

# Body Composition And Motor Skills Of Judokas

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**Abstract:** *The goal of this paper is to determine the role of judo in improving general motor skills and body composition in judokas, which also reflects the importance of this martial art. The research included five original scientific papers. All works satisfied the problem by providing an answer to the problem. The selection of works in the period from 2005 to 2021 was taken as a method. It was concluded that judo has a positive influence and a significant role in improving general motor skills, then it affects the reduction of the percentage of fat tissue and the total amount of fat tissue, and is a form of sport with the aim of improving health and improving motor skills.*

**Keywords—**judo, basic motor skills, body composition

## INTRODUCTION

Before reviewing the body composition and motor skills of judokas, it is necessary to point out the concept of judo, as a martial art. Judo is a Japanese martial art and Olympic sport created as a collection of selected techniques from jiu-jitsu. The founder of judo - Jigoro Kano (1860 - 1938), who mastered several styles of jiu-jitsu, decided to take the best of each style and discard the unnecessary. It is an Olympic discipline, spread all over the world. Some studies have shown that judo athletes have exceptional strength, capacity and flexibility, as well as a small percentage of fat tissue [1,9]. Judo is a discipline of speed and strength and requires a high level of motor preparation of competitors. The effort related to judo is general and activates more than 30% of the body mass, both the upper and lower body, but the arm and elbow flexor muscle groups are the most involved. The aim of this paper is to point out the importance of practicing judo and its influence on the body composition of judokas and their motor skills. On this occasion, several papers were used that are based on research with an emphasis on the influence of judo on body composition and motor skills. The groups of respondents are of different ages and categories, about which there will be more words and a more detailed description in the paper itself. The work consists of four main parts. The first part is the methodological part of the work and it shows the method with the help of which research was carried out on the given topic. The second part is focused on the results of the research. This part of the work contains a presentation as well as a table in which the used works, samples, as well as the results of research. The third part of the paper is a discussion, in which the details of the research are explained, such as the population of respondents, then the motivation of judokas, and discussions about body composition and motor skills [7]. It has been elaborated in detail how judo affects the body composition of people who practice judo, i.e. what is the body composition and what are the motor skills of judo players.

## METHOD

Research data for the purposes of this paper were collected through electronic databases SportLogia, Google Scholar, PubMed and ResearchGate. The search of works was done for the period from 2005 to 2021. When researching databases, the following keywords were used: judo, basic motor skills, body composition, martial arts. The research titles, abstracts and full texts found were then read and analyzed. In order for the research to be accepted for the final analysis, it had to meet two basic criteria: the first criterion refers to the issue of motor skills and body composition in people, and the second criterion is the implementation of the analysis of the works in the selected period. Research that met the set criteria was then analyzed and presented based on the following parameters:

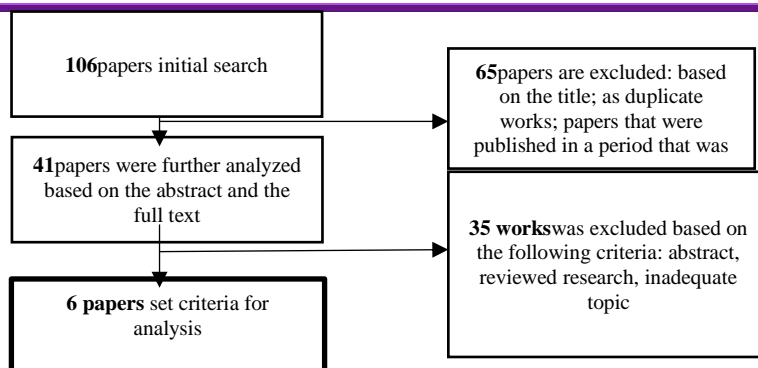
## RESEARCH RESULTS

The procedure of collection, analysis and elimination of found works is shown in Exhibit no. 1.

Based on keywords, 106 works were identified. The number of studies that were immediately excluded based on the title, duplicate papers, as well as papers that were excluded based on the period when they were published is sixty-five, while forty-one papers were included in further analysis.

