

## STUDY ON THE MANIFESTATION OF EQUILIBRIUM CAPACITY IN SYNDROM DOWN ATHLETES PRACTINCING JUDO

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**Abstract:** Equilibrium capacity is an important component of motor guidance. An objective balance assessment for judo-practicing lower-grade athletes was achieved through the Y-Balance (Functional Movement, 2016) platform, a dynamic test executed on a foot or a hand requiring strength, flexibility, central control and proprioception. Six athletes, Judoka Bears team members, with a 3-year competitive experience participated in this study. They practice judo as a therapy in recovery activities for people with this syndrome starting with the end of 2014. The aim of the research is to assess the ability to manifest the dynamic balance for Down syndrome judo practicing athletes, knowing that they are characterized by poor coordination of body segment movements and poorly developed motor skills. The objective is to establish the level of balance-of-mind capacity for mentally deficient people, and the influence of judo on them. Depending on upper limbs and lower limbs, the study revealed, according to the correlation matrix, that the strongest variables of the total number of variables are for the upper right limb with antero-medial displacement (0.882429 factorial saturation), followed by the upper right limb with lateral displacement, whose factorial saturation is 0,868248, and the lower right leg with postero-medial displacement with a saturation level of 0,825715.

**Keywords:** judo, down, balance, sports, sports performance.

### Introduction

Balance capacity is closely correlated with speed, strength, resistance and mobility, being of great importance both in the acquisition and improvement of technique and tactics, as well as in judo contests.

Postural stability and dynamic balance may represent gradual indicators of neurological dysfunction orexceptional skills forperformance rifle shooting, circus artor special professions, provided that they are objectively measured [1].

Down syndrome is the result of one of 3 chromosomal abnormalities, a generic condition associated with intellectual disability, balance, and the coordination of impaired moments [2], obtaining significant positive changes on balance, posture, and motor control, as an effect on the implementation of new training activities.

Developing motor skills for people with Down syndrome is characterized by specific problems, so coaches need to take advantage of the potential they have and develop an adapted form of motor power for them.

A general characterization of psycho-motor capacity to mental deficiency indicates the following: lack of coordination of body segment movements, poorly developed motor skills, difficulties in coordinating motor activity through language, and difficulty in breathing action [3]. A large proportion of people with intellectual disabilities are historically inclined towards obesity and a weaker state of health. This would be a reason why sport should play an important role in their lives.

Individuals with Down syndrome have been generally described as having high levels of oxidative stress, which have been associated to an increased morbidity. Fortunately, recent studies have reported that aerobic training may upregulate antioxidant defence system both in general population and individuals with trisomy 21. As a consequence, Ordonez et.all., have made up a study through which they demonstrated that aerobic training efficiency produces the decline of protein oxidation [4].

Designing scientifically and professionally valid training programmes, consisting of the necessary methodology and didactical instructions for sport engagement of people with intellectual disability, is not only a challenge but has become a necessity for the near future. After a judo training period, positive changes in motor skills have been observed, so people with intellectual disabilities are improving their quality of life [5].

We believe that the use of the basic elements in judo, as well as games and adapted exercises when training disabled children will lead to achieving the instructive-educational objectives such as: maintaining andstrengthening health, autonomy, socialisation, increase of the bio-motor potential [6].

Boguszewski et.all, as a result of their study, consider that the therapeutic value of classes in judo dedicated to children with mental retardation has not been recognized yet. However, the results achieved by a group of patients attending them clearly indicate their high effectiveness, which

only confirms the primary goal of judo as a utilitarian form of movement [7].

From a scientific point of view, it can be said that judo is part of the group of sports with a complex manifestation of motor skills, requiring the combination of speed, strength, resistance, skill and mobility, physiologically said, the effort can be maximal and submaximal, with varying intensity and a predominantly dynamic character, sometimes combined with static effort [8].

Procedures in judo generally do not run out of force, and in this sense de-balances favor the execution of the design. Thus, the unbalance engages the opponent in motion in the direction of execution of the process by facilitating the execution of the process, the inertia of the initial movement being used in the execution of the process.

These people have a profile that highlights a particular level of motor development because they have a delay in reaching motor models, so there is a different sequence to acquire the basic motor skills required in judo, but if the type of training is appropriate and individualized, after a period, improvements will be seen.

**Materials and methods**

Applying judo adapted as therapy for people with Down Syndrome can cause significant changes in balance characteristics.

The research was conducted on 6 Judoka Bears team members, with a competitive experience of 3 years, and notable European results. This judo practice adapted as a therapy in recovery activities for people with Down syndrome from the end of 2014. The aim of the research is to evaluate the ability to manifest the dynamic balance for Down syndrome judo practitioners knowing that they are characterized through poor coordination of body segment movements and poorly developed motor skills.

