

# Inclusion of people with intellectual disabilities in judo: a systematic review of literature

## Authors' Contribution:

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Manuscript Preparation
- E Funds Collection

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## Abstract

### Background and Study Aim:

What do we know about the inclusion of judokas with disabilities? We find many different types of disability in judo and also diverse expressions in professional literature such as: judo for blind, judo for hearing imperative, judo for the deaf, g-judo, judo for disabled people, adaptive judo, special needs judo, judo for all, ID (intellectual disability) judo, inclusive judo, special judo, modified judo etc. An important division of disability is noticed considering mental or physical disability according to the disability medical model. Since judo for the blind is a Paralympic discipline, there are some more professional and scientific articles about judokas with a physical disability, especially blind, visually impaired and deaf athletes, but there are only a few about judokas with mental disability. The cognitive aim of our research of literature is problem the necessity of the inclusion of people with intellectual disabilities, which, according to the disability social model and human rights model, includes those who need more decision-making help in everyday activities.

### Material and Methods:

We used the EBSCO Discovery Service (EDS) in the National and University Libraries (NUK) in Ljubljana, which used data from entire text databases such as: Academic Search Complete, JSTOR, ScienceDirect, Oxford Academic Journals, SpringerLink, Taylor and Francis, SAGE, Wiley Online Library, PsycArticles, Emerald and data from the bibliographic collections MEDLINE, SCOPUS and Web of Science. Databases were searched by following the PRISMA [32] guidelines for systematic reviews. Additional articles from other sources were identified by examining the reference lists of the studies located via the database search. A total of 24 articles met the final inclusion criteria.

### Results:

The authors of the selected articles examined various aspects of the judo impact on people with diverse abilities. Articles address: 4 topics related to judokas with autism, 1 to judokas with attention deficit hyperactivity disorder (ADHD), 1 to judokas with down syndrome, 16 to intellectual disabilities and 2 to judokas with behavioural disorders. Research relates to: quality of life; motor abilities and movement skills; measurements of grip strength; a level of hyperactivity and of impulsivity; health and physical activity promotion; analysis of judo matches; effects on psychosocial factors; ethics of inclusion; the impact of judo on aggressive behaviours; effects on cortisol and stress; physical and psychosocial benefits of modified judo practice; effects of controlled intensity on the basis of lactate threshold on the blood oxidative stress status and motor coordination; the effectiveness of judo sessions as a supplementary therapeutic method; balance; possibilities and limitations of judo and innovative agonology in the therapy; reports from festivals and championships and popularization of judo.

### Conclusions:

Due to the small number of subjects and the small number of similar surveys, the results cannot be generalized to the broader population. Research varies greatly by type of research and is therefore not comparable. Judo for people with intellectual disabilities is on the rise and is practiced as a therapy, as for recreation with an emphasis on inclusion, or as a sport with competitions at the level of the World Championships.

### Keywords:

adaptive judo • disability models • diverse abilities • integration • special needs • therapeutic method

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**Medical model** – is the first known used sociological division of people that bases on the medical diagnosis [5, 7, 18].

**Social model** – is the second sociological model, which supports segregated groups of people and enables integration into society in a way that seeks adjustments in the environment [5-8].

**Human rights** – model is the last sociological model of equal treatment of people [5].

**Diverse ability** – is a modern expression for all kinds of disabilities, differences, diseases and conditions of a person who needs some adjustments, gadgets or other assistance for equal inclusion into society. Similar expressions are, for example, "different ability" or "additional need".

**Autism** – is a lifelong developmental disorder that affects the brain in processing information.

**Down syndrome** – also known as trisomy 21, is a genetic disorder caused by the presence of all or part of the third copy of chromosome 21.

**Agonology** – science about struggle.

**INAS** – (International Sports Federation for Persons with Intellectual Disability; originally called INAS-FMH, later INAS-FID and now as INAS) was established in 1986 by professionals in the Netherlands who were involved in sport and wanted to promote the participation of athletes with a mental handicap in elite sports. The organization's brand name is the International Federation for Intellectual Impairment Sport, promoting the sport worldwide for athletes with an Intellectual Disability, Autism and Down Syndrome. On 19th October 2019, at the closing

## INTRODUCTION

Judo for people with disabilities has a long tradition in practice [1] but rare in science [2]. Judo ethics bases on values such as respect, fairness, trust, order, discipline, reciprocity, modesty, patience and requires calmness, focus and perseverance from the practitioner. The principles of judo such as mutual prosperity and the use of the minimum power for maximum effect [3, 4] is not woven only into judo practice, but in all areas of life, formal (study, work) and non-formal (family, friends, etc.). Judo, as such, represents a particularly favourable environment for the equal treatment of athletes. To be able to properly present most of the subgroups of judokas with diverse abilities [5] in judo practice and competitions, we will look through three different s: medical, social and the current human rights model [6-8]. From the perspective of the disability medical model, the basic division in judo would present two larger subgroups: judokas with physical disabilities and judokas with intellectual disabilities. Judo discipline in Paralympics' is called para judo and includes athletes with vision impairment. Men's para judo was first included in the Seoul 1988 Paralympics with woman's para judo following in Athens 2004. The sport is governed by the International Blind Sports Federation (IBSA) and International Judo Federation (IJF). Some researchers [9] use the phrase "adaptive judo" for judokas with hearing impairment [10] or athletes with spinal cord injury [11], or sensor violations [12]. All these subgroups are part of a group of people with physical disabilities. Definition of people with an intellectual disability, according to American Association on Intellectual and Developmental Disabilities [13] is a disability characterized by significant limitations in both intellectual functioning and in adaptive behaviour, which covers many everyday social and practical skills and disability originates before the age of 18. In the 1<sup>st</sup> and 2<sup>nd</sup> Judo European Championship ID-Judo 2017 and 2019 in Koln, Germany, all judokas with intellectual disability,

who passed International Sports Federation for Persons with Intellectual Disability (INAS) requirements, were able to compete [14].

The classification process verifies the intellectual disability of an athlete through the use of an IQ test coupled with other diagnostic criteria. All judokas from this competition are part of the people with an intellectual disability group. There is, however, another large group of judokas who don't belong to any of the two previously presented groups of people with disabilities. These are for instant judokas with brain damage caused by head injury (accident, illness, etc.) after the age of 18 or people with mental illness or combinations of here presented different categories and others who due to some specific psycho-physical condition or illness cannot be part of so-called mainstream. A good example are young people with behavioural problems observed by Gleser & Lison [15], who published a pilot study in 1986. We have also found an important work on the subject from the author Jeffrey Robert Greene [16] comparing 2 groups of youngsters living in a community-based residential treatment facility. His aim was to examine the relationship between judo and various aspects of adaptive behaviour and self-concept in a population of mild mentally retarded male adolescent offenders.

In the light of the disability social model, all these different psycho-physical conditions and diseases open a wider area of the so-called "judo for all" or "inclusive judo" concept [1, 17-19]. Following the social principles of inclusion [20, 21] and normalization [22, 23] judo for athletes with diverse abilities is still in the developing process. From the perspective of the social model, the medical disability model for athletes with physical impairment excludes many subgroups such as judokas who are not blind or partially sighted, or all who do not pass intellectual disability VIRTUS (former INAS) requirements. Historically, sports for people with

a physical disability started to develop after the 2<sup>nd</sup> World War by medical staff, helping wounded, no leg, no hand, blind, deaf, etc. warriors. This is why the medical model [6, 24] is still in use in the sports sphere.