Through further analysis of forty-one papers, thirty-five papers were excluded based on several criteria: abstracts, because they were systematic review studies, as well as inadequate information needed for our research. The remaining six works met the set criteria, and these were works published in the period from 2005 to 2021.

**View no. 1.** The process of collecting, analyzing and eliminating found works



References	Population	Grouping	Treatment	The results
<sup>6</sup> Witkovski et al., 2021	M	n = 54	TM, PMT	TM increased, PMT decreased
<sup>8</sup> Radjevic, N. 2012	M, 16 GS	n = 32	Variables experimental i control groups: years, sports experience (Si), BH(cm), BW(kg), BF(%),FFM(%), SMM(kg).	E: SMM increased*, BF% ↓* K: SMM increased*, BF% →
<sup>5</sup> Prieske et al., 2020	24 M.-14 GS and 20 F-14 GS	n = 44	-BH (cm), BM (kg), BMI (kg/m2), LBM(kg), BF(%) - HGS (Kg), CMJ(cm), DJ(cm), Y-balance test (dom.) (%), Y-balance test (non-dom.) (%).	LBM, HGS, CMJ= M>F BF% decreased ↔DJ increased BM↑ ↔Y-balance test↑
<sup>3</sup> Franchini et al., 2005	M, Seniors	n = 13	BH(cm), BM(kg),BF(%), MM(%), HGR(kgf), HGL(kgf).	BF% ↔ static power, aerobic power BF% ↔ balance BF% ↔ flexibility BF% ↔ SJFT
<sup>4</sup> Koral et al., in 2009	M = 10 F = 10 Cadets	n = 20	Variables BM and BF(%) code (K) i (E) group of subjects 4 weeks before (T1) and one day before (T2) competitions: BM(kg)-M, BM(kg)-F, BF(%) -M, BF(%) - Ž. SJ(cm), CMJ(cm).	E: BM decreased*(3.9%), SJ→, CMJ → K: BM→, SJ→, CMJ→

**DISCUSSION**

The duration of the experimental programs had a wide range and ranged from 4 weeks to 6 years. All programs are of different duration, and the shortest duration was the program of the study by Koral et al. – 4 weeks, followed by the study program of the author Radjević N. – 10 weeks. After that, the study program of Frnchini et al. - 3 months. This study is followed by a study with a duration of 10 months - Prieske et al., then a study lasting 2 years - by Arazi et al and finally we have the longest period of 6+ years, a study by Witkovski et al. The average frequency of training was 2-4 times a week. The youngest population of respondents was in the author's work[2], with an average of 14 years of age, and the number of respondents is a total of 44, of which 24 are male and 20 are female. In the author's work (Rađević, N. 2012), the sample of respondents was 16 years old on average, and the number of respondents was 32. The number of respondents ranged from 13 respondents in the work (Franchini et al., 2005) to 54 respondents in the author's work (Witkovski et al., 2021), of which a total of 133 persons are male, while only 30 persons are female, which are included in the authors' works (Prieske et al., 2020 and Koral et al., 2009 and Prieske et al. - 20 and Koral et al.-10). Before moving on to presenting

the changes in the body composition and motor skills of judokas, it is necessary to first point out that the expected changes are conditioned by the length of training, then the age of the subjects, as well as gender. Namely, the changes that occur in the composition of the body, they are partly conditioned by gender, where there are smaller oscillations among the changes between men and women, which is conditioned by hormones. Also, age plays a certain role, which is why the previously presented population of respondents, from the youngest to the oldest group of respondents.