In our research, the objective assessment of the equilibrium capacity for judo-practicing lower-grade athletes was achieved through the Y-

Balance Platform (Functional Movement, 2016). This is a dynamic test executed while standing on one foot, position that requires strength, flexibility, central control and proprioception, and the position of the support, facially/ lying forward on one hand. The purpose of this test is to maintain balance on a leg and a facial / forward restraint on one hand, as far as possible with the other inferior or superior member in three different directions. The three directions of movement are: anterior, postero-medial, post-lateral posterior and lateral, postero-medial, antero-medial hand, executed on each member. Therefore, there are twelve tests that have been executed in the following order: right anterior; right post-lateral; postero-medial right; left anterior; left post-lateral; left postero-medial; right lateral; postero-medial right; right antero-medial ; left lateral; left postero-medial and left antero-medial.

The starting position for the lower limb is on a foot on the plate, with the toes of the foot on the red line, the other foot tapping slightly with the tip of the fingers on the red side of the plate. The free foot is moved in the desired direction, pushing the pointer as far as possible while maintaining the balance. The free foot must be brought back to the starting position under control without touching the ground.

The starting position for the upper limb is the facial support forward with a hand on the plate, with the thumb on the red line, the other hand tapping, with the tip of the fingers, the red side of the plate. The free hand is taken in the desired direction by pushing the pointer as far as possible while maintaining the balance so that the free hand has to be brought back to the starting position under control without touching the ground.

The objective is to establish the level of balance manifestation for mentally deficient people, and the influence of judo on them.

**Results**

Table no 01. Descriptive statistics of median results of tested athletes

		Statistic	Std. Error
judo	Mean	52,2500	3,69915
	95% Confidence Interval for Mean	Lower Bound	44,1082
		Upper Bound	60,3918
	5% Trimmed Mean	51,7778	
	Median	50,0000	
Variance	164,205		

Std. Deviation	12,81423	
Minimum	37,00	
Maximum	76,00	
Range	39,00	
Interquartile Range	24,50	
Skewness	,526	,637

As shown in the table above, the default error is 3.6 with a confidence interval that does not contain the 0.00 value, the statistically significant difference to a two-tailed significance level of 5%.

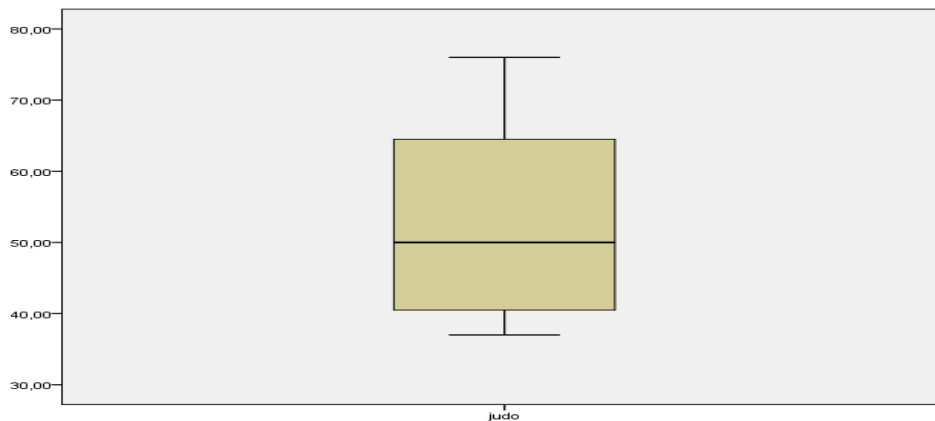


Figure 1. Box-plot plot for median results

As for the data median (the centerline of the box), it is noted that this is not in the center of the box, having a slight asymmetry in the lower part of the data.