The social model supports terminology that maintains the dignity of people with disabilities and avoids medical expressions like retarded [25, 26] or degenerate, handicap (the beggar with the cap in hand), invalid (not valid), etc. [7, 27] also feeble-minded [16]. Words like impairment, special need, additional need, diverse abilities, different abilities, the special condition started to replace old medical diagnostic expressions. Terminology in judo that is in use nowadays is G-judo, special need judo, adaptive judo [28], judo for all or inclusive judo [1, 17, 19, 29, 30]. The social model also encourages the use of phrases that point out a person with the additional condition or illness in the first place before putting special conditions, for example, “judoka with a disability” and not “disabled judoka”. Researchers stressed [27] the importance of the use of language and point out that we need a word that goes beyond the distinction between “us” and “them”, a concept that captures the specificity of involvement. According to the principles of normalization [22], we should expose a disease or condition of an athlete only when this is an obstacle to further participation.

The question of equal opportunities rises when we continue with the inclusion of all judokas regardless of their psycho-physical condition or illness. There are certain possibilities for competition in judo but not for all judokas with disabilities. Judo clubs are open for any person who would like to practice judo in general, but not all coaches and programs are developed to include athletes in an equal manner. By involving members of the segregated groups in sports clubs, we are increasing the possibilities for their inclusion in the wider society. In the guidelines for sport and recreation for people with disabilities [31], we find that the involvement of athletes with a disability in the society helps to overcome prejudices and fears prior to this population, which are primarily the result of ignorance of the life of persons with disabilities due to their social isolation, which applies to both children as well as adults. It also promotes interactions and meetings in clubs' events, which means full socialization. For the provider of sports and recreation programs, this ultimately means a better image

in the local community. “Judo for all” or “inclusive judo” is one large group of judokas practicing a different level of judo, acting towards each other in an equal manner through the principle of “jita kyoie”, but not all have equal opportunities to choose the diverse judo programs.

Here rises the third, human rights model in which we are all called to act responsibly towards each other. It upgrades a social model in pointing out civil rights before social rights. The human rights model values impairment as part of human diversity. The meaning of equality takes place: equality of rights, equality of treatment, freedom, autonomy and non-discrimination. The human rights model favours respect for the dignity of a person with a disability, her/his quality of life, respect towards one's identity, awareness, recognition and consideration of each person's psycho-physical condition as a normal part of humanity [8].

In this review paper, despite the modern terminology presented here, we will use in some places the old terms used by individual researchers in order to better understand the different models and periods in which they were created.

The cognitive aim of our research of literature is problem the necessity of the inclusion of people with intellectual disabilities, which, according to the disability social model and human rights model, includes those who need more decision-making help in everyday activities.

## MATERIAL AND METHODS

### Protocol and search method

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guideline was followed [32].

A literature search was carried out on the 5<sup>th</sup> of March 2020. We used the EBSCO Discovery Service (EDS) in the National and University Libraries (NUK) in Ljubljana, which used data from entire text databases such as: Academic Search Complete, JSTOR, ScienceDirect, Oxford Academic Journals, SpringerLink, Taylor and Francis, SAGE, Wiley Online Library, PsycArticles, Emerald, etc. and data from the bibliographic collections MEDLINE, SCOPUS, Web of Science, etc. The search term consisted of two sets of keywords, both in the abstract.

ceremony of the 5th Global Games, INAS announced a substantial rebranding and will henceforth be known as Virtus: World Intellectual Impairment Sport.

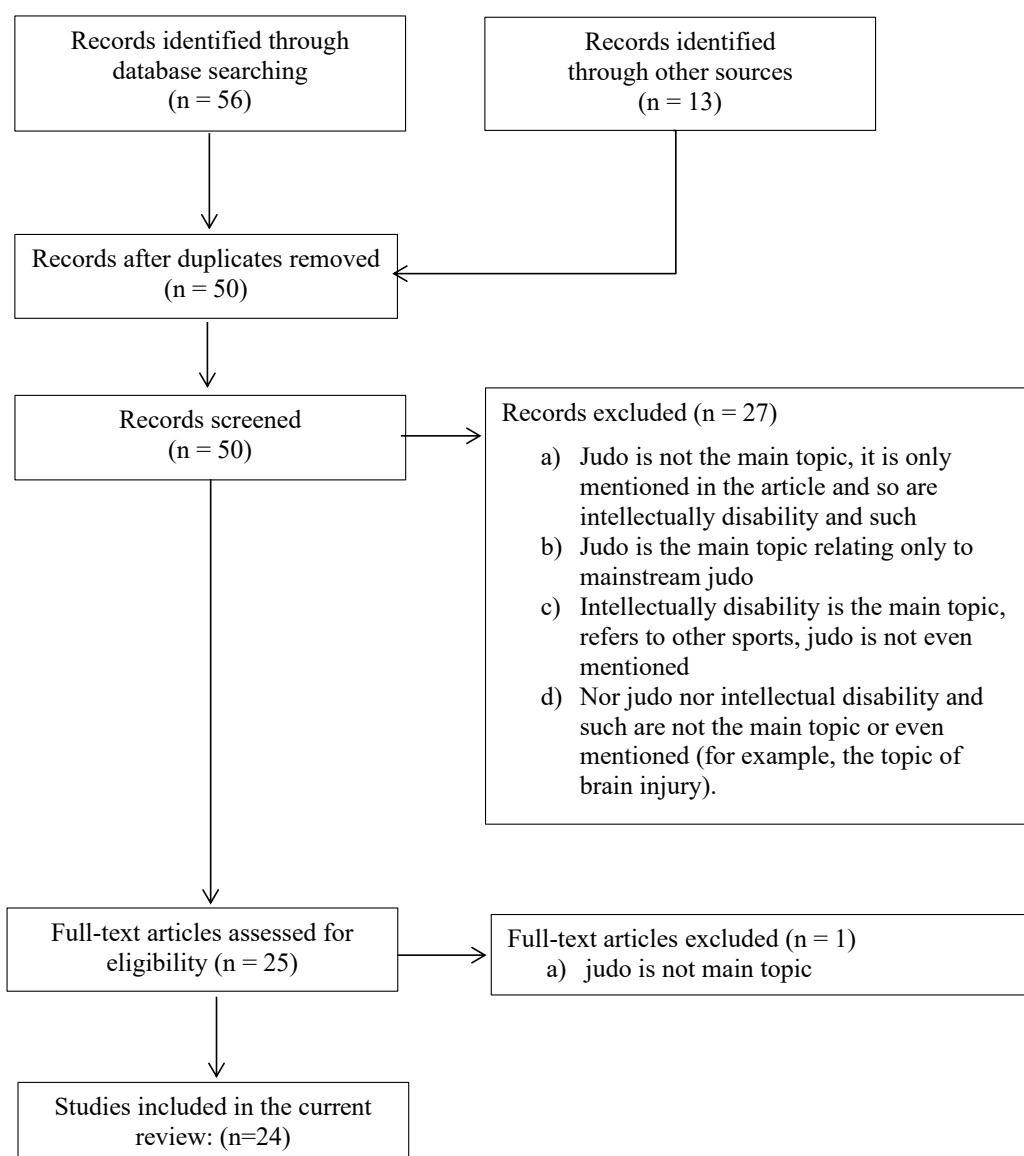
**Jita kyoie** – is a Japanese expression that could be translated as a mutual benefit. It is the second of two principles of the founder of judo dr. Jigoro Kano [3].

**Gan** – this word comes from Japanese and means “inclusive”. The term “G-judo” has been used for the past 25 years. G-judo refers to inclusive judo and judo for all concepts.

**Judo** – is a dynamic, high-intensity intermittent combat sport, invented by dr. Jigoro Kano, in 1982, where a considerable number of different morphological dimensions alongside an excellent level of physical fitness physical conditioning and mental readiness plays a vital role in the final sports result [44].