Also, it is important to highlight the method that was used when determining body composition. Body composition analysis in this study was performed using bioelectrical impedance (BIA), which is a new, rapid, non-invasive, accurate method for subjects, which has recently gained the trust of experts worldwide. The aim of the papers was to study the correlation between body composition and motor potential. Based on the obtained results, it was established that an increased amount of body fat affects the reduction of the productivity of static strength, flexibility, balance and aerobic strength. Therefore, it is important that judokas avoid increasing body fat, with the aim of maintaining their motor skills. On the other hand, it was found that a reduced amount of lean tissue (muscle mass) causes a decrease in strength in athletes, and thus negatively affects their performance [8, 10]. This is also confirmed by the fact that the more successful judokas possessed a larger amount of muscle mass and a smaller amount of fat tissue than the less successful ones. Taking into account these facts, the existence of a negative correlation between body fat and muscle mass of athletes can be confirmed. It was also observed that in people with different training, the body mass index (BMI) does not have a good discrimination related to body composition. This means that only the mass of the body is taken into account when calculating it, and not what it is made of. That is why it often happens that an athlete who has a minimal amount of fat and a large amount of muscle mass is overweight according to BMI standards [11,17,18]. Speaking of maximum strength, it was concluded that there is a positive correlation between it and body weight, as well as a negative correlation between it and performance on the specific judo fitness test (SJFT). Increased lean mass (FFM) with low body fat (BF%) can be accompanied by increased force production, i.e. efficiency in performing SJFT. What's more, it was established that speed, explosive power and agility in the lower extremities can lead to a quick change of position, and thus affect the execution of quick throws. It was also concluded that anaerobic power has a very large influence on the performance of sudden and explosive movements in judokas. When it comes to explosive power, which is a very important component of judo, applying the squat jump and counter movement jump tests, it was determined that there were no significant differences between the control and experimental groups. This once again confirms the fact about genetics as the most important factor for the manifestation of explosive power, as well as the fact that it can be influenced very little by training [12,19,20]. Agility, as a very important motor ability, showed a negative correlation with fat tissue (BF%). Namely, the difficult manifestation of this ability is a consequence of the role of ineffective body mass (fat) in conditions of acceleration, deceleration and change of direction of movement. Agility training can have a great benefit in reducing the possibility of injury to athletes, which is a good reason for its systematic development as part of training [13,16]. Based on the presented research and their results, it was concluded that an increased amount of fat-free mass (FFM) with a low percentage of body fat (BF%) can be accompanied by increased force production, i.e. efficiency in performing SJFT. Also, it was determined that all subjects had a lower physical performance and a higher percentage of body fat than top judoka competitors. Moreover, a negative correlation was found between body fat percentage (BF%) and explosive reactive power (DJ) [14,15].

## CONCLUSION

Due to its character of judo as a weight category sport, body composition, especially body fat and lean body mass, are the two most important aspects that require systematic monitoring during the long-term development process of an athlete.

Generally speaking, lower percentages of body fat and higher percentages of lean body mass increase relative strength levels in athletes. In addition, these two measures of body composition have been suggested as relevant to competition success. For example, higher muscle and bone mass together with lower ectomorphism were associated with better performance on a special judo fitness test in athletes of the Spanish national judo team. Judokas strive to maximize the amount of lean body mass and minimize fat mass in order to reduce overall body mass. In an earlier study, Franchini et al. compared elite (national and international medalists) with sub-elite (medal winners at national competitions) judokas with regard to limb girth used as an indicator of muscle mass. The authors reported greater muscle mass

## REFERENCES

- [1] Thomas, S. G, Cox, M. H, LeGal, Y. M, Verde, T. J, & Smith, H. K (1989). Physiological profiles of the Canadian National Judo Team. *Can J Sport Sci*, 14, 142–147. PMID: 2819609
- [2] Arazi, H., Noori, M., & Izadi, M. (2017). Correlation of anthropometric and bio-motor attributes with Special Judo Fitness Test in senior male judokas. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, 17(4), 19-24.
- [3] Franchini, E., Takito, MY, & Bertuzzi, RCM (2005). Morphological, physiological and technical variables in high-level college judoists. *Archives of budo*, 1(1), 1-7.
- [4] Koral, J., & Dosseville, F. (2009). Combination of gradual and rapid weight loss: Effects on physical performance and psychological state of elite judo athletes. *Journal of sports sciences*, 27(2), 115-120.

- [5] Prieske, O., Chaabene, H., Gabler, M., Herz, M., Helm, N., Markov, A., Granacher, U. (2020). Seasonal Changes in Anthropometry, Body Composition, and Physical Fitness and the Relationships with Sporting Success in Young Sub-Elite Judo Athletes: An Exploratory Study, *Int. J. Environ. Res. Public Health* 2020, 17(19), 7169
- [6] Witkowski, K., Superson, M., Piepiora, P. (2021). University School of Physical Education in Wrocław, Wrocław, Poland, original article, *Archives of Budo, science of martial arts*, 17, 161-175. AoBID: 14352
- [7] Cicović, B., Bjelica, B., & Pržulj, R. (2014). Relationships of functional abilities with agility results in young judokas. *Sport and Health*, 9(2), 14-19.
- [8] Bjelica, B., Cicovic, B., Stevic, D., D'Onofrio, R., Perović, T., Pržulj, R., Mitrović, N. (2020). Effects of creatine monohydrate (CR) on muscle strength and body composition. *Italian Journal of Sports Rehabilitation and Posturology*, 7(3), 1624 -1637.
- [9] Aksović, N., Bjelica, B., Joksimović, M., Skrypchenko, I., Filipović, S., Milanović, F., Pavlović, B., Čorluka, B., Pržulj, R. (2020). Effects of aerobic physical activity on cardio-respiratory fitness of the elderly population: systematic overview. *Pedagogy of Physical Culture and Sports*, 5, 208-218.
- [10] Bjelica, B. (2020). Effects of group fitness programs on body composition of women. *Facta Universitatis, Series Physical Education and Sport*, 18(2), 345 - 354.
- [11] Bjelica, B., Milanović, Lj., Aksović, N., Zelenović, M., & Božić, D. (2020). Effects of physical activity on cardiorespiratory changes. *Turkish Journal of Kinesiology*, 6(4), 164-174.
- [12] Bjelica, B., Gojković, D., Pržulj, R., Cicović, B., & Joksimović, M. (2018). Connection between morphological characteristics and vertical jump stiffness of female volleyball players. *International Journal of Physical Education, Fitness and Sport*, 7(1), 17-23.
- [13] Karačić, S., Gojković, D., Bjelica, B., Fulurija, D., Pržulj, R. (2018). Impact of program for correcting lordosis to changes in motor abilities of elementary school students. *Journal of Physical Fitness, Medicine & Treatment in Sports*, 3(3), 1-6.
- [14] Zelenović, M., Bjelica, B., D'Onofrio, R., Bosiljčić, S. (2021). Overview of the current research about the anthropological space of male and female young scholars. *Italian Journal of Sports Rehabilitation and Posturology*, 8(16) 1-4, 731-1744
- [15] Manojlović, N., Bjelica, B., Aksović, N., D'Onofrio, R. (2022). The effects of a specific exercise program on the motor abilities of children and youth with special needs. *Italian Journal of Sports Rehabilitation and Posturology*, 9(21), 3-5, 2202-2210.
- [16] Aksović, N., Jovanović, Lj., Bjelica, B., Zelenović, M., D'Onofrio, R. (2023). Methodological-organizational forms of work in physical education teaching. *Italian Journal of Sports Rehabilitation and Posturology*, 10(24); 3; 2; 2436 – 2451.
- [17] Zrnić, R., Bjelica, B., Gadžić, A., D'Onofrio, R. (2021). The comparison of the effects of recreational aerobics and swimming on the psychosomatic status of women, *Ita. J. Sports Reh. By.* 2023; 10(26); 5; 5: 2719 - 2737
- [18] Zelenovic, M.; Kontro, T.; Stojanovic, T.; Alexe, DI; Bozic, D.; Aksovic, N.; Bjelica, B.; Milanovic, Z. & Adrian, SM Effects of repeated sprint training in hypoxia on physical performance among athletes: A systematic review. *Int. J. Morphol.*, 39(6):1625-1634, 2021.
- [19] Aksović, N., Skrypchenko, I., Bjelica, B., Mohan Singh, RR, Milanović, F., Nikolić, D., Zelenović, M. (2021). The influence of motor skills on the short sprint results. *Pedagogy of Physical Culture and Sports*, 2021;25(6):382–387.
- [20] Zečirović, A., Bjelica, B., Pajović, L., & Aksović, N. (2021). Postural Status And Kyphosis In School-Age Children. *International Journal of Academic Health and Medical Research (IAHMR)*, 5(11), 90-97.