Tabele no 02. Correlation matrix

Components	Right inf. limb- anterior	Right inf. limb- posteromedial	Right inf. limb- posterolateral	Left inf. limb- anterior	Left inf. limb- posterolateral	Left inf. limb- posteromedial	Right sup. limb- lateral	Right sup. limb- anteromedial	Right sup. limb- posteromedial	Left sup. limb- lateral	Left sup. limb- posteromedial	Left sup. limb- anteromedial
Right inf. Limb - anterior	1	0,825715	0,440792	0,633016	0,198405	0,624889	0,868248	0,882429	0,141548	0,613243	0,354492	0,680514
Right inf. limb - posteromedial	0,825715	1	0,826033	0,589548	0,590167	0,38917	0,981009	0,868201	0,475311	0,860275	0,446594	0,695062
Right inf. limb - posterolateral	0,440792	0,826033	1	0,656905	0,935601	0,365714	0,826483	0,738501	0,861502	0,960382	0,707992	0,747926
Left inf. limb - anterior	0,633016	0,589548	0,656905	1	0,69255	0,940878	0,730739	0,894019	0,745621	0,829678	0,940943	0,989421
Left inf. limb - posterolateral	0,198405	0,590167	0,935601	0,69255	1	0,42061	0,628584	0,611765	0,982015	0,895326	0,834622	0,746284
Left inf. limb - posteromedial	0,624889	0,38917	0,365714	0,940878	0,42061	1	0,560098	0,794953	0,51313	0,600954	0,828869	0,890803
Right sup. limb - lateral	0,868248	0,981009	0,826483	0,730739	0,628584	0,560098	1	0,947712	0,54504	0,904985	0,582385	0,815284
Right sup. limb - anteromedial	0,882429	0,868201	0,738501	0,894019	0,611765	0,794953	0,947712	1	0,585852	0,888394	0,738177	0,936466
Right sup. limb - posteromedial	0,141548	0,475311	0,861502	0,745621	0,982015	0,51313	0,54504	0,585852	1	0,849746	0,902429	0,77287
Left sup. limb - lateral	0,613243	0,860275	0,960382	0,829678	0,895326	0,600954	0,904985	0,888394	0,849746	1	0,817753	0,898306
Left sup. limb - posteromedial	0,354492	0,446594	0,707992	0,940943	0,834622	0,828869	0,582385	0,738177	0,902429	0,817753	1	0,926038
Left sup. limb - anteromedial	0,680514	0,695062	0,747926	0,989421	0,746284	0,890803	0,815284	0,936466	0,77287	0,898306	0,926038	1

0,5-1 strongly positive; 0,3-0,5 moderately positive; 0,1-0,3 weakly positive

According to the correlation matrix, the diagonal has correlations equal to 1, since the correlation of a set of scores with it is a perfect positive one.

Table no 03. Component matrix correlation

Correlation matrix		
		Component
		1
Strongly positive	Right sup. limb - anteromedial	0,882429
	Right sup. limb - lateral	0,868248
	Right inf. limb - posteromedial	0,825715
	Left sup. limb - anteromedial	0,680514
	Left inf. limb - anterior	0,633016
	Left inf. limb - posteromedial	0,624889
	Left sup. limb - lateral	0,613243

Following the matrix realization, it was possible to extract a single group of strongly interrelated variables (table no. 2). The strongest variables in the total number of variables are for the upper right anteromedial upper limb (0.882429 factorial saturation), followed by the lateral right upper limb, whose factorial saturation is 0.868248, and the right lower right limb with a saturation level of 0.825715.

**Discussions**

People with Down Syndrome can practice judo as therapy within recovery activities. These are characterized by poor coordination of movements of body segments and poorly developed motor skills.

Thus, nine athletes were coopted for this research, of which only 6 athletes were able to accomplish the test, the other three athletes failed to maintain on the platform, because they participated in only a few judo lessons.

**Conclusions**

In conclusion, we support the fact that the Y-Balance platform is a measurement and evaluation tool that provides a clear and faithful picture of predominant judo's balance ability, which is necessary to achieve great sport performance for athletes with Down Syndrome. At the same time, we believe that this platform can also be successfully used in the selection process of the athletes in order to form representative teams.

In judo, the direct fight with the opponent requires a high level of effort and balance to cope with the pace imposed by the opponent, his actions, but especially to be able to trigger vigorous actions throughout the race.

**Acknowledgement**

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**References:**

[1] Paunescu M., Paunescu C., Mircică L., Balance ability in performance sports. A perspective on scientific studies, SGEM 2017, Psychology and Psychiatry, Sociology and Healthcare, Book 3, Vol 4, 55-62 pp

[2] Cosma G., Dragomir M., Nanu M.C., Braiescu-Calinescu L., Cosma A., (2017), The influence of the dance for people with down syndrome, Bulletin of the Transilvania University of Brasov, series IX: Sciences of Human Kinetics, vol. 10 (59) no. 1, 83-88

[3] Teodorescu S., Bota A., Stănescu M., (2003), Educație fizică și sport adaptat, editura SEMNE, p.157

[4] Ordonez F.J., Rosety I., Rosety M.A., Camacho-Molina A., Fornieles G., Rosery M., Rosety-Rodriguez M., (2012), Aerobic training at moderate intensity reduced protein oxidation in adolescents with Down syndrome, Scandinavian Journal of Medicine & Science in Sports

[5] Maslesa S., Videmsek M., Karpiljuk D., Motor abilities, movement skills and their relationship before and after eight weeks of martial arts training in people with intellectual disability, publicat în Acta Universitatis Palackianae Olomucensis. Gymnica, 2012 (vol. 42), issue 2

[6] Ene M., Rosu D., Neofit A., (2014), Judo adapted to the therapy of disabled children, Procedia - Social and Behavioral Sciences 137, 37 – 42

[7] Boguszewski D., Swiderska B., Adamczyk J.G., (2013), Judo as a supplementary form of therapy for children with mental retardation, Science of Martial Arts, Vol.9, 85-92

[8] Păunescu C., (2011), Judo, îndrumar metodic, editura Printech, p10