The words in each string were associated with the Boolean operator “or”. The strings were interconnected by the Boolean operator “and”. The first set contained words and phrases related to intellectual disability and the like (“intellectual disability” or “mental retardation” or “learning disability” or “developmental disability” or “autism” or “mental illness” or “special needs” or “cerebral paralysis” or “brain injury”). The second set contained words and phrases related to judo and the like (“judo” or “adaptive judo” or “inclusion in sport” or “g-judo” or “judo for all” or “sport for all”). We downsized the search by

using related terms to ensure the subject of the review was found (Table 1). Additional articles from other sources were identified by examining the reference lists of the studies located via the database search (Table 2). We did not limit the year of publication. A total of 24 articles met the final inclusion criteria. The search includes articles in peer-reviewed, non-indexed journals, handbooks and manuals pertaining to the relevant topic, graduate theses and dissertations in English, Finnish, Japanese, Slovene, Spanish and Russian language.



**Figure 1.** The selection of studies based on the PRISMA method [32].

## Inclusion and exclusion criteria

Research, reviews, meta-analyses, conference papers, case studies, books, book chapters, and theses or dissertations were included, with no restriction to age, gender or nationality, which corresponded to the field of analysis, i.e. judo of persons with intellectual disabilities and others.

## Study selection

All articles that met category A based on inclusion and exclusion criteria were reviewed in detail by the authors (Figure 1).

## Quality assessment and risk of bias

Two reviewers independently assessed the risk of bias of the trials. Bias in the areas of participants selection, pre-selection, drop-out effect, possible third variables effect, selective outcome reporting, or other sources of bias was assessed.

## Data extraction

Data were annotated into a database and verified by a second reviewer. Pre-specified data were collected for each study; these included general classifiable information about the objectives, sample, design, measurement tool, and findings.

**Table 1.** Summary of the study's findings.

References	Issues	Design and sample	Measurement tool	Findings
Dadič 2001 [1]	Research on the quality of life and the impact of sport (judo and other sports) in social welfare institutions for persons with intellectual disabilities.	Research is a qualitative analysis, 5 people with special needs from a social welfare institution.	Interview; audio-recorded; measuring instrument: normalization criteria by David and Althea Brandon.	Sportsmanship significantly affects the quality of users' lives. Sport breaks the taboos of what disabled people are capable of. Sport destigmatizes, normalizes and integrates people with disabilities. Quality of life very much depends on social conditions. The ability to choose is important for people with disabilities, also to participate in social life and decide for themselves how to satisfy their needs. Some users are deprived of their basic needs. Users have great confidence in professionals. Sports activity is one of the possible factors for strengthening self-image, participation in society and better opportunities for personal development.
Masleša et al. 2012 [51]	Motor abilities, movement skills and their relationship before and after eight weeks of martial arts training in people with intellectual disability (ID).	Quantitative research; 23 judokas with mild and moderate intellectual disability (5 women and 18 men aged between 16 and 36); the training programme lasted for two months, with two sessions per week.	8 tests to assess motor abilities and 9 tests to assess martial art skills with associated descriptions of the essential characteristics, developed by a special team of martial arts experts (judo, karate, boxing and fencing) and population of people with ID at the Faculty of Sport in Ljubljana.	After the training, positive changes in motor abilities and motor skills of Gan judokas had been noted by improving motor abilities and expanding the boundaries of skills, people with intellectual disabilities enhance their quality of life.
Pečnikar Oblak et al. 2016 [33]	Measurements of grip strength in G-judo (judo for athletes with diverse abilities) group.	Quantitative research; 17 judokas with ID (intellectual disability); 4 girls and 13 boys.	Dynamometer Camry EH101	The average value of the right dominant handgrip strength of $21.3 \pm 9.3$ kg and the left non-dominant handgrip strength of $19.27 \pm 7.83$ kg was identified. A statistically relevant difference between the dominant and non-dominant handgrip strength in G-judokas (DIN-R hand, DIN-L hand) $t(14) = 2.92, p = 0.011$ was found.
Suorsa 2016 [35]	Health promotion among intellectual disabled people through physical activity (judo).	Practice-based thesis; 5 people participated in two judo lessons in cooperation with local judo club Yawara.	Evaluation through written and verbal feedback questionnaire, Piper's nurse health promotion model, definition of people with intellectual disabilities as defined by Rintala et al. [55] guidance of persons.	Increased participants' enthusiasm to exercise. When promoting health among intellectually disabled people through physical activity, the focus should be on the activities.
Tomey 2017 [36]	Effects of a modified judo program on psychosocial factors in typically developing and children with autism spectrum disorder.	Mixed-methods study, 5 children with ASD and 5 TD children (age from 7 to 11) who participated in 10 sessions of a modified judo program during their typical physical education time for school.	Focus group discussions; semi-structured interviews; observation; audio-recorded.	Participants found the program to be enjoyable. The school staff observed improvements in psychosocial health and behaviour. Increased self-confidence was mentioned by all participating school staff.
Pečnikar Oblak et al. 2018 [17]	Inclusive judo and the ethics of involving athletes with special needs in the regular sports environment; inclusion theorists; review of research in the field of inclusive judo in Slovenia.	Qualitative-descriptive method; an overview of research in the field of inclusive judo in Slovenia.	Review of a) international and Slovenian documents in the field of inclusion ethics in sports, b) theorists of inclusion, c) existing research on the topic of inclusive judo in Slovenia.	15% of the world population represents people with disabilities; only a few inclusive sports clubs in Slovenia; 4 pieces of research conducted in the field of inclusive judo in Slovenia; poor national sports education plan for young athletes with a disability.

References	Issues	Design and sample	Measurement tool	Findings
Rodríguez Martín 2018 [34]	Evaluation of judo practice effects in ADHD children level of attention, level of hyperactivity and level of impulsivity.	Pre experimental investigation project on one group of children with ADHD diagnoses. The study population is 5 boys and girls between the ages of 7 and 10 at the selected school.	Observation; questionnaire; statistical package for the social sciences (SPSS); Microsoft Excel. The evaluation of the intervention will be similar to that carried out for the diagnosis of ADHD, taking as a starting point the opinion of the parents or legal representatives as previously explained in the data collection section and external observation as main tools that evaluate the intervention in each session.	The study provides data on the benefits of practicing martial arts and specifically Judo in children with ADHD.
Kunčič 2019 [19]	The analysis of inclusive judo matches.	Quantitative, descriptive and causally nonexperimental; observation and analysis of judo matches, checklist technique, 33 competitors: 9 women, 24 men	Camera model Canon Legria HF R706; analysed by two experts of sport and rehabilitation pedagogy, IBM SPSS Statistics 22, Excel 2016, t-test, Levene test, Shapiro-Wilko test, Mann-Whitney test, hi2 test, Kullback test.	The time structure of inclusive judo is different. 13 different judo techniques were shown: 9 throws, 3 hold-downs. The most frequently performed throws in inclusive judo are: osoto o toshi, ko soto gake, seoi toshi and one hold-down called kesa gatame; 78,8% of competitors ended before the regular time. No significant differences between men and women were noted.
Renziehausen 2019 [39]	Effects of a 10-week judo program on cortisol and stress in children with autism spectrum disorder.	Mixed-methods design; 10-week judo program, 20 children with ASD, mixed-methods convenience sample of 11 adolescents and 9 children, recruited from Center for Autism and Related Disabilities (CARD).	Stress Survey Schedule, Actigraph GT9X accelerometers, Paired samples t-tests, measures ANOVA.	Acute changes in cortisol levels may be seen following one session of judo. Subscales of the parent-reported questionnaire may also show improvements following 10 weeks of participation in a judo program.
Rivera 2019 [37]	The impact of judo on aggressive behaviours in youth with autism spectrum disorder (ASD).	The proposed study was a part of a larger, ongoing mixed-methods study examining the effects of an 8-week judo intervention in youth with Autism Spectrum Disorder (ASD). 33 children (ages 8-17); 8-week judo program (45 minutes, 1x week).	Overview of original study; questionnaires; measurement of sleep quality: actigraph GT9X accelerometers; a modified version of the Aberrant Behaviour Checklist (ABC).	A strong association between class attendance and lower ABC scores were observed, along with improvements in moderate to vigorous physical activity (MVPA) and sleep quality. Future studies should include larger samples of youth with ASD over a longer intervention period.
García et al. 2020 [38]	Efficacy of a judo program to promote physical activity in youth with autism spectrum disorder (ASD).	The mixed-methods study, demographic/anthropometric measures; 14 youth (ages 8–17) with a formal diagnosis of ASD; 8-week judo program (45 minutes, 1x week).	Demographic questionnaire; calibrated standard medical scale (439 Physician Scale; Detecto, Webb City, MO); two measures were used to assess the effects of the program on moderate-to-vigorous physical activity (MVPA) and sedentary behaviour (SB): (1) changes in objective measures of MVPA and SB and (2) continued participation in a second judo program (or similar program); physical activity and sedentary behaviour were assessed using the ActiGraph GT9X accelerometers (ActiGraph Inc, Pensacola FL).	Participants attended the majority of the judo sessions and 50% of the sample continued participation results showed favourable increases in MVPA.

**Table 2.** Studies identified as essential for review of people with ID and others who due to some specific psycho-physical condition or illness cannot be part of so-called mainstream (emotionally disturbed, adolescent offenders with mild mental retardation).

References	Issues	Design and sample	Measurement tool	Findings
Gleser & Lison 1986 [15]	Judo as therapy for emotionally disturbed adolescents: A pilot study	Qualitative research of 10 adolescents aged 14 to 18 years; 5 months, twice a week participated in a special judo class at the beginning and later joined regular judo club classes.	Participant observation method.	1. Physical consequences - beneficial effects on the musculoskeletal, neurological and cardiorespiratory systems. 2. Psychological consequences: improved mood, acquiring a more real body image, mastery over the body and will, reduction of anxiety level, emotional stability, higher frustration tolerance, increase of security, self-sufficiency and self-esteem, generalization of the experience, maturation of defences, increase socialization.

References	Issues	Design and sample	Measurement tool	Findings
Greene 1987 [16]	Comparison of the effects of judo training and socialization games on the collateral maladaptive behaviours and self-concepts of mild mentally retarded male adolescent offenders.	Quantitative research of 20 males aged 16-18 years; 10 in the judo group and 10 in the socialization games treatment group; 20 weeks of judo instruction 1h per week.	Self-concept was measured utilizing the Tennessee Self Concept Scale. Adaptive functioning was measured utilizing the AAMD Adaptive Behavior Scale.	<ol style="list-style-type: none"> <li>1. The use of a two-factor mixed design is appropriate for this type of investigation.</li> <li>2. Judo training may be a more effective vehicle for promoting improvement in maladaptive behaviours than a socialization games program.</li> <li>3. Gross motor aspects of judo training appear to connect well with the physical orientation of a delinquent population and the martial nature of judo appears to institutionalize the delinquent person's behaviour and works toward their strength.</li> </ol>
Gleser et al. 1992 [25]	Physical and psychosocial benefits of modified judo practice for blind, mentally retarded children: A pilot study	Quantitative research of 7 blind, mentally retarded children with associated neuropsychiatric disturbances 6 to 12 years old, 6-month judo program twice a week	N >6 Wilcoxon matched-pairs signed-ranks test was used. When there was no change in the pair, the binomial test was used to measure success. Assessments included 4 areas. (1) Orthopedic and neurologic, (2) Physical fitness, (3) Developmental Level, (4) Overall psychosocial functioning.	Analysis indicated improvements in physical fitness, motor skills, and psychosocial attitude.
Burnik & Brod 2006 [40]	Judo for children and youngsters with a moderate disorder in mental development	An example of good practice in Judo club Bežigrad; 8 children and adolescents with moderate intellectual disabilities from 14 to 20 years old; spring semester; 1 hour per week	Observation with active participation.	Practicing judo had a positive effect on children both physically and mentally. The important fact is a different environment (judo club instead of school). Socializing was beneficial to anyone who participated in the cycle of judo practice.
Aguiar et al. 2008 [41]	The effects of a supervised judo training of controlled intensity and monitored on the basis of lactate threshold on the blood oxidative stress status and motor coordination of young adults with Down's Syndrome (DS)	Quantitative research; 21 young adults with Down's Syndrome; lasted 16 weeks, three sessions per week	physical examination, review of the karyotype report from each individual's medical record, the Gross Motor Function Measure (GMFM) 88, Measurement of the exercise intensity, blood sampling, Oxidative stress assays, Antioxidant enzyme assays, Statistical analysis	The exercise improved the motor function and significantly decreased lactate production . . . Physical exercise can improve motor disabilities in people with DS.
Boguszewski et al. 2013 [26]	The effectiveness of judo sessions as a supplementary therapeutic method dedicated to children with mental retardation.	Quantitative research; a group of 73 children (38 girls and 35 boys); 2 groups: experimental and reference group	The research tool was an authorial survey (consisting of 21 questions), filled in by the parents of children suffering from mental retardation.	<ol style="list-style-type: none"> <li>1. Judo is a utilitarian form of movement;</li> <li>2. Considerable differences between the standard and non-standard therapy methods for the benefit of judo.</li> </ol>
Ion-Ene et al. 2014 [24]	Research proposal: Judo adapted to the therapy of disabled children	Professional article on terminology, models of disability, why is judo adapted, project motivation from different points of view (motor skills, economic, psycho-pedagogical, social)	Research proposal on study of specialised literature; the historical method; case study – interview; observation or documents; the testing method – psychomotor skills, the, statistical mathematical method – statistical significance, the graphic method; the table method.	Research proposal: review of practice in EU countries; rethinking of educational process for disabled children; judo didactic design for disabled children; application into Romanian Judo Federation coaching system and judo clubs; publishing a theoretical-methodological paper.
Tatalović 2014 [42]	Balance among a selected group of judo players with intellectual disabilities	Qualitative research - case study; 5 adults with moderate intellectual disabilities;	Bruininks-Oseretsky test of motor proficiency	The results show an improvement of balance after completing the three-month exercise program.
Peck 2016 [43]	Annual California State University at San Bernardino's (CSUSB) DisAbility Sports Festival	Bulletin; Blind Judo Foundation; Riverside Youth Judo Club (RYJC) has 52 out of 200 students with various developmental disabilities who are finding judo of rehabilitative value.	announcement, news	Some judokas have walked, run and jumped for the first time in their life; RYJC will be hosting the first ever "US Special Needs Judo Championships" in March 2017
Mosler & Kalina 2017 [2]	Possibilities and limitations of judo and innovative agonology in the therapy of people with mental disorders and also in widely understood public health prophylaxis	Quantitative analysis of scientific papers regarding judo in title and theories of agonology; theoretical and empirical argumentation. Web of Knowledge resulted in 1,264 records (Core Collection + Research Journal of Budo) from 66 different countries.	Web of Science tools. Records were ranked in following fields: authors, countries/territories, general categories and research areas, journal.	<ol style="list-style-type: none"> <li>1. Science categories: sports sciences (72%), internal medicine (15%), physiology (14%), rehabilitation (5%), neuroscience neurology (4.5%) and pathology (3.5%). Sports orientation is dominating over health promotion and public health medicine.</li> <li>2. Model of cognitive-behavioural prophylactic and therapy innovative agonology</li> </ol>

References	Issues	Design and sample	Measurement tool	Findings
Hamana 2018 [44]	Observations of the 1st World Championship for judoka with an intellectual disability held from October 10th to 22nd, 2017, in Cologne, Germany.	Report article; competition of judokas with intellectual disability (IQ below 75), 102 participants, age 16+	Observation of the competition.	World championship can be considered a huge success for the future of competitive judo for intellectually impaired athletes. The support of the IJF will be crucial for the further development. 4 important points: establishment of referee rules considering safety; training of referees who are familiar with judo for people with intellectual disabilities (ID); promotion of understanding of persons with ID for judo leaders; international dissemination.
Takahiro 2018 [14]	All Japan Judo Federation will hold the 1st All Japan ID (Mentally Disabled) Championship at the Japanese Culture University in Hachioji, Tokyo on the 17th of September 2018.	Bulletin; Teller Report;	announcement, news	Judo of disabled people is organised within the Japan Federation for the Visually Impaired. Representatives also attended Special Olympics events. However, domestic development was delayed in popularization due to lack of leaders.
Krga 2019 [18]	Inception of inclusive judo in Serbia	Professional article presented and published on the 5th International Scientific Conference 07.12.2018, Belgrade, Serbia; over 40 people of all ages with different disabilities have attended training sessions of inclusive judo, 35 of which have maintained continuity.	Report of inclusive judo development.	The goal of this programme is popularisation of sports for persons with disabilities through specially adapted sports and recreational activities in the forms of judo.

### Preliminary selection of articles

The search identified 56 records from databases and 13 through additional resources (Figure 1). After removing duplicates, 39 articles from the EDS databases and 13 articles from other sources have been screened. All reviewed articles were divided into five categories after reviewing the abstract: A – judo relating to intellectual disability is the main topic; B – judo and intellectually disability are not the main topics, they are only mentioned; C – judo is the main topic relating only to mainstream judo; D – intellectually disability is the main topic, refers to other sports, judo is not even mentioned; E – nor judo nor intellectual disability are the main topics, and they are not even mentioned (for example, the topic of brain injury). After screening, 12 unique citations from the database and 13 from other sources were screened for eligibility and reviewed one more time by reading their full texts. The final articles included in the current review resulted in 24 documents, 11 articles from databases and 13 from other sources. The reviewed articles from databases were published between the years 2001 and 2019 and from other sources between 1986 and 2018. Most of them are from the period 2016 to 2019, which shows faster development of the profession in recent years. An important development of the field is also observed in the period 1974-1979 (Table 3), which we learn mainly from the two oldest articles presented here from 1986 [15] and 1987 [16]. “*What is*

*known, however, is that judo and the martial arts have been used as a therapy with mentally, emotionally, behaviorally, and physically disabled populations of all ages and genders.*” [16].

### Criteria for the presentation of the results of the review

The data shown tables are arranged as follows: 1<sup>st</sup> column – Authors information, 2<sup>nd</sup> column – Issues, 3<sup>rd</sup> column – design and sample, 4<sup>th</sup> column – measurement tools and 5<sup>th</sup> column – findings.

Table 2. contains some publications that cannot be broken down into previously listed categories. However, we have partially placed the articles, as they seem essential for reviewing the judo of people with ID.

## RESULTS

The authors of selected articles examined various aspects of the effects of judo on people with diverse abilities: in Table 1 deal with four topics related to judokas with autism, one article with judokas with attention deficit hyperactivity disorder (ADHD) and six with intellectual disabilities – the number of participants is small, from a minimum of 5 to a maximum of 33; the publications from Table 2 address two topics to judokas with predominantly behavioural



**Table 3.** Important studies from period 1974-1979 reviewed from Greene [16].

Author	Screened by Greene [16]
Portuondo and Landry 1974 [45]	The authors at a hospital for disturbed children, aged 12 years and under, reported on their trial of judo as an activity for therapy. Classes were taught by a qualified judo instructor supervised by the chief recreation therapist. Using staff observations, results of the program were assessed in terms of behaviour on the ward and in the hospital's school, behaviour with peers, and in performance during the judo sessions. The number of fights were recorded daily. Precise behavioural data were not presented in the published article, but of 50 children in the program, all 8 of the aggressive girls and 13 of the 15 aggressive boys were considered improved, and in the passive group, 3 of the 6 girls and 16 of the 21 boys were considered to have developed more confidence and were less withdrawn. Forty of the 50 residents were deemed to have benefited from the program. With respect to fighting, there was no reported incident of improper use of judo techniques outside of the classroom, and there was a clear decrease in the number of fights instigated by aggressive judo students. As two of the club members were passive, a recorded increase in their fighting was considered favourable to adjustment.
Van Krevelen 1974 [47]	Research projects carried out at the "Sportbelange fur das behinderte Kind" an institution interested in furthering the sports activities of children with physical and mental difficulties, demonstrated an increase in motor control, improvement of self-defence and enhanced self-esteem in mentally retarded youth following training in judo. They add, however, that community residences for the "feeble-minded" do not reject judo activities, but medically supervised institutions for the feeble-minded refuse to apply it to their patients in Holland.
Davis and Byrd 1975 [50]	The research by authors studied the effects of 12 weeks of judo instruction on 16 educable mentally retarded boys enrolled in the occupational education unit of a junior high school. Pre- and post-experimental evaluation of personality, achievement, and physical fitness was accomplished through the use of the California Test of Personality, the Wide Range Achievement Test, and the American Association for Health, Physical Education and Recreation Special Fitness Test. The experimental group participated in a one hour a day, three days per week, twelve-week class in judo. Test data were analysed by analysis of covariance and showed significant changes in total adjustment and some measures of fitness. No significant improvements were made in academic achievement. The authors concluded that instruction in judo is of value in remediating some of the social, emotional, and physical problems common to the educable mentally retarded.
Ross 1975 [46]	Author described frequent teaching of the martial arts to various populations of persons with disabilities, indicating that the mentally retarded have often been excluded from such programs as incapable of acquiring the necessary judgement for self-control; an opinion that she does not share from her experiences in teaching karate. The effective elements of karate appear similar to those attributed to judo- an avenue to emotional and physical control and desirable attitudes achieved through practice and the emulation of the karate ideals. Classes are formal and ceremonial, beginning with the bow, disciplined line-up, warm-up exercises, and then instruction. Students are respectful and must behave seriously while in the special setting. Author states her affirmation of the rehabilitative value of the martial arts teaching must be conducted by a person committed to the philosophical implications of the origins of these arts. The teacher must be an example and must adhere to the traditional formality which conveys that the activity is not a game and that self-control is the goal.
Amirpour & Shurawski 1979 [48]	The authors investigating the efficacy of judo as an adjunct to rehabilitation, formed a judo group with twenty children, 9 to 15 years old, who received treatment at a centre for developmental diagnostics and paediatrics. The children suffered primarily from more or less pronounced cerebral motor disturbances. Other functional disturbances such as perceptual disorders, language and reactive behavioural disturbances completed the picture of minimal brain damage. The training program attributed more importance to functional judo exercises than to perfect judo techniques.
Greene et al. 1980 [49]	After 15 months of judo training, the authors reported that improvements were observed in the motor, psychological and perceptual fields. Authors tested the effectiveness of judo for improving the academic performance of disabled youth on arithmetic, spelling, and reading scores. Seventeen middle school students, consisting of 12 males and 5 females enrolled in the same learning disability program were assigned to either a judo group or control group. The treatment group received the regular LD school program and was treated with one hour of judo per week. The control group also received the same LD programming and one additional hour of unstructured attention per week. The treatment lasted for 18 weeks- a span of three grading periods. A time by treatment analysis of variance was performed on the subject's grade point averages in the three academic areas of interest. The authors report that the group treated with judo showed significant increases in both arithmetic and spelling performance. Of further interest was the finding that the control group showed an overall decrease in spelling and arithmetic performance. Reading performance, however, did not appear to change as a function of judo.

disorders, one topic to judokas with Down syndrome and ten topics to judokas with intellectual disabilities – the number of participants ranged from 5 to 73. The issues covered in Table 1 and Table 2 differ widely, as do the designs and measuring instruments. The research results support the research question in all articles, mostly positively.

