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STRENGTH DEVELOPMENT THROUGH JUDO TECHNIQUES EXECUTIONS

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Abstract: *The study aimed to streamline judo sports training by overlapping the objectives of strengthening and improving the techniques for developing motor skills, especially strength. The research started from the hypothesis according to which the multiple repetition of a technical procedure in judo strengthens or improves it, but at the same time, it also develops motor and implicitly muscular capacities responsible for the execution of the movement. Several specific tests have been established to assess the overall strength at two different times during the training period. Following the analysis and processing of the data recorded at the two tests, it was found that a force capacity is being created as well as a consolidation of the execution of some technical procedures (throwing over the hip and over the shoulder).*

Key words: *judo, strength, execution forms.*

1. Introduction

The development and continuous improvement of psychomotor abilities, as well as their correlation with the purpose of each physical field, is explained by the use on a larger scale of new discoveries in science, especially those in the field of physiology, biochemistry, biomