

STUDY ON THE IMPACT OF ADAPTED JUDO PRACTICE ON INDIVIDUALS WITH ASD AND DOWN SYNDROME

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Abstract. *Studies on the evolution of participation among individuals with special needs, such as Autism Spectrum Disorder (ASD) and Down syndrome, in the practice of adapted judo is of growing significance. The practice of adapted Judo tailored to their specific needs can help them overcome challenges and improve their overall physical and mental well-being. The objectives of this study are centred on assessing the importance and outcomes of practicing adapted judo to promote increased integration capabilities. Our research starts from the premise that determining the effects of judo practice on the development of essential skills for social integration and endurance can bolster the integration capacities of people with disabilities. The research encompassed 41 coaches, methodologists, teachers, representatives from basic sports organizations (clubs, associations), and 14 athletes with special needs from the Down Bucharest association. Over a span of 8 months, these athletes actively participated in adapted judo training, attending a minimum of 2 sessions per week. The data collection process employed a variety of methods, including questionnaires, the Sargent test, determination of maximum oxygen consumption, and the plethysmographic method. The study seeks to facilitate the compilation, analysis, and interpretation of data to formulate an effective best practice strategy and methodology for the practice of adapted judo. The ultimate aim is to bridge the communication gap between decision-makers and practitioners, enhancing the overall approach to adapted judo practice. This paper underscores the significance of judo practice in fostering physical development among people with disabilities, particularly those with ASD and Down syndrome.*

Keywords: judo, preparation, capabilities, adaptation.

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Introduction

The practice of adapted judo, specifically designed for individuals with autism spectrum disorders (ASD) and Down syndrome, is a targeted study geared towards persons with disabilities, as well as families and institutions involved in their social integration. Ascertaining the levels of effort capacity and physical fitness in this population represents a significant challenge (Franchini et al., 2018). The inclusion of adapted judo in the Calendar of the Romanian Judo Federation (FRJ) from 2021 onwards underscores the need for targeted research to determine the potential effects and importance of adapted judo on skills development in this population (Chen et al., 2017). The organization and practice of adapted

judo is a crucial component of specific training, facilitating the development of skills (Farzad et al., 2011). The purpose of this research is to promote adapted judo as an educational tool that provides equal opportunities to engage in sports and foster personal and social development, leading to more cohesive communities (Beneke et al., 2002).

Research emphasized that children with ASD exhibited improvements in executive function and motor abilities after a physical activity intervention (Pan et al., 2017). Practitioners with ASD exhibit lower levels of effort capacity than individuals with normal development, the causes of this disparity in practitioners with ASD remaining unclear. However, limited access to instructors and services for physical training programs represents a significant barrier to the development of practitioners with ASD and Down syndrome (Liang et al., 2016).

This study aims to analyse the implementation stages of an adapted judo activity program over the course of eight months, which includes training, national and international sports activities, and evaluates its effects on individuals with autism spectrum disorder (ASD) and Down syndrome. ASD is a neurological disorder characterized by deficits in communication, social interaction, and repetitive behaviours. Understanding the effects of this program on the practitioners can contribute to the development of skills, increase their capacity for social integration, and strengthen the capabilities of organizations involved in the practice of judo adapted as a way of life. The interdisciplinary collaboration among coaches, instructors, and practitioners involved in the program can also be optimized (Artioli et al., 2012).

The implementation of the adapted judo program within the FRJ will serve as an opportunity to validate research results, understand the benefits of increased motor activity, physical, and psychosocial abilities for individuals with ASD and Down syndrome, and understand how to use adapted judo in specific activities (Franchini et al., 2019; Kamandulis et al., 2018). Processing and interpreting the presented data highlight the positive effect of motor stereotypes on individuals with ASD and Down syndrome (Farzad et al., 2011).

The inclusion of adapted judo in the Romanian Judo Federation's calendar is an important step towards enhancing the development of judo at both national and international levels. The results obtained will be reported and incorporated into similar studies, policy recommendations, and training programs for adapted judo coaches. This strategic policy can contribute to the inclusion of children and young people with disabilities in the practice of judo.

Mental health problems affect a significant share of the population, and sport can play an essential role in facilitating the integration of individuals with disabilities into society, supporting intercultural dialogue, and promoting social inclusion. The White Paper on Sport emphasizes the European Commission's intention to promote social inclusion through sport, through various means, funding instruments, and by considering sport in the action plan for the European strategy for people with disabilities (Duel-Piening, 2018).

The specific needs and circumstances of various groups of martial arts practitioners have been noted by many researchers, who emphasize the important role that judo and other martial arts can play for young people (Ravier et al., 2009). However, it is crucial to take into account studies involving people with disabilities, given the particular, less privileged environment in which physical exercise is practiced. The availability of necessary resources and equipment for judo practice, along with the complexity of anaerobic exercise and the strength-speed and power actions specific to standing fight techniques, have been shown to significantly enhance the psycho-motor and physical capacities of judo practitioners (Sale et al., 1990). The

combination of techniques employed in ground fighting and standing fight techniques further underscores the significance of strength and simple gripping techniques for direct attack actions, based on the element of surprise. With respect to the rights of persons with disabilities, (Duel-Piening, 2018) all official United Nations documents include the right to full participation and inclusion in society, in the life of the community, for the individuals who are often among the poorest and most disadvantaged members of society. A growing body of studies on individuals with disabilities have also called for increased investment in technology and equipment that supports vulnerable children with specific needs, in order to increase their opportunities for education, employment and social engagement (Turner et al., 2014). The European Pillar of Social Rights, which provides direction for social and employment policies, underlines that people with disabilities have the right to income support that ensures their means of living in dignity, services that enable them to participate in the labour market and in society, and a work environment that is adapted to their needs (Convention on the Rights of Persons with Disabilities, 2023).

Moreover, the European strategy for people with disabilities, 2021-2030 further encourages proposals for projects and programs that promote positive changes for people with disabilities, especially those with fewer opportunities, and which aim to reduce inequalities (Implementation of the European Strategy for People with Disabilities, 2017). Specific guidelines issued by global organizations on improving physical activity to enhance health (WHO, 2022) emphasize the importance of providing all children, adolescents, and adults living with disabilities with opportunities and resources to participate in age- and ability-appropriate physical activities. The active involvement of young people with ASD and Down syndrome in community physical activities is expected to encourage their participation in community life, given the social skills that such involvement can foster. Increasing numbers of trainers, parents, and specialists have confirmed the beneficial effects of adapted judo practice for people with ASD and Down. The objectives of our study coincide with the coordinated actions, at national and European levels, resulting from the new strategies of relevant organizations, such as the FRJ, EJU, and FIJ.

In order to determine the needs of organizations involved in adapted sports in general and adapted judo in particular, we analysed the existing data in the specialized literature. The needs presented below as a result of the analysis of specialized literature, research and studies carried out in some partner countries, allowed us to formulate our specific objectives. Of course, these needs will be further developed and researched during the implementation of adapted judo. According to European Statistical Evidence (ESS, 2022), in 2019, 21.1% of the population of the European Union (EU), the equivalent of 92.4 million people, was exposed to the risk of poverty or social exclusion, in a slight decrease compared to 2018 (21.6%). Children and young people, aged between 7 and 31 years, with autism spectrum disorder (ASD) and Down syndrome (DS) face many challenges in their daily lives in terms of access to sports and physical activity. Autism spectrum disorder is a developmental disorder that appears in the first three years of life and is characterized by communication problems, social interaction deficits and repetitive/restricted interests and behaviours (ESS, 2022). The prevalence of ASD appears to be increasing worldwide, although there is no centralized registry of ASD cases in any EU member state. Over the past 30 years, the number of reported cases of autism has increased rapidly in all countries where prevalence studies have been conducted. In April 2017, it was

estimated that 1 in 160 children/young people worldwide suffer from ASD, representing over 7.6 million and 0.3% of the global disease burden (Implementation of the European Strategy for people with disabilities, 2017). ASD can affect up to 11 in 1,000 children/youths with a male to female ratio of 4:1.