Greene [16] published short summaries of earlier research on judo as a stimulating environment for the implementation of various therapeutic programs in his dissertation. Table 3 contains a transcript of the summaries and the authors cited by Greene. Unfortunately, the full texts were not available to us, as they are older publications from the 1970s.

### Results from Table 1

The impact of judo practice is being studied by Dadič [1] and Rivera [37] whom both find that practicing judo has positive effects. Dadič [1] inspected five persons from a special social welfare institution in Koper, Slovenia and concluded that sports (judo and others) breaks the taboos of what disabled people are capable of and strengthens self-image, participation in society and opens better opportunities for personal development. Rivera [37], who submitted a thesis in partial fulfilment of the requirements for the degree of Master of Science in the School of Kinesiology and Physical Therapy in the College of Health Professions and Sciences at the University of Central Florida Orlando, USA researched the influence of judo training among

33 young people with autism spectrum disorder (ASD) from Centre for Autism and Related Disabilities (CARD) in correlation to their aggressive behaviour and showed that judo intervention helped increase health behaviours and reduced total sedentary behaviour. Masleša et al. [51] also records that after the judo training, positive changes in motor abilities and motor skills of 23 Gan judokas from Ljubljana and Koper, Slovenia had been noted. Pečnikar Oblak et al. [33] performed measurements of grip strength in G-judo group where a statistically significant difference between dominant and non-dominant hand was found. In the process of data acquisition, it became clear that we can use hand dynamometer to determine the dominant hand of people with special needs, which cannot or do not know how to write. Rodríguez Martín [34] presented a graduate project on advantages of judo practice in children with ADHD as a pre-experimental investigation of 5 children with ADHD from a private school for early childhood and primary education in the Community of Madrid, Spain and will research of how the benefits of judo effect on the level of attention, level of hyperactivity and level of impulsivity. Tomey's [36] thesis submitted in partial fulfilment of the requirements for the Honors in the Major Program in Sport & Exercise Science in the College of Education and Human Performance and in the Burnett Honors College at the University of Central Florida, Orlando from the University of Central Florida, USA and found that modified judo program has positive effects on psychosocial factors in typically developing (TD) and children with autism spectrum disorder (ASD) since all participants, 10 children and school staff, reported their desire to continue with the program. Suorsa's [35] thesis of the Degree program in Nursing, reports of increased enthusiasm that was noticed among 5 people with an intellectual disability included in two judo lessons in cooperation with local judo club Yawara, Finland to promote health. Pečnikar Oblak [17] from Faculty of Sport in Ljubljana seeks the foundations for the ethical inclusion of people with disabilities in ordinary sports environments in documents such as the White Paper on Sport, United Nations Convention on the Rights of Persons with Disabilities, European Disability Strategy 2010-2020 and others. Garcia [38] from Department of Health Sciences, College of Health Professions and Sciences, University of Central Florida, Orlando and in cooperation to School of Kinesiology and Physical Therapy

and Center for Autism and Related Disabilities examine the preliminary efficacy of an 8-week judo program to promote physical activity and reduce sedentary behaviour also notes that a judo program may be well-received by youth with autism spectrum disorder (ASD). In her master's thesis on Faculty of Education, University of Ljubljana, Kunčič [19] performed an analysis of the judo fights of the first Slovenian national championship in inclusive judo in 2017, such as time used to win the point, used techniques, differences between men and women, etc. Renziehausen [39] presents the effects of a 10-week judo program on cortisol and stress in children with ASD in a thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in the School of Kinesiology and Physical Therapy in the College of Health Professions and Sciences at the University of Central Florida, Orlando. Research is part of an already existing study to examine the effects of a 10-week judo program on children with ASD. The purpose of this study was to determine if judo practice could decrease stress and cortisol levels in children with ASD. Although changes were not significant, the findings support that the use of judo attenuates stress and cortisol level. Judo also contributed to several positive changes in participants' behaviours and it may also be beneficial to developing social skills and adapting to unfamiliar situations.

## Results from Table 2

A pilot study published in 1986 by Gleser & Lison [15] refers to judo as a therapy for 10 emotionally disturbed adolescents from Jerusalem in Israel. The first author is from the Department of Psychiatry, Hadassah University Hospital and the second is from Bnai Brith Women, "Beth Hana" Group House for Boys. The article from the 1980s is based on a medical model, but the results already show modern tendencies of inclusion, as the authors note: improved mood, a more real body image, mastery over the body and will, reduction of anxiety level, emotional stability, higher frustration tolerance, an increase of security, self-sufficiency and self-esteem, a generalization of the experience, maturation of defences and increase socialization, which is the basis for the appropriateness of another approach, where the subject of research is a person with many abilities, i.e. for a social model of disability. Greene's dissertation [16] is important to us for two reasons. He did an excellent review of the literature on judo in the 1970s in relation to people

with intellectual disabilities (Table 3). His results lead us to important beginnings and help us to understand the medical model of disability better. His research compares the effects of judo training and socialization games of 20 mild mentally retarded male adolescent offenders from a private residential treatment facility in central Ohio. The researcher presented his work for the degree of Doctor of Philosophy at Graduate School of Ohio State University in the United States of America. Gleser et al. [25] again presents the pilot study that was designed to investigate the therapeutic application of modified judo practice. Seven children from 6 to 12 years old with multiply disabilities and residents of the Keren or the Jewish Institute for the Blind (Jerusalem) participated in the study. Gleser is from Division of Mental Health, Ministry of Health, Israel this time and some others from Department of Orthopedic Surgery, Hodossah Medical Center, Jerusalem then Jerusalem Osteoporosis Center and Department of Geriatric Medicine, Herzog Memorial Hospital, Jerusalem which indicates the medical model approach. Burnik & Brod [40] presented physical education for children and youngsters with moderate and severe disorders in mental development in the educational program where they find judo practice as one of the possibilities for integration and influence on coordination, flexibility, strength and social relationship. Aguiar et al. [41] study evaluates the effects of judo training, which uses gross motor skills as a fundamental aspect of the technique, on the blood oxidative stress status and motor coordination in young adults with down syndrome. Researchers come from Brazil institutions such as experimental laboratory of neurodegenerative diseases, laboratory of physiology and biochemistry of exercise, physiotherapy and physiological sciences. The primary cognitive goal of the Boguszewski et al. [26] research was the effectiveness of judo sessions as a supplementary therapeutic method dedicated to 73 children with mental retardation. The study was conducted in Poland, Warsaw. Researchers come from: rehabilitation department of medical university and, theory of sports department, academy of physical education. Ion-Ene et al. [24] and other authors come from Romanian universities and one of them from the school sports club. The article is a research proposal about teaching judo to disabled children in the educational system and Romanian Judo Federation within the framework of the training stages for judo and implementing the concept of disabled children's

training in sports clubs. Tatalović [42] from the Faculty of Education in Ljubljana, explores the level of balance of a selected group of 5 judokas with intellectual disabilities before and after a three-month exercise program. Peck [43] presents Annual California State University at San Bernardino's Disability Sports Festival where The Blind Judo Foundation spearheaded judo not only for the blind and visually impaired but as a sport for all disabilities. Mosler & Kalina [2] from Department of Sport, Faculty of Physical Education, Institute Physical Education, Tourism and Physiotherapy, Poland presents possibilities and limitations of judo and innovative agonology in the therapy of people with mental disorders. Takahiro's [14] announcement from Teller Report is about All Japan ID (intellectually disabled) Championship from September 2018 in performance of All Japan Judo Federation. Krga's [18] presentation of inclusive judo beginnings in Serbia was published in the 5<sup>th</sup> International Scientific Conference. Hamana [44] from Faculty of Law, a member of the All Japan Judo Federation team, reports about observations of the 1<sup>st</sup> World Championship for judoka with an intellectual disability held in Germany in 2017.

### Results from Table 3

As mentioned before, Table 3 is a copy of short summaries of research results from the 1970s that Greene [16] found in a literature review in 1987 and which refer to judo practice for people with different abilities. We also explained earlier that we could not find the original articles because they are older and have included them later in this paper because we found them last. However, we did not want to ignore them, as they are an essential complement to the review of judo for people with intellectual disabilities. Šomen et al. [52] believes that judo is suitable for various therapies, but also for recreational activities and, of course, for top-level sport. Under the aspect of usefulness of judo Table 3 shows therapeutic, rehabilitation, improved motor control, measuring fitness, self-defence, self-esteem, explores the impact on psychological and perceptual fields, improving in academic performance, all of which is still very important today. Nevertheless, it can be said that the period of 50 years (1970-2020) shows the evolution of the usefulness of judo, which finally allowed the development of the sports discipline, or more precisely the sport called judo for ID, which is now on the rise in the 2020s [14, 19, 44].

## DISCUSSION

The literature review on inclusion in judo, inclusion of persons with intellectual disabilities and others with various psycho-physical conditions, diseases or disorder, points to various aspects of describing this area. They can be roughly divided into 3 subgroups, namely:

**Social perspective** covers the importance of equal integration of judokas with diverse abilities into regular sports clubs [1, 17] in Table 1 and the possibility to use results of the research projects in the educational system specific to the disabled children and also popularization of judo for all, integration and socialization [18, 24, 40] of people with intellectual disability in Table 2.

**Medical and psychological aspect** points out to the impact of judo on certain psycho-physical characteristics of persons with autism disorder and ADHD and exposes promotion of the health of persons with special needs through judo in Table 1 [34-39]. Further, in Table 2 and Table 3, we find benefits in a range of judo influences on young people with behavioural disorders that are minimally intellectually impaired for a variety of reasons, on youth with cerebral palsy and positive progress of modified judo practice and effects of a supervised judo training on young adults with Down's Syndrome, judo as a therapeutic method and judo for public health prophylaxis [2, 15, 16, 25, 26, 41].

**Physical and sports aspect** reveals an exploring of the motor abilities of judokas with intellectual disabilities, an analysis of inclusive judo matches in Table 1 [19, 33, 51] and further balance among judo players with intellectual disabilities and reports of disability sports festival in California State University at San Bernardino's, All Japan ID (mentally disabled) Championship in Japan and World Championship for judokas with an intellectual disability in Germany [14, 42-44] in Table 2.

We excluded articles relating to judokas with exclusively physical disabilities, which do not affect their intellect. The authors that cover an area of judokas with physical deficits or disease we came across when searching for literature are, for example, Zakirov [9-12], Neofit & Ion-Ene [53] and Murata et al.[54]. Zakirov [9-12] writes about judokas with impaired vision or impaired hearing, also with spinal cord injury, or with a violation of the musculoskeletal system. Neofit & Ion-Ene [53] shows improvements of

scoliosis in children as a result of a kineto-therapeutically program with exercises adapted from judo. Murata et al. [54] presents that a purpose of the study was to describe the number of concussions and to describe which of 14 contact and collision sports had the highest rate of concussions in 67 Hawai'i high schools across school years 2010-2016. When evaluating concussion rate per 1000 exposures, girls' judo was the highest. Both research methods and measurement instruments are different in the here analysed articles. We reviewed 2 qualitative, 3 quantitative, 4 mixed-method design, 1 pre-experimental investigation project and 1 practice-based thesis in Table 1 and 4 quantitative, 1 qualitative, 4 professional articles and 2 reports in Table 2. The final findings can also be summarized in the 3 previously mentioned subgroups:

Through **the social aspect**, we see that judo significantly effects on the quality of users' lives and breaks the taboos of what judokas with disability are capable of [1, 52], it also destigmatizes, normalizes and integrates [31]. Some athletes with a disability are deprived of their basic human needs. The quality of a person's life also very much depends on social conditions, that is why the ability to choose, to participate in social life and to decide [17] is so important. Because people with disability have great confidence in professionals, a great responsibility from professionals is needed [18]. Burnik & Brod [40] found out through observation and active participation in judo practice that it improves mental and physical well-being, socialization and integration of children with intellectual disability, although the exercise took too little time to bring about concrete and measurable changes in physical terms, but they believe that inclusion of children with special needs in sports clubs undoubtedly contributes to integration. Sports activity in judo is one of the possible factors for strengthening self-image, participation in society [24] and better opportunities for personal development. Ethics of inclusion requires collective creativity where all actors: individuals, families, state systems and politics work in the direction of equal integration. Rutar et al. [20] states that inclusion cannot be national integration of people with disabilities into social life as people with disabilities already are a part of social life – they do not live in an empty space. General involvement of judokas with different abilities and skills in a regular judo club is possible and allows a positive experience to all members.

Authors of the **medical and psychological aspect** mostly conclude that the main limitation in the presented studies is the sample size. Results cannot be generalized, and there are also no studies to compare outcomes. Greene [16] points out that judo and the martial arts were used primarily as therapy for mentally, emotionally, behaviourally and physically disabled people of all ages and genders. The major limitation of his research, which compared judo training and socialization games between mild mentally retarded male adolescent offenders was the fact that the author was the sole instructor for both treatment conditions. The results showed, among other things, that judo training can be a more effective vehicle for promoting the improvement of maladaptive behaviour than a socialization game. Gleser & Lison [15] as authors from the 1980s similarly researched in an adolescent residential group house where 10 emotionally disturbed boys lived and found positive effects on the musculoskeletal, neurological and cardiorespiratory system, an improved mood, acquiring a more real body image, mastery of the body and the will, reduction of the level of anxiety, emotional stability, higher frustration tolerance, increase in security, self-sufficiency and self-esteem, generalization of experience, maturation of defences and increase in socialization. Their problems in the study were: (1) judo as only one intervention in a comprehensive treatment program; (2) the boys started the class without judo uniform, which may have had an unknown influence on the outcome; (3) on the days when the most popular youth workers were present, the class was more disciplined; (4) the judo teacher had also received training in psychiatry so that his ability to understand, interpret and offer different possibilities and reinforcements was greater than that which a normal judo teacher could offer. Rodríguez Martín [34] concludes that one aim of evaluation of judo practice effects in ADHD children was to recommend judo practice while encouraging research on the benefits of specific sports for specific health problems. Suorsa [35] similarly notice some beneficial aspects of health promotion among people with an intellectual disability through physical activity such as judo. Those who organize the sports activity gain valuable mentoring experience from the target group, participating people with developmental disabilities receive information about the effects of exercise on health, an opportunity to try a new sport and gain social benefits of physical activity. Tomey [36] overall notices positive experience and observes benefits as a result

of the judo program and continues that the use of an inclusive environment is highly encouraged to increase the well-being of all participants. Despite positive feedback from the staff, teachers, and participants of the program, there were no significant quantifiable psychosocial improvements at the cessation of the program. The reason could again be a small sample size, also the short duration of the program and the inability to monitor outside lifestyle factors. The impact of judo on aggressive behaviours in youth with autism spectrum disorder (ASD) that was examined by Rivera [37] showed that although no significant differences were noted in behaviours before and after judo sessions, there was a strong negative correlation between inappropriate behaviours and a total number of classes attended. There was also an improvement in sleep duration. Feedback from the intervention was overall positive from participants and parents. A limitation was again the small sample size. Future studies should examine a longer intervention in order to see larger improvements. A frequency of two sessions per week may be necessary to elicit significant changes in behaviours. Renziehausen [39] who examined the effects of a 10-week judo program on cortisol and stress in children with autism spectrum disorder (ASD) indicated that there was a decrease in acute levels of cortisol before and after one judo session. Although changes were not significant, the findings support the use of judo to attenuate stress and cortisol levels in this population. Staff and participants' parents supported the implementation of a judo program as it contributed to several positive changes in participants' behaviours. Limitations were: sample size, the duration of the study, some additional measurements such as circadian rhythm production of cortisol are missing and some circumstances like the use of medication of participants could be included. Garcia et al. [38] notices that participants with autism spectrum disorder (ASD) attended the majority of promoting judo program sessions and 50% of the sample continued participation in judo or a similar martial arts program following the 8-week program, suggesting that a judo program may be well-received by this population. Preliminary results showed favourable increases in moderate-to-vigorous physical activity (MVPA) although causation cannot be inferred. Given the novelty and limited sample size of the pilot study, more studies are needed to support the findings. Gleser et al. [25] indicates improvements in physical fitness, motor skills, and psychosocial attitude

after a 6-month judo program of 7 children with visual impairment and with intellectual disability. The pilot study showed that the changes were not based on natural growth because the examination performed five months later showed decreased functioning or scores. The study is limited by the small number of participants, the difficulties of assessing the validity of findings, problems in devising appropriate assessments for such a population as well as the lack of control and comparative groups. Aguiar et al. [41] reports that the results of supervised judo program of 22 young adults with Down's syndrome reinforce the notion that physical exercise can improve motor disabilities, but it must also be conceded that the study was performed with a small number of subjects and therefore, the generalization of the results must be limited. Boguszewski et al. [26], who researched judo sessions as a supplementary therapeutic method among 73 children with intellectual disability, concluded that judo is a utilitarian form of movement and beneficial therapy method. He recommends that the research may serve as the basis for further scientific exploration, cyclic research on larger, randomized groups, applying objective research tools. Mosler & Kalina [2] find the concept of judo and innovative agonology coherent and useful in the therapy of people with mental disorders and also in widely understood public health prophylaxis.

**Physical and sports aspect** is sovereignly represented in 7 publications, of which 4 are surveys and 3 are an event-announcements or event-reports. Masleša et al. [51] measured motor abilities and selected martial art skills in 23 judokas with mild and moderate intellectual disability. The study was conducted using 8 tests to assess motor abilities and 9 tests to assess martial art skills. After the training process, positive changes in motor abilities and motor skills of Gan judokas had been noted. He concludes that the effects of the training program should be verified in future studies and it is worth reiterating that by improving motor abilities and expanding the boundaries of skills, people with intellectual disability enhance their quality of life, their engagement in sport and in their lives in general. The initial measurements of dominant and non-dominant handgrip [33] in judokas with special needs by a digital dynamometer have shown a statistically relevant difference in left-hand and right-hand grip strength. Further research into how the use of the dynamometer could simplify the dominant and non-dominant hand determination is

recommended. Measured balance among 5 judokas aged 28 to 42 years with intellectual disability by Tatalovič [42] achieved results corresponding to 5-year-olds. Improvement of balance after completing the three-month-long exercise program was noticed. The limitations of the research are: too small sample, differences in age and gender, the test used offers norms only for children but not for adults, the subjects were not present at all trainings. Official competitions in inclusive judo that go beyond the club level and friendly tournaments are increasingly expanding in different countries since 2017. The documents found here testify to the official national championships, as well as to the European and world championships. With analysing inclusive 42 judo matches and stand-up fights on the 1<sup>st</sup> inclusive judo national championship in Slovenia in 2017 by Kunčič [19] found that time structure was not the same as in general population and judokas used 13 techniques (9 throws, 4 hold-down). Limitations in the research are no similar study on the population, diversity of special needs, age differences and differences in judo knowledge. Judo for all is strongly represented all over the world. A report from a Disability Sports Festival [43] in San Bernardino, USA, shows that diverse events regarding inclusive judo are happening such as a Blind judo foundation actions, Riverside Youth Judo Club finding judo of rehabilitative value and the 1<sup>st</sup> US Special Needs Judo Championships. Similarly, Takahiro [14] reports of the 1st All Japan ID (Mentally Disabled) Championship at the Japanese Culture University in Hachioji, Tokyo on the 17<sup>th</sup> of September 2018 hold by All Japan Judo Federation. The official report on observations of the 1<sup>st</sup> World Championship for judoka with an intellectual disability held 2017 in Cologne, Germany, written by the coach and master of judo from Japan Tomoo Hamana [44], is invaluable. It is an important document with details on the organization, rules, participants and other informational details based on which other similar judo competitions for the intellectually disabled can be organized.

## CONCLUSIONS

The collection of scientific and professional articles and other publications on the subject of judo for people with intellectual disabilities shows a fairly wide representation according to the country of origin. The presented papers and reports are from Brazil, Finland, Israel, Japan,

Poland, Romania, Russia, Slovenia, Serbia, Spain and the USA. The professional and scientific approach is represented in the field of kinesiology, social work, sports, pedagogy, medicine, nursing, physiotherapy, psychology and philosophy. Most of the covered articles ( $n = 15$ ) were written in the period from 2016-2019, and one in 1986, 1987, 1992, 2001, 2006, 2008, 2010, 2013, 2014, which indicates a more intensive expansion of the field in the last three years. We can also find earlier research mentioned by the author Greene [16]; two from 1974 and 1975 and one from 1979 and 1980. The subjects are mostly children and young people with intellectual disabilities. However, some contributions also address specific disorders such as ADHD disorder, down syndrome and autism and in older articles we find: disturbed children, mentally retarded, children with physical and mental difficulties, cerebral motor disturbances and their functional disturbances such as perceptual disorders, language and reactive behavioural disturbances, minimal brain damage, disabled youth. Adults with mental health challenges are mentioned, too. The researchers' findings mainly point to the positive impact of judo practise on people with intellectual disabilities. Due to the small number of subjects and the small number of similar surveys, the results cannot be generalized to the broader population. Research varies greatly by type of research and is therefore not comparable. Judo for people with intellectual disabilities is on the rise and is practiced as a therapy, as for recreation with an emphasis on inclusion, or as a sport with competitions at the level of the World Championships.

## HIGHLIGHTS

Judo for people with disabilities has a long tradition in practice [1] but is rare in science [2].

We find many different types of disability in judo and also diverse expressions in professional literature such as judo for blind, judo for hearing imperative, judo for the deaf, g-judo, judo for disabled people, adaptive judo, special needs judo, judo for all, ID (intellectual disability) judo, inclusive judo, special judo, modified judo etc.

The social model of disability encourages the use of phrases that point out a person with the additional condition or illness in the first place, before putting special condition, for example, "judoka with a disability" and not "disabled judoka".

The question of equal opportunities rises up when we continue with the inclusion of all judokas regardless of their psycho-physical condition or illness. There are certain possibilities for competition in judo but not for all judokas with disability. Judo clubs are open for any person who would like to practice judo in general, but not all coaches and programs are developed to include athletes in an equal manner.

The professional and scientific approach in judo for people with an intellectual disability is represented in the field of kinesiology, social work, sports, pedagogy, medicine, nursing, physiotherapy and psychology.

The researchers' findings mainly point to the positive impact of judo practise on people with intellectual disabilities.

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