both knees raised (squatting position)
12	Progress from step 11 to reaching the arm through the legs to send the roll over one shoulder rather than sideways.
13	From standing, do a half squat into the start position for step 12
14	Practice mae-mawari-ukemi from a standing position

In each session a warm-up consisted of rehearsing earlier steps. The first lesson might just cover steps 1 – 3. Then these would form the warm-up in the second lesson before progressing to teach step 4. In this way a sense of accomplishment was maintained and with positive verbal reinforcement the participants grew in confidence.

CONCLUSION

To conclude, by utilising the two coaching approaches outlined in this paper, the older participants were able to progress confidently in their judo lessons focussed on ukemi. This approach provides the underpinning pedagogical method advocated by the British Judo Association in their coach education initiative 'Introducing judo to an older population – for safer falling and ageing well'.

It is recommended that judo coaches utilise the coaching of three principles underpinning the mechanics of ukemi and the use of micro-progressions to develop technique when they are working with specific cohorts of older people.

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DIFFERENCES IN THE TIME STRUCTURE OF JUDO BOUT BETWEEN MALE CADETS AND SENIORS IN THE MIDDLEWEIGHT CATEGORIES AT THE 2022 EUROPEAN CHAMPIONSHIPS

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ABSTRACT

The goal in the development of younger athletes is the result in the senior age group. The dynamics of the bout may differ depending on the weight and age of the competitors and competition analysis can provide valuable information for technical and tactical development. The sample consists of 60 bouts, of which 30 bouts of male cadets in the two categories *(under 66kg and under 73kg)* and 30 bouts of male seniors in the two categories *(under 73kg and under 81kg)* from the 2022 European Championships. Independent t-test was used to determine the differences between cadets and seniors in all variables. The results indicate that the bout of seniors is of longer duration. All aspects of bout are of longer duration with emphasize on fight in standing position. In the transition to the older age group, it will be important to emphasize development of technical and tactical elements of grip fighting and to improve strength and conditioning of athletes because of longer duration of bout in seniors.

Keywords: judo, *middleweights, European championship*

INTRODUCTION

Judo as a combat sport has progressed a lot in previous decades which resulted in great competition. To be able to keep up with the competition it is important to analyze opponents for technical and tactical improvement of athletes. Depending on the weight category and the age group of the competitors, the dynamics of the bout can vary greatly. So far, a small number of papers have investigated the differences between seniors and younger age groups in the situational parameters of judo bout. One of the papers indicates that in seniors the duration of the overall bout, grip fighting, fight on the ground is longer than in younger groups *(Miarka, B. et al., 2012)*. In another paper that investigated the differences between female senior and cadet competitors, the results indicate that in senior women, the fight for grip as well as the total time of the bout is longer than in cadet women *(Miarka, B et al., 2014)*. In a paper that investigated the differences between the heavyweight and lightweight categories of female competitors, the results indicate that the heavyweight competitors spend more time grip fighting compared to the lightweight categories, while in the lighter categories, a higher number of throwing attempts is noticeable compared to the heavyweight category. *(Soriano, D. et al, 2019)*. The goal of this paper is to determine the differences in the time structure of judo bout between male cadets and seniors of the middle categories who competed at the 2022 European Championships.

METHODS

The entity sample consists of 60 bouts, of which 30 bouts of male cadets in the middleweight categories *(up to 66kg and up to 73kg)* and 30 bouts of male seniors in the middleweight categories *(up to 73kg and up to 81kg)* from the 2022 European Championships. Independent samples t-test was used to determine differences between groups in all variables. Based on previous research, a list of variables was established *(Calmet et al., 2010; Gorostiaga, 1988; Marcon et al., 2010; Miarka, Hayashida, Julio, Calmet, & Franchini, 2011; Miarka, B: et al, 2014)*. The variables are total time of the bout; time spent fighting in a standing position; time spent on ground; time without contact.

RESULTS

Table 1. Descriptive parameters of the judo bout structure for the group of cadets

	N	Mean	Min	Max	Std. Dev
Total time of the bout	30	151,40	15,00	429,00	96,88
Time standing position	30	111,53	10,00	368,00	84,57
Time on the gound	30	27,17	0,00	73,00	20,13
Time without contact	30	13,77	3,00	33,00	9,74

Table 2. Descriptive parameters of the judo bout structure for the group of seniors

	N	Mean	Min	Max	Std. Dev
Total time of the bout	30	201,40	35,00	394,00	78,34
Time standing position	30	144,33	15,00	261,00	62,02
Time on the gound	30	34,70	0,00	102,00	24,82
Time without contact	30	23,13	2,00	63,00	15,74

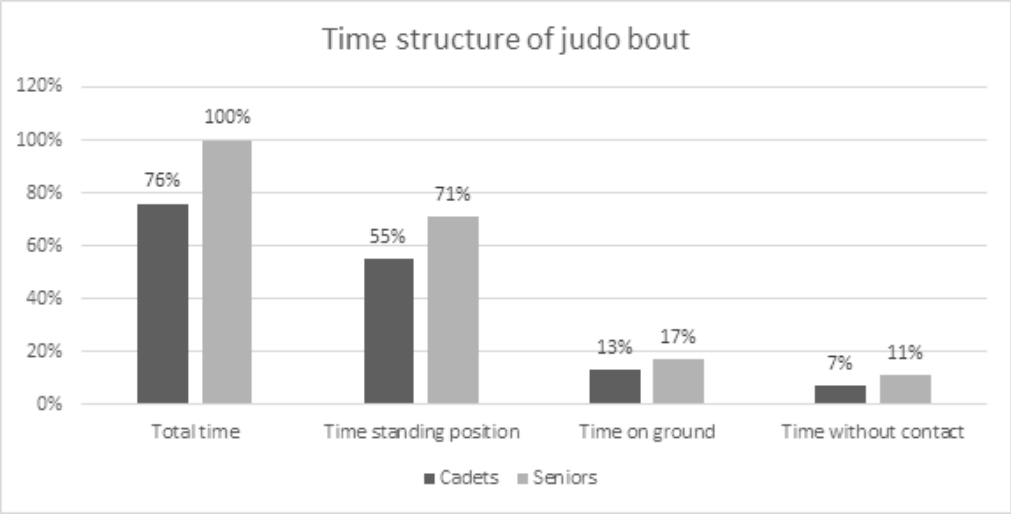
Tables 1 and 2 show the basic descriptive parameters of the structure of a judo bout. It can be noted that for the age of cadets and seniors, the largest part of the bout takes place in a standing position, then on the ground, and the smallest part of the fight is conducted without contact.

Table 3. Differences in the structure of a judo bout between cadets and seniors, independent samples t-test

	Mean Sen	Mean Cad	t-value	df	p
Total time of the bout	201,40	151,40	2,198	58	0,03
Time in a standing position	144,33	111,53	1,71	58	0,09
Time on the gound	34,70	27,17	1,29	58	0,20
Time without contact	23,13	13,77	2,77	58	0,01

Table 3 shows the differences between cadets and seniors in the structure of a judo fight. It is noticeable that the bout in seniors lasts longer than in cadets.

DISCUSSION



Graph *1. Time structure of judo bout for seniors and cadets*

The results of this research indicate that the bout in seniors lasts longer than in cadets. The average duration of a bout in cadets is 2:31 minutes, while in seniors it is 3:21 minutes. Looking at the percentage, the total fight in seniors is 24% longer than in cadets. *Fig*hting in a standing position, although it is not statistically significantly different, it is 16% longer in seniors than in cadets, as well as the time without contact, which is 4% longer in seniors.

These results correspond to the results of previous research, although they were carried out before the new rules of judo *(Miarka, B. et al., 2014; Miarka, B. et al., 2012)*. In this research, the fight in the standing position was not divided into the grip fighting and the time spent in throwing attempts, so it is not known which of these two segments influenced the prolongation of the fight in the standing position.

Nevertheless, previous research indicates that more experienced judokas spend more time grip fighting than less experienced ones *(Calmet et al., 2006; Franchini et al., 2008)*. Therefore, it can be assumed that the longer duration of the bout in the standing position of the seniors compared to the cadets was largely related to the grip fighting. The differences in the duration of time spent on ground is not statistically significant, although it is noticeable that the time spent on ground is 4 % longer duration in seniors. Some authors of similar research found these differences at the level of statistical significance *(Miarka, B. et al., 2014)*.

CONCLUSION

The results indicate that the structure of the fight between seniors and cadets differs. The bout in seniors is of longer duration, and this prolongation is due to all segments of the bout with an emphasis on fighting in a standing position. The longer time fighting in a standing position can be explained by a higher level of technical-tactical knowledge of senior athletes. It can be concluded that in the transition to the older age group it will be important to emphasize development of technical and tactical elements of grip fighting and to improve strength and conditioning of athletes because of longer duration of bout in seniors.

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EFFECT OF EIGHT WEEK POLICE PHYSICAL TRAINING 2 PROGRAM ON JUDO MOTOR SKILLS

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ABSTRACT

Combat skills have an important role in work of police officers and practicing martial arts is one of the ways of improving these skills. During Police Physical Training 2 *(PPT 2)* on the University of Criminal Investigation and Public Security in Zagreb *(VKJS)* students learn elements of judo and police self-defence with the aim of improving specific knowledge of combat that can occur during police work. The aim of this paper was to determine the effects of 8-week PPT 2 on the development of judo motor skills. List of variables consisted of judo falls *(zempo kaiten ukemi, ushiro ukemi, yoko ukemi and bridge fall)* and judo throws *(osoto gari, o goshi and tai otoshi)*. T-test for dependant samples was used to assess the change between initial and final testing. Based on the results of the t-test for dependent samples, there was a significant positive change in quality of execution of elements of judo falls and judo throws. Although current programme makes a positive change in combat motor skills in trainees it could be even more improved if Police Physical Training *(PPT)* became a mandatory subject with a greater number of hours.

Keywords: police *education, falls, throws*

INTRODUCTION

According to Sertić, Segedi and Barić *(2007)* the use of martial arts in classes has a significant impact on anthropological characteristics of pupils and students. It determines the improvement of several personality dimensions that are important for biological and social development of the practitioners. Police officers must be in excellent physical condition, mentally stable and must possess the highest level of intrinsic motivation, courage, and self-confidence *(Jozić et al., 2023)*, they must also possess specific technical-tactical knowledge for individual and collective action. To obtain these characteristics, police officers and students of police academies implement a specific martial arts program that is saturated with elements of judo, boxing, karate and aikido *(Kosanović, 1988; Jozić et al., 2016)*. Based on the results of a research by Sertić, Segedi and Segedi *(2008)* who stated that judoka dominate in the dimensions of explosive strength compared to boxers and karateka, as well as that there are no significant differences between judoka, karateka and boxers in repetitive strength and static strength, we can conclude that the elements of judo are suitable for the purpose of educating police officers.

During training in simulated combat conditions one often falls, which is why there is a great emphasis during training on adopting fall techniques to reduce the possibility of injury. Judo fall techniques are the first motor skill that participants in specialist training must acquire. According to the landing mechanism, fall techniques are divided into rolling and acrobatic falls. Acrobatic falls imply making contact with the ground at all points of support simultaneously, which distributes the force uniformly to all points, while in rolling falls, contact with the ground is made with points of support successively, one after the other, which enables the continuous transfer of force from point to point *(Sertić and Segedi, 2013)*. Given that the application of judo throws in self-defense is obvious and necessary, many police self-defense procedures are finalized by throwing or include one of the wide varieties of judo techniques *(Kosanović, 1988; Sertić and Segedi, 2013; Sertić and Segedi; 2015; Jozić et al., 2019)*. Judo is a versatile, advanced, and modern system of physical and mental training *(Cadot, 2019)* and is suitable for improving the knowledge of combat elements of police action tactics that require high-quality, fast, and safe police action in riot control. The elements of Judo should be implemented even more significantly in the Police Physical Training 1 *(PPT 1)*, Police Physical Training 2 *(PPT 2)*, Police Physical Training 3 *(PPT 3)* and Practical Training in the Use of Coercive Means at the University of Criminal Investigation and Public Security in Zagreb.

The main goal of this paper is to determine the impact of the eight-week PPT 2 program on the acquisition of specific combat skills *(judo throws and judo falls)*.

METHODS

The research was conducted on a convenient sample of 23 respondents, part-time students at the University of Criminal Investigation and Public Security in Zagreb. The sample of variables consisted of: Zempo kaiten ukemi *(forward rolling fall) (ZKU)*, Ushiro ukemi *(backward rolling fall) (USUK)*, Yoko ukemi *(fall to the side, right and left) (YUK)* and Bridge fall *(BF) (Kosanović, 1988)*. In addition to evaluating judo falls, the paper also evaluated the performance of judo throws: osoto gari *(OSG)*, o goshi *(OGO)* and tai otoshi *(TAI) (Sertić and Segedi, 2013; Kosanović, 1988; Jozić et al., 2019)*. The official program of PPT 2 lasts 30 teaching hours. The martial arts *(judo)* basics program consists of pre-exercises for fall techniques, fall techniques, holding techniques, choke techniques and judo throws, as well as police self-defense techniques. During the eight-week training cycle of the PPT 2 course, 18 hours of PPT 2 classes were realized. All trainings and initial and final testing were conducted in the VKJS hall. The trainings were held in accordance with the students' schedule *(study weeks)*. Most of the training was used to learn judo throwing techniques *(osoto gari, o goshi, tai otoshi) (Momirović and Sviben, 1960; Kazuzo, 1976; Sertić and Segedi, 2013; Sertić and Segedi, 2015)* and fall techniques *(Zempo Kaiten Ukemi, Ushiro ukemi, Yoko Ukemi, Bridge fall) (Kosanović, 1988)* as well as procedures for apprehension, tactics of police action in defence against armed and unarmed attackers *(specific combat skills)* and upper body strength exercises *(Jozić et al., 2019)*. The PPT 2 training was structured with training elements of judo and police self-defence with the aim of improving specific knowledge of combat. For the purposes of this paper, a qualitative assessment of the execution of above-mentioned throws and falls was carried out. Three experts for martial sports, long-term police officers of the basic and special police evaluated the performance quality of each technique. As a measure of inter-expert reliability, Cronbach's alpha was calculated and was above 0.90 for all variables. Before starting the experimental evaluation process, the criteria of the evaluation process itself was defined and trial evaluations of a certain number of entities that did not participate in the experiment itself were conducted. Then, the potential mistakes of performing each judo technique and techniques' complexities, which would have to affect the final evaluation of the quality of performance, were jointly defined. The quality of each technique was rated in the range of 0-5 *(Sertić, 2000)*.

An example of a grade according to Sertić *(2000)*: "Grade 5 was awarded for flawlessly executing a throwing technique, in other words for a throwing technique executed with adequate power, speed and amplitude without technical errors".

The parameters of descriptive statistics were calculated *(table 1)* and the differences between the average grades of students in the initial and final examinations were determined by the t-test for dependent samples *(table 2)*. The data were processed with the statistical package Statistica for Windows ver. 13.4 at the Faculty of Kinesiology, University of Zagreb.

RESULTS

Table 1 shows the parameters of descriptive statistics for the initial and final testing.

Var	Valid N	Mean	Std.Dev.	Skewness	Kurtosis
ZKU_I	23	2,91	1,04	0,42	-0,38
USUK_I	23	2,99	1,11	0,17	-0,92
YUK_I	23	3,07	1,20	-0,32	0,51
BF_I	23	2,99	1,16	-0,26	0,96
OSG_I	23	2,65	1,11	-0,34	0,26
OGO_I	23	2,80	1,06	-0,49	0,87
TAI_I	23	2,52	1,19	-0,23	-0,20
ZKU_F	23	3,70	0,90	-0,49	0,53
USUK_F	23	3,88	0,87	-0,13	-0,83

YUK_F	23	3,93	0,88	-0,26	-0,96
BF_F	23	3,84	0,98	-0,41	-0,66
OSG_F	23	3,55	0,99	-0,73	0,47
OGO_F	23	3,59	1,03	-0,37	-0,68
TAI_F	23	3,58	0,98	-0,60	0,09

Table 2. t-test for dependent samples of the initial and final testing in all variables.

Variable	T-test for Dependent Samples Marked differences are significant at p < ,05000						
	Mean	Std.Dv.	N	Std.Dv.	t	df	p
ZKU _I	2,91	1,04					
ZKU_F	3,70	0,90	23	0,49	-7,69	22	0,00
USUK _I	2,99	1,11					
USUK _F	3,88	0,87	23	0,47	-9,26	22	0,00
YUK _I	3,07	1,20					
YUK _F	3,93	0,88	23	0,53	-7,73	22	0,00
BF _I	2,99	1,16					
BF _F	3,84	0,98	23	0,53	-7,73	22	0,00
OSG _I	2,65	1,11					
OSG _F	3,55	0,99	23	0,37	-11,70	22	0,00
OGO_I	2,80	1,06					
OGO_F	3,59	1,03	23	0,40	-9,59	22	0,00
TAI_I	2,52	1,19					
TAI_F	3,58	0,98	23	0,48	-10,61	22	0,00

DISCUSSION

The results of the VKJS students initial and final testing of the judo falls and judo throws techniques are shown in table 1 and table 2. Based on the results of the t-test for dependent samples, there was a significant change in quality of execution of judo falls and judo throws. The PPT 2 training program, which consists of a significant number of judo elements, produced statistically significant changes in all applied judo techniques: judo falls *(Zempo Kaiten Ukemi, Ushiro Ukemi, Yoko Ukemi and Bridge fall)* and judo throws *(osoto gari, o goshi, tai otoshi)* in the period of two months of training, from the initial to the final testing *(table 2)*.

Based on the results of the research, the hours spent in the process of learning the elements of judo in PPT 2 can be positively valorised and further recommended for systematic specialist training. Of course, the quality of performing elements of combat skills *(judo falls, judo throws, police self-defence skills (ASDS-arrest and self-defence skills)*) *(Renden et al., 2016)* would probably be further improved if Police Physical Training *(PPT)* had the status of a mandatory subject, which would automatically increase the number of practicing hours.

To increase the efficiency of the training elements of PPT 2 frequency of training, intensity and situational sparring should be increased *(Renden et al., 2016)*. That could be achieved if PPT was to become a mandatory subject with a greater number of hours with the aim of improving the level of situational efficiency in dealing with stressful situations at work. PPT 2 using judo techniques teaches trainees calmness, stability, composure, and self-control which is necessary in highly stressful conditions of police work. Likewise, better motor abilities are in positive corelation with police officers' achievements in the martial arts skills so during PPT 2 there should also be an emphasis on improvement of all motor abilities to further increase improvement in judo motor skills *(Lauš, D. & Ribiči, G., 2017)*.

CONCLUSION

The presented results of the research on the effectiveness of the PPT 2 training show that a two-month period of specific training with an emphasis on elements of judo training caused statistically significant changes in all tested elements of judo falls and judo throws. Students of the University of Criminal Investigation and Public Security in Zagreb *(VKJS)* should train continuously and hard with the application of those elements of judo training and police self-defence that improve the level of situational efficiency and reduce the level of stress in emergency situations. Specific elements of judo training are suitable for preparing VKJS students for high-quality analysis of stressful police procedures, tactics of police procedures, analysing and teaching fighting skills *(holding techniques, riot control techniques, throwing techniques (judo throws)*, stances, movements, grips, judo falls, chokes, defence against grabbing of clothing, etc.). The official training program of PPT 2 was most likely successful because the training elements were implemented in a high-quality and highly motivating manner and during the training, the principle of individualization was considered, all with the aim of detecting and correcting individual and group errors. The training elements of PPT 2 *(judo falls, judo throws, elements of police self-defence, defence against armed and unarmed attackers)* are the basis for the high-quality implementation of modern police self-defence. Considering the obtained results, in future research the authors plan to determine whether the 8-week cycle had a positive effect on the students' anthropological characteristics and especially on their motor skills.

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DIETARY SUPPLEMENTS FOR ATHLETES

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In recent years, the number of different nutritional supplements available on the market has been increasing, and the percentage of their use by professional and recreational athletes is increasing. The results of research among Croatian athletes showed that 88% of professional and 77% of recreational athletes use nutritional supplements. The most frequently used groups of dietary supplements are protein preparations *(23%)*, followed by vitamins *(22%)* and minerals *(17%)*. The research found that athletes' knowledge about nutritional supplements is insufficient *(1)*. Therefore, the aim of this article is to mention the most commonly used dietary supplements among athletes, to point out the benefits and risks of their use, and in which cases it is most recommended to use them.

In general, food additives *(supplements)* are preparations with a nutritional effect, which help the normal functioning of the organism or enrich the usual diet in order to maintain health. An athlete's nutritional supplement is any active substance taken by athletes with the purpose of: enriching the diet, increasing muscle mass, strength, and endurance. Namely, athletes have a higher energy consumption and need more food, but also food richer in nutrients. The use of nutritional supplements is mostly not necessary if a proper diet plan is made that covers the intake of recommended daily needs for all nutrients. It is important to emphasize that athletes should be careful when choosing supplements and it is best not to take them without consulting a doctor, pharmacist or nutritionist.

Dietary supplements are divided into four groups: 1. proven effective; 2. possibly effective, but insufficiently tested; 3. have not been proven to be effective; 4. dangerous, prohibited and illegal substances *(2)*. Possibly effective, but insufficiently tested supplements and supplements that have not been proven to be effective make the majority of dietary supplements.

A special group are vitamins and minerals, which are basic nutrients, they may be a dietary supplement, but also a medicine, it all depends on the reason for use.

Vitamins and minerals

Vitamins

It is a broad group, and further will be mentioned some of the most important vitamins and minerals necessary for the health of athletes.

Vitamin C is a water-soluble vitamin, and is present in fresh fruits and vegetables *(such as lemons and oranges, tomatoes, potatoes and leafy greens)*. Vitamin C is important for the maintenance of proper structure and functioning of bones, connective tissues, muscles and blood vessels. It also helps the body to absorb iron, which is needed to produce red blood cells. It is known that long-term physical activity increases the need for vitamin C *(2)*. It is desirable that athletes who exercise for prolonged period of time take additional vitamin C. Overdosing can lead to kidney stones and other kidney disorders *(3)*.

Vitamin D is a fat-soluble vitamin whose main role is to stimulate the utilization of calcium ions from food through the digestive system. A stable concentration of calcium ions is necessary for the normal function of the nervous system, the transmission of signals within cells, and especially for mineralization and bone health. Most of the body's need for vitamin D is met after exposure of unprotected parts of the body to sunlight. That's why athletes who train indoors are at risk for vitamin D deficiency *(2)*. Foods rich in vitamin D include fish and seafood, milk and dairy products *(full-fat cheese and yogurt)*. Supplementation of vitamin D is, if needed, taken in agreement with the doctor, especially in the winter months. Taking excessive doses can cause nausea, vomiting and increased concentration of calcium in the blood *(3)*.

Minerals

Iron *(Fe)* is a part of hemoglobin in erythrocytes *(red blood cells)* and is needed for transporting oxygen in the body and for storing and using oxygen in the muscles. Food rich in iron are meat, fish, beets and spinach. Low iron levels are the most common nutrient deficiency in athletes, especially female athletes and vegetarians. It is important to say that iron needs can increase by up to 70% in athletes in endurance sports. Chronic iron deficiency, with or without anemia, that results from consistently poor iron intake can negatively impact health, physical and mental performance, and warrants prompt medical intervention and monitoring *(2)*.

Magnesium *(Mg)* is necessary for the activity and balance of the nervous system: it has a relaxing and calming effect and is effective in relieving muscle spasms. It is also important for the health of bone tissue. Athletes should be educated about good sources of magnesium *(green leafy vegetables, nuts)*. In those who do not get enough of it and those who have symptoms of magnesium deficiency such as muscle cramps, it should be supplemented. Excessive intake can cause nausea, vomiting and diarrhea *(3)*.

Calcium *(Ca)* is the most abundant mineral in our body and is necessary for growth and maintenance of bone health. Insufficient calcium intake carries the risk of bone fractures in sports injuries. Supplementation is needed if the diet is low in calcium *(e.g. too little dairy products)*. Excessive intake can cause muscle weakness and vomiting *(3)*.

Food supplements that are proven to be effective

Isotonic (sports) drinks

Isotonic drinks are an integral part of hydration *(fluid replacement)* for athletes. During longer physical activities *(especially >2h)*, where is a lot of sweating, it is advisable to drink sports drinks that contain electrolytes *(sodium, potassium)* and carbohydrates *(2)*. Namely, plain water cannot correct the drop in sodium level caused by sweating in the short term. If it is a shorter sports activity *(less than 45 minutes)*, sports drinks are not considered necessary. It is advisable to read the product declarations to be sure which is the real composition of the sports drinks. Drinks containing potassium and sodium help correct electrolyte loss and fluid retention in the kidneys, while carbohydrate-rich drinks are a good energy replacement.

Energy drinks are not considered as a proper replacement of isotonic drinks due to the very high sugar content, and possible content of unfavorable ingredients. They can cause nausea during physical activity, are less hydrating and contain large amounts of caffeine. Sports drinks can also have a high sugar content *(which is precisely why it is advisable to read the product declarations)*, but they contain sodium and potassium, contribute to greater endurance during physical activity, hydrate more and they do not contain caffeine. It is recommended not to use energy drinks, while it is useful to use sports drinks during longer physical efforts, as previously stated.

An article was recently published in Jutarnji list, which stated that in 2022, every third pupil in Croatia at the age of 11 consumed an energy drink, and the percentage of consumption still increases as age of children increases *(4)*. It should be mentioned that the risk of caffeine overdose is higher in children than in adults, as well as that excessive caffeine intake causes an increased heart rate, increased blood pressure, nausea, vomiting and agitation *(3)*.

Proteins

Protein preparations are used in the form of tablets, gels, powders mixed with water or milk and ready-made shakes. It is also possible to consume supplements with purified amino acids. Consumption of protein preparations is not necessary if the energy and protein intake is adequate. They are most often used as a meal replacement. High-quality proteins such as whey, casein or soy are effectively used for the maintenance, repair and synthesis of muscle proteins *(5)*. Other types of protein used are egg, rice and pea. They should always be used after exercise. Unwanted consequences are allergies to certain types of supplements, especially those made from egg protein. Health risks are more pronounced when using purified amino acids. When taking purified amino acids, nausea, vomiting, flatulence and abdominal pain are possible *(3)*.

Creatine

Creatine is a nitrogen compound that is produced in the liver, mostly is stored in the form of phosphocreatine in the muscles, and serves to restore energy in the muscles. It is the single most used nutritional supplement among athletes, especially among athletes who want to build muscle mass and increase muscle strength. Creatine supplementation may enhance post-exercise recovery, injury prevention and thermoregulation *(6)*. Creatine has been shown to be effective in sports such as sprinting and weightlifting, but not in sports where greater endurance is required *(e.g. long-distance running) (1)*. Consequently, it is necessary to determine exactly which athletes would benefit from creatine intake and which would not. Known side effects are weight gain, cramps, nausea and vomiting *(3)*. It should not be used in people with impaired kidney function and in a state of dehydration. It is important to be careful that it is not used together with caffeine.

Dietary supplements that have not yet been proven to be effective

Data on the efficacy and safety of many products used by athletes are limited. Many dietary supplements lack evidence of effectiveness, while some cite "evidence" from research that is insufficient to properly prove effectiveness. This is a large group where most of the dietary supplements are included. As an example, further are listed some popular dietary supplements from this group.

L-Glutamine

L-glutamine is a conditionally essential amino acid, which means that our body can synthesize it. Glutamine is normally the most abundant amino acid in muscle tissue. In the case that the body is regularly exposed to increased efforts during intensive training, the demand for glutamine increases and exceeds the capacities that the body is able of producing. The role of L-glutamine in recovery after intense exercise is possible. However, so far it has not been proven that it has effects on the sports performance itself. Recent studies indicate that glutamine may help mitigate exercise-induced muscle damage in sports such as basketball *(7)*. There is no definitive conclusion on its effect on the performance in athletes. Possible side effects are nausea, diarrhea, vomiting, abdominal pain, flatulence and joint pain *(3)*.

L-Carnitine

L-carnitine is a compound that is formed in the liver and kidneys from essential amino acids, it is stored in the muscles, and serves to convert fatty acids into the energy needed for muscle activity. In research literature, studies differ regarding methodology, i.e. differences in exercise intensity, amount of L-carnitine applied and time of application in relation to exercise, with no possible firm conclusions on its use for performance in athletes *(8)*. For now, it is known that it might improve high-intensity exercise, but not moderate exercise. *(9)*. Possible side effects are nausea, vomiting, headache, blurred vision and dizziness *(3)*.

Dangerous, prohibited and illegal dietary supplements (Doping control)

A number of ingredients that can be found in dietary supplements are considered as illegal agents according to the World Anti-Doping Agency *(WADA)*. Doping is considered as the illegal consumption of substances with the aim of increasing physical and/or psychological abilities. It is important that athletes carefully read the declarations on the dietary supplement products *(as well as the declarations of any other preparations or medicines)* to make sure that they are not consuming any illegal substance. If the athlete is not sure whether a substance is allowed or not, it is best to consult with his coach, pharmacist or doctor before consumption. According to the list of prohibited substances of the World Anti-Doping Code *(valid from January 1, 2023)*, some of the most commonly used substances are: anabolic steroids, peptide hormones and growth factors, diuretics, stimulants *(amphetamines, methamphetamines)*, narcotics *(morphine)*, cannabinoids, glucocorticoids etc. *(10)*. A significant part of these substances is dangerous for human health and their purchase is illegal.

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TATTOOING – POPULAR „SPORT“ TODAY

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In recent years, tattooing has become popular in Western countries. Throughout Europe, there is an increasing trend in the frequency of tattoos, especially among the younger generations *(Piccinini et al., 2016)*, with women more often tattooed than men. Depending on the country, there are 10% to 40% more tattooed women than tattooed men *(ECHA, 2017)*.

Tattooing process. Tattoo needles inject ink into the inner layer of the skin *(dermis)*, piercing the surface layer of skin *(epidermis)* at a rate of 50 to 5000 times per minute, depending on the type of machine used. Capillary action draws the ink deeper into the dermis. The tattoo becomes permanent when the person's immune system begins the process of healing the wound *(caused by breaking the skin barrier)* and injecting the foreign body *(ink)* into the skin. Since the immune system recognizes the pigment particles as a foreign "invader", macrophages engulf the particles to remove them from the body. Only pigment particles retained in the dermis by macrophages and skin connective tissue cells *(fibroblasts)* create a permanent tattoo image *(ECHA, 2017)*.

The composition of tattoo ink. Tattoo ink is a suspension of colour particles *(pigment)* in a solvent *(most often water)*, glycerine and alcohol. Pigments can be organic or inorganic. Organic pigments are mostly chemically synthesized *(e.g. nitro, azo and anthraquinone dyes, phthalocyanines)*, but there are also plant pigments *(e.g. curcumin, sandalwood, or dried algae used in some black inks)*. Carbon black, used to produce some popular tattoo inks, is obtained by burning bones, tar, resin and other substances. Unlike organic pigments that give intense, bright colours, inorganic pigments *(barium sulphate, titanium dioxide, iron oxides, minerals)* give duller colours and are less often used for tattooing. Auxiliary substances serve to dilute the pigment *(water)* and maintain the pigment in a liquid state *(glycerine, alcohol)*, maintain pigments in suspension *(detergents)*, and suppress the development of microorganisms *(preservatives) (ECHA, 2017)*.

Tattoo ink manufacturers usually do not produce colours *(pigments)* specifically for tattooing, but use colours produced for other purposes. The big problem is that these colours are not intended to be injected into the skin and may contain various impurities and toxic substances. The colours used in tattoo inks are usually produced by the chemical industry for outdoor applications in products such as textiles and automotive and plastic paints, as they exhibit good light fastness properties *(i.e., do not fade when exposed to light) (ECHA, 2017)*.

The path of soluble substances from tattoo ink in the human body. Recent studies have shown that dye particles travel from the tattooed skin to nearby lymph nodes, in both animals and humans. Moreover, even metal nanoparticles, which are used for tattoo accessories, have been found in the lymph nodes *(ECHA, 2017; Schreiver & Luch, 2020)*. Experiments on animals have shown that paint particles reach the liver, but there are no data on whether the same happens in humans. Only about 10% of the injected colour remains at the tattoo site and creates a tattooed image *(ECHA, 2017)*. Tattoos on parts of the body exposed to sunlight often fade. The reason is the photochemical degradation of the paint by visible and/or UV light *(ECHA, 2017)*.

The risk of infection due to tattooing. The source of infection can be a tattoo artist, the instruments, the ink, or the tattooed person himself. Infection can occur if tattoo instruments are not properly sterilized or disposable tattoo needles are not used. Tattoo ink can become microbiologically contaminated during production or after opening the bottle *(e.g. due to poor hygienic conditions in a tattoo salon or by diluting the ink with non-sterile water) (ECHA, 2017)*. Infection can also occur during tattoo healing. After all, tattooing is essentially an intentional injury to the skin. It creates thousands of tiny wounds and the tattooed person walks around with an open wound. Therefore, it is necessary to take good care of tattooed skin, especially in the first days and weeks after tattooing *(Melanie Rud, 2022)*.

The risk of allergic reactions due to tattooing. Although people who have allergic skin diseases are more prone to it, people who are not prone to allergies can also get an allergy to some ingredient in the tattoo ink *(Piccinini et al., 2016)*. The onset of an allergic reaction is unpredictable, and can occur immediately after tattooing or up to 45 years later. The duration is equally unpredictable and the hypersensitivity reaction can last a lifetime.

Various chemical substances in the ink can lead to an allergic reaction. For example, it can be metals such as chrome, nickel, and cobalt, then colours *(pigments)*, most often red, and less often green or light blue, and preservatives. A huge number of preservatives are allergens, and they are regularly added to ink to prevent the growth of bacteria and other microorganisms.

Often, however, it is not possible to discover which ingredient in the tattoo ink is responsible for causing the allergic reaction. Namely, standard skin patch testing may not always be reliable, given that tattoo ink during the tattooing procedure is not applied on the skin *(as is the case with patch testing)*, but into the skin. In addition, the exact composition of the ink is not always known. For example, illegal tattoo inks *(which do not comply with EU regulations)* may contain illegal colours or other ingredients, or illegal amounts of impurities. Also, over the years, tattoo inks can change their chemical composition in the body, either due to the action of enzymes in the skin or due to exposure to sunlight *(photochemical reactions)*.

It is suspected that this is exactly the case with red tattoo inks *(Piccinini et al., 2016; Varnai et al., 2019)*. Allergy can manifest at the tattoo site as itching and/or sensitivity of the skin, but also as eczema *(redness, rash, itching of the skin)*, swelling or hardening of the skin, non-infectious warts, and skin damage *(ulcers, death of part of the skin)*. It is also possible that the allergy manifests in places far from the site of tattooing, and even in the whole body. Thus, for example, cases have been described in which, after tattooing, eczema first developed at the tattoo site, and then spread over the entire body within few days. Some people also develop inflammation of blood vessels throughout the body *(vasculitis)*, including the iris of the eye *(iritis)*. It is important to emphasize that the treatment of allergies to tattoos can be demanding and long-term, sometimes even requiring surgical excision of the tattooed skin *(Piccinini et al., 2016)*.

Frequency of health problems related to tattooing. Research in Europe and the USA has shown that every 17th tattooed person has long-term skin problems, such as redness, swelling, itching of the tattooed skin, especially after sun exposure and raised tattooed skin *(often with red tattoos)*; and every 33rd tattooed person has general health problems, such as dizziness, nausea and headaches *(Piccinini et al., 2016)*.

EU regulations regarding substances in tattoo inks. In 2022, the regulation limiting the concentration of dangerous substances in tattoo inks came into force in the countries of the European Union, including in Croatia *(Varnai et al., 2019; Commission Regulation (EU)* 2020/2081). The regulation primarily prohibits the use of substances that have carcinogenic and mutagenic properties, which are skin allergens and irritants, and which can adversely affect fetal growth and fertility. The highest permissible concentration of certain impurities in tattoo inks is also prescribed. Namely, for a large number of chemicals it is still not known whether they can harm people.

It should also be kept in mind that the toxicity tests that are mandatory for assessing the risk of chemicals to human health are not intended to assess the risk of substances that enter the skin. In these tests, substances are given to laboratory animals by mouth, by air, or are applied to the skin. Therefore, there remains a doubt that some chemicals that have not been shown to be harmful in the mandatory toxicity tests, will still be harmful when injected into the skin during tattooing. It is assumed that some colours in the ink can change composition over the years and become dangerous to health a few years after tattooing. This mainly refers to the occurrence of allergic reactions *(Piccinini et al., 2016)*. Inks purchased in countries that do not apply EU regulations *(e.g. online purchases from China)* may contain hazardous chemicals or impurities in concentrations that may be hazardous to health.

Tattoo removal methods. Tattoo removal methods include: laser removal, dermabrasion, chemical peeling, surgical excision and tattoo removal creams. The methods differ in their effectiveness.

Laser removal is most often used method nowadays. A laser *(a focused beam of light)* heats ink particles in the skin to break them up into smaller particles that are easier for the immune system to remove. It may be necessary to repeat the procedure several times. Blue or black tattoos respond well to laser treatment because they absorb light better, but some tattoo colours are difficult to remove. Sometimes the pigments are too deep in the skin for the laser to reach *(Sometimes Interesting Editors, 2023; American Society of Plastic Surgeons, 2023)*.

In addition, it is also possible to develop allergic reactions due to the release and chemical change of ink particles under the action of the laser *(Piccinini et al., 2016)*. A study conducted in Germany a few years ago showed: one out of three persons who went for laser tattoo removal treatment were not happy with the result. Furthermore, every third person got scars after the procedure and the tattoo disappeared in less than half of the treated subjects *(Piccinini et al., 2016,*

ECHA, 2017). During dermabrasion, the outer layers of the skin containing the tattoo ink are removed under anaesthesia. There remains an open wound on the skin that must heal.

Chemical peeling peels off the outer layers of the skin and the tattoo gradually disappears/fades. This procedure is not as effective as laser removal, and can cause skin irritation and scarring. Surgical excision is, of course, effective, but it can only be used for small tattoos. Tattoo removal creams are less successful than other procedures and it takes months to see results. Irritation and even skin damage is possible *(Sometimes Interesting Editors, 2023)*.

CONCLUSIONS AND RECOMMENDATIONS

It is definitely not recommended to get a tattoo if certain medications are taken, if there is a tendency to form scars, and in people with allergic and certain other skin diseases *(Steve Nelson, 2022)*. Furthermore, tattoos in places that are heavily exposed to sunlight, fade earlier and the risk of allergic reactions *(photosensitization, photochemical colour change in the ink)* is increased *(Piccinini et al., 2016)*. Cheaper tattoo salons could employ cheaper inks, which may contain ingredients hazardous to health. It is important to make sure that a salon keeps high hygiene standards, especially the sterile way of injecting ink. Tattoo shape can change over time.