Methodology

Research question

What are the effects of practicing adapted judo in participants with ASD and Down syndrome?

Participants and Procedure

A total of 41 coaches from different organizations responded to the questionnaire, of which 29 were active coaches registered with the FRJ (Romanian Judo Federation), and 12 coaches represented unregistered organizations and associations. Also, 14 athletes with special needs from the Down Bucharest association participated in the research. The research subjects (with special needs), female and male, range in age from 12 to 24. In order to comply with the conditions regarding research ethics, the consent of the representatives of the associations to which the subjects belong was obtained.

Data collection occurred between October 5, 2021 and May 10, 2022, where we distributed an online questionnaire to 59 clubs and associations, as well as national sports organizations.

Instrument

The questionnaire used in the study covered various topics, including information on organization structure, occupation of sports specialists, and specific needs regarding adapted judo coaching.

Results and Discussions

From the point of view of the effects of practicing judo, the data collected by us show that high-intensity training generally led to increases in VO₂ max ranging from 4.4% to 23.0%, similar to the data presented by numerous researchers, in judo athletes (Franchini et al., 2019). This finding reinforces the claim made by Ravier et al. (2009) that aerobic exercise contributes to faster recovery in judo and martial arts athletes, with similar results suggesting that high-intensity interval training can help improve athletes' recovery between successive high-intensity actions or between competitions (Muraretu et al., 2018). Currently, there are almost 800,000 people with disabilities in Romania, most of whom are registered in Bucharest. The activities that involve professional athletes with disabilities and the creation of opportunities in the field of personalized education, adapted sports are almost non-existent in Romania. In Romania, there are more than 30,000 people affected by autism, where the incidence shows that 1 in 40 people on this spectrum are boys, and 1 in 68 children in the world suffer from this

disorder. Autism can appear in any family, regardless of race, ethnicity, geographical area, or level of education, according to the data presented by the Romanian Paralympic Committee (2022).

In Romania, there are currently 104 active clubs and associations registered with the Paralympic Committee that provide opportunities for individuals to participate in adapted sports, with 12 located in Bucharest and 92 located in other cities. The number of athletes who practice adapted sports and are within the ASD and Down syndrome spectrum totals 4,420 individuals, of whom 2,611 are children and 1,809 are adults, according to statistics from the "Ai o carte, ai o parte" project, which is financed by the European Commission (ESS, 2022) and aims to integrate people with disabilities into the labour market and mainstream education. The county with the largest population of people with Down syndrome and ASD is Iasi with 274 individuals recorded, while the fewest are located in Sălaj with 34 people (Romanian Paralympic Committee, 2022).

Through our analysis, we have concluded that Romania is facing a deficit of sports specialists in all subsystems, including adapted sports for individuals with limited abilities.

In response to the question of whether the role of an adapted sports coach was deemed essential, a majority of the participants in the current study, specifically 37 out of 41, responded affirmatively.

As the Romanian Paralympic Committee currently only oversees 16 branches of adapted sports, the 37 respondents expressing interest in the profession suggest a demand for specialized coaches in adapted sports. Adapted sport or unified sport in Romania is predominantly carried out through the Special Olympics Romania projects, and our study has identified at least 50 children with disabilities who have expressed interest in participating in judo.

To assess the perspectives of sports professionals on the impact of judo practice on people with Down syndrome and autism spectrum disorder (ASD), this study examined the responses of specialist, including coaches, methodologists and teachers.