For example, larger tattoos are more susceptible to changing shape if the shape of the body changes. Also, certain parts of the body are more susceptible to stretch marks and changes due to weight gain or weight loss.Before getting a tattoo, for a young person, it is important to think about which profession he/she wants to choose after getting a tattoo. Although today tattoos are mostly accepted, even when they are on a visible spot, there are exceptions. For example, according to the Croatian Ordinance that prescribes the mental and physical health capacity of police officers, in certain workplaces, police officers cannot have "tattoos in visible places that are not covered by the summer police uniform and tattoos of inappropriate content" *(NN 37/2018)*.

All this should be considered if a person decides to get a tattoo. The care of a fresh tattoo is extremely important, both for preventing infection and for the subsequent appearance of the tattoo. In case of health problems related to a tattoo, tattooed people very often first contact the salon where they got the tattoo. For minor health problems, this can be an acceptable solution, but in case of more serious problems, it is necessary to consult a doctor.

It is important that the decision to get a tattoo is a mature and independent decision of a young person. Peer pressure or decisions made in a drunken state or in a state of strong emotions, whether positive or negative, can, at the very least, end up with a tattoo that the tattooed person will later be unhappy with. Also, much more serious consequences are possible, for example those of a health nature.

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WHAT IS HAPPENING DURING GOLDEN SCORE PERIOD IN HIGH-LEVEL JUDO MATCHES?

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ABSTRACT

When there is no score superiority during a judo match, the match goes to golden score. The match ends in the golden score period if there is disqualification or any score. This study aimed to investigate the differences in scores and penalties during golden score according to weight categories and sex. 1414 matches out of 6872 official judo matches from world championships, grand slam and grand prix competitions with golden score were included in this study. The difference in the total match duration was investigated using independent sample t-test and one-way ANOVA between men and women, and among weight categories, respectively. Chi-square test was used to analyse the difference in the rate of matches resulting in a point or a penalty according to sex and weight categories.

The duration of the women matches *(343.3±81.1 seconds)* were longer than men *(330.8±76.2 seconds) (t1412=-2,98, p=0.003)*. The match duration differed among weight categories *(F6,1413=3.12, p=0.005)*. Heavyweight athletes had the shortest duration during the golden score. The matches were more likely to end with scores for men than women, and less likely to end with hansoku-make *(HSK) (χ2(1, n=1414)*=5.94, p=0.02). The rate of winning a match with score differed among weight categories *(χ2(6, n=1414)*=13.76, p=0.03). The rate of winning a match with score was lower than winning a match with HSK. However, the rate of winning a match with score was higher in the other weight categories. The rate of receiving a shido was higher in defeated athletes compared to winner athletes during the normal match duration *(χ2(1, n=2828)*=69.93, p<0.001). Nevertheless, it was not differed between defeated and winner athletes during the golden score *(χ2(61, n=28248=0.14, p=0.71)*.

The results of the study showed that the duration of the match and the way the match ended were different between sexes and among weight categories in matches with golden score. Receiving a shido during the official match duration can lead to defeat in the golden score, thus athletes should be careful of presenting active judo and refraining from any action leading to be penalized.

Key words: *Score, shido, match duration, gender, weight categories*

THE IMPACT OF THE PANDEMİC ON MATCH DURATİON İN HİGH-LEVEL JUDO MATCHES: BETWEEN 2019 AND 2020

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ABSTRACT

Objective: Due to Covid-19, which emerged in late 2019, the whole world, including the sports world, entered an unknown situation. This situation started a pandemic process and the whole sports community, including Judo, was affected. In this study, we aimed to determine the relationship between competition times and sex and kilogram category in the Junior European Judo *(2019-2020)* and U23 European Judo Championships *(2019-2020)* held before and after Covid-19. Methods: Within the scope of the study, a total of 1431 competitions, including 2019 Junior EJC, 2020 Junior EJC, 2019 U23 EJC and 2020 U23 EJC competitions, consisting of male and female athletes, were analyzed. The analyses were reviewed by three judo expert coaches of the International Judo Federation.

Information on match times and other variables was taken from the Official Results Books of the International Judo Federation for further analysis. Then one judo expert *(a judo coach, more than 30 years of judo experience and a black belt)* tabulated the data and another judo expert *(more than 15 years of judo experience and a black belt)* performed the statistical analysis. Results: Before Covid, the maximum time of the end of the competition in Junior female and male was 'Golden score' in terms of percentage, while after Covid it was the second first half of the competition for female *(121-180 sec.)* and the first half for male *(61-120 sec.)*. In the U23 category, there was no change in the time of the end of the competition before and after Covid. In Junior category, there is a statistically significant relationship between Covid time *(before and after)* and competition times in the male's category [$x2_{(2)}=11.663$, $p<0.05$].

There is a positive relationship between the competition times before and after the U23 Covid time and the sex of the athletes *(p=0,01)*. In the Junior category, no statistical significance was found for the weight variable affecting the match duration before and after Covid-19 *(p>0.05)*. In the U23 category, the strength of the relationship calculated with the Contingency Coefficient was found to be 0.455 and it was determined that there was a positive relationship between the competition times before and after the Covid time and the weight of the athletes at a high level.

Conclusion: It is thought that the fact that the competitions ended at the time of the goal score before Covid and ended in the first half of the competition after Covid is the result of a tactical attempt due to the training and performance levels of the athletes during Covid. The time without training may have changed the endurance of the athletes, which is an important tactic for athletes to use energy efficiently considering that the competitions last all day long. Measuring the aerobic-anaerobic endurance performances of athletes during Covid time may reveal important results in carrying the study forward.