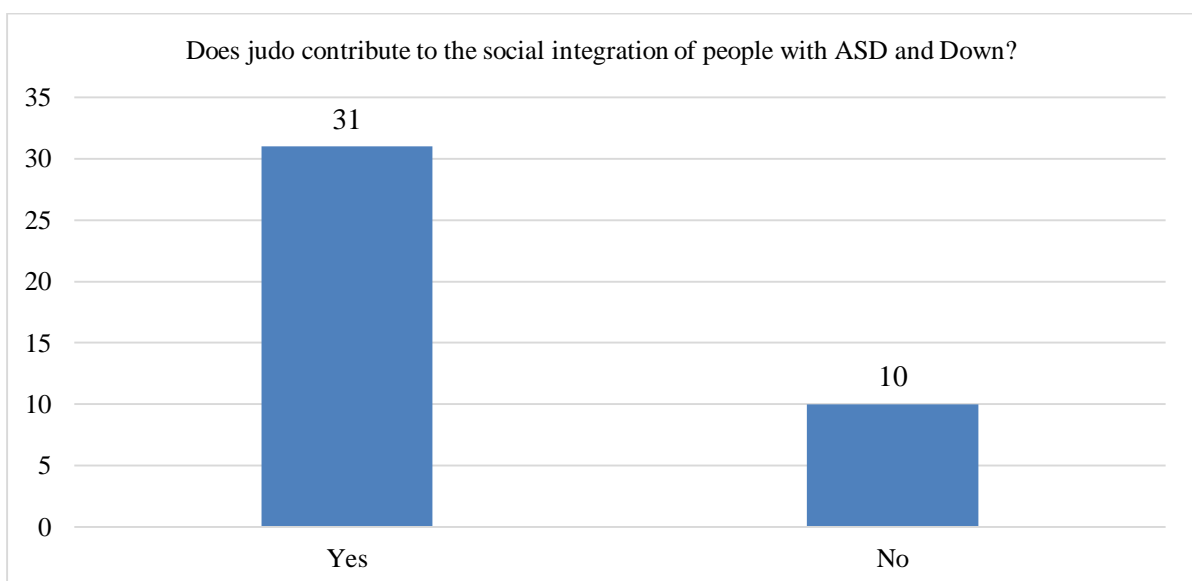


Figure 1. Does judo contribute to the social integration of people with ASD and Down?

When asked why judo brings change, respondents indicated the following results highlighting the effects of practicing judo among Down and ASD platforms.

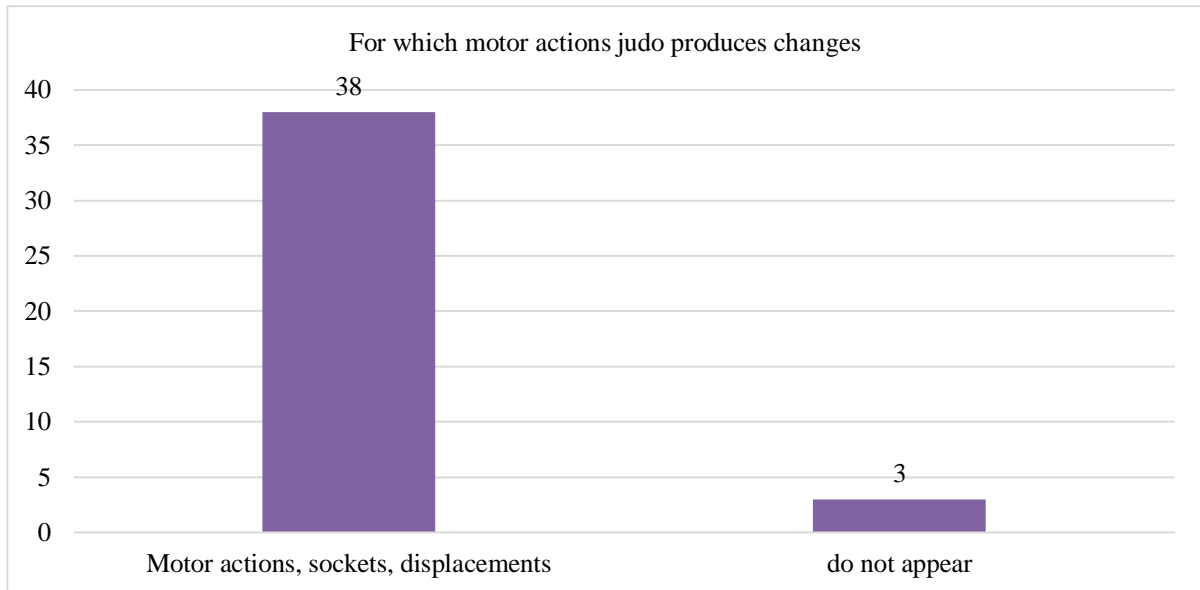


Figure 2. For which motor actions judo produces changes

When asked about the increasing effects of judo practice on people with Down and ASD disabilities, as a result of the introduction of the practice of the discipline, in the form organized within the clubs and associations within the FRJ and the participation in national and international competitions, respondents presented the following data.

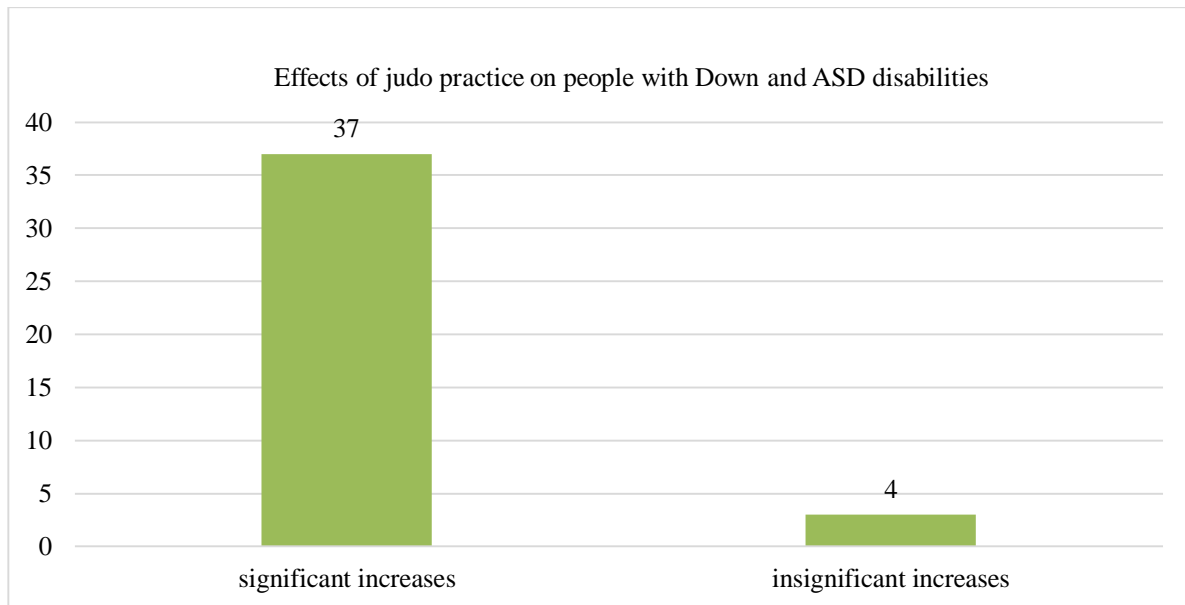


Figure 3. Effects of practicing adapted judo on combating side conditions

To the question regarding the effects of practicing judo on people with Down and ASD disabilities, from the point of view of combating obesity, cardiovascular diseases and osteoporosis, as a result of the introduction of the practice of the discipline, in the form organized within the clubs and associations within the FRJ and of participation in national and international competitions, the respondents presented the following data.

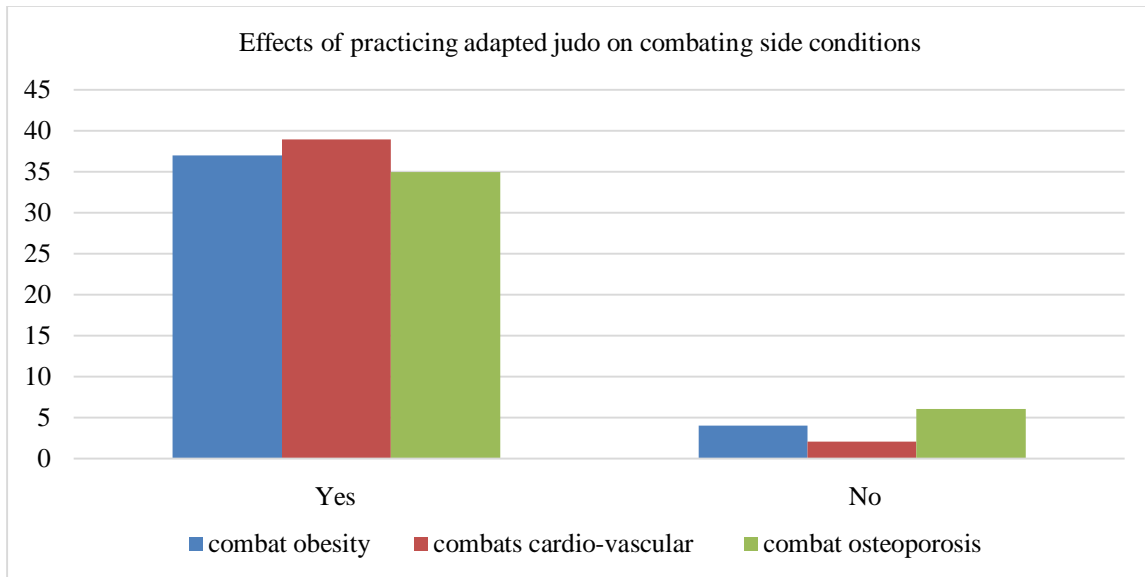


Figure 4. Effects of practicing adapted judo on combating side conditions

In order to evaluate the effects of the practice of adapted judo on the aerobic and anaerobic effort capacity of the 14 athletes with special needs from the Down Bucharest association, the data presented in Table 1 were recorded. The data on the evolution of the anaerobic capacity, obtained during the three-stage verification, initial, intermediate and final, by applying the Sargent and VO₂max test, and the Plethysmographic test. The data show a significant increase in aerobic and anaerobic capacity, according to T-test values, between initial and final testing (3.37 and 4.68), t critical value being 2.16 (for df = 13 and alfa 0.05). The increase in effort capacity was recorded during a complete training cycle, when the athletes registered a peak sports form with outstanding results in international competitions. Average VO₂ values for a judoka can vary depending on training level, age, sex, weight, and other individual factors. According to some studies, average VO₂ max values for athletes may be around 50-60 ml/kg/min for men and 40-50 ml/kg/min for women (Liang et al., 2016). It is important to note that the fully recorded VO₂ values show significant increases at the three evaluations regarding the average values recorded.

Table 1. Data on capacity developments- anaerobe (Test Sargent) and VO2max

	Name and Surname (Initials)		Male/ Female	Weight Categ in kg	Initial Test Sargent (W)	Middle Test Sargent (W)	Final Test Sargent (W)	Initial VO2 max ml/kg/min	Middle VO2 max ml/kg/min	Final VO2 max ml/kg/min
1	D	A	M	60	141.11	151.2	165.3	52	55	58
2	I	C	F	57	114.41	126.8	130.12	31	36	37
3	R	N	M	73	140.22	157.21	157.4	45	47	52
4	A	Z	M	60	131.67	127.83	130.78	48	48	50
5	C	M	F	48	129.71	144.11	159.24	34	36	38
6	L	I	M	81	142.48	152.67	161.12	45	50	53
7	M	A	F	48	150.3	152.5	161.24	36	38	40
8	V	O	F	48	148.65	156.96	162.75	32	40	45
9	I	R	M	66	135.5	142.31	133.32	54	57	58
10	D	S	F	57	146.28	154.73	162.64	34	38	49
11	B	L	M	73	137.46	143.12	152.66	53	56	57
12	A	D	F	52	141.18	154.46	173.31	34	40	45
13	Z	V	M	81	154.31	161.52	161.74	47	50	55
14	N	B	M	90	151.32	159.74	163.12	52	54	58
		Mean			140.32	148.94	155.33	42.64	46.07	49.64
		Standard Deviation			37.35	39.61	41.98	13.64	13.88	14.51
		T -test			3.37			4.68		

In the following representations, the data obtained by participants of different weight categories, the modelled representation, the results of the plethysmographic test are displayed graphically. Graphical representations emphasize the evolution of the pleth signal, in the initial, intermediate and final evaluation. The evolution of the plethysmographic graphs (Figures 5-7) shows the increase in cardiovascular resistance as a result of adaptation to the anaerobic efforts specific to judo, represented by the reduction of red areas, as an effect of the reduction of periods of apnoea.

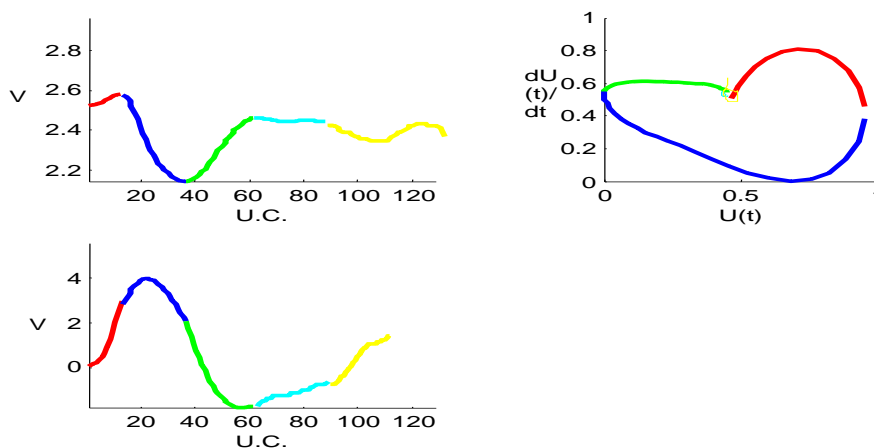


Figure 5. The evolution of model pleth wave signal initially

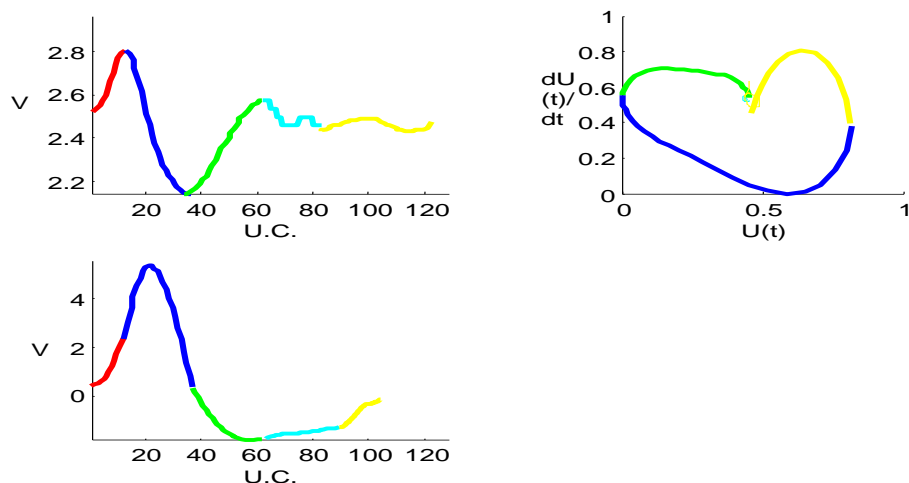


Figure 6. The evolution of model pleth wave signal (middle)

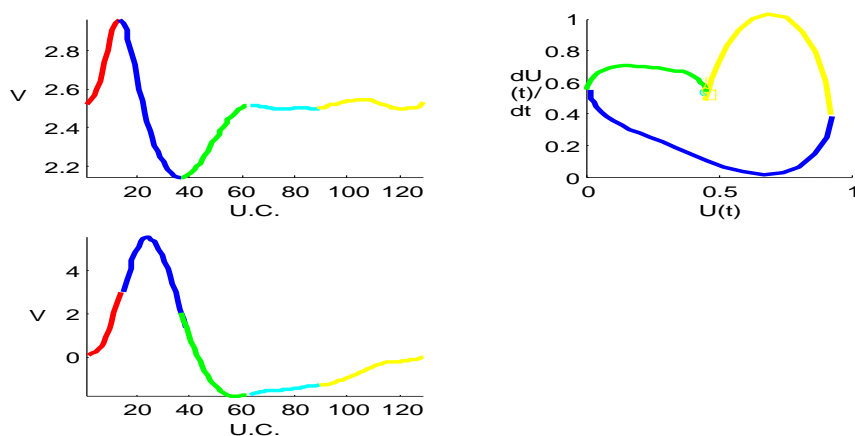


Figure 7. The evolution of model pleth wave signal (final testing)

Conclusions

The analysis and processing of the data obtained during the research allow us to present the following conclusions:

- Regarding the effects of judo practice on people with Down syndrome and ASD, the answers obtained by applying the questionnaire to 41 specialist respondents (coaches, methodologists, teachers), the majority of respondents (over 50%) stated that judo contributes to the social integration of people with ASD and Down (Figure 1-4).
- The introduction of adapted judo as a practiced discipline organized in specialized sports structures is considered by the respondents as a necessary measure to increase the effectiveness of practicing the discipline for the growth and development of these people.
- When asked about the effects of practicing judo on people with Down and ASD disabilities, from the point of view of combating obesity, cardiovascular diseases, and osteoporosis, as a result of the introduction of practicing the discipline, most respondents

emphasized the need to practice adapted judo, the training of specialized staff and the realization of a methodology of good practice in judo adapted for people with ASD and Down syndrome.

The data obtained when evaluating the effects of practicing judo adapted on the aerobic and anaerobic effort capacity of the 14 athletes (presented in Table 1) show a significant increase in anaerobic capacity (by applying the Sargent test). Also, the values recorded through the VO₂max test show a significant increase in the aerobic capacity.

The data obtained by the participants of different weight categories, considering the plethysmographic test, taking into account the evolution of the pleth signal, at the initial, intermediate and final evaluation (Figures 5-7) show an increase in cardiovascular resistance as a result of adaptation to the anaerobic efforts specific to judo, represented by the decrease of red areas, as an effect of reduced periods of apnoea.

The lack of certified trainers for the practice of adapted judo and a specific methodology could contribute to this restriction, along with the fact that children/youth with autism need more time and encounter difficulties in learning new movements and skills while participating in training sessions. Teachers and staff working in special education, rehabilitation and sport are struggling to develop a curriculum. The data presented, following the completion of the research, can help reduce huge barriers in society, including stigma, discrimination and lack of opportunities due to participants' special conditions, which leads to limited opportunities for community or social activities - almost 40% spend little or no time with friends. Physical exercises specific to judo are useful, reducing motor impairments and improving social integration.

The data obtained by analysing the information from similar studies (Monks et al., 2017) and through the respondents included in our study show that the practice of judo contributes substantially to increased social integration of the practitioners. The effects of judo practice are particularly noted in the formation of motor skills and the development of specific skills, walking, climbing, catching, falling, or significant increases in dynamic balance.

The introduction of judo practice for people with disabilities, through adapted judo, practiced in associations and clubs in the field, under the coordination of specialized bodies, FRJ (Romanian Judo Federation), EJU (European Judo Union), FIJ (International Judo Federation), enhance the beneficial effects of judo practice, thus contributing to the social integration of practitioners. All these factors underscore the necessity of implementing a well-structured methodology for adapted judo training and competitions, which would regulate the practice of this discipline.

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Informed Consent Statement: The participants provided their written informed consent to participate in this study.

Data Availability Statement: Data is available upon request to the contact author.

Conflicts of Interest: The authors declare no conflict of interest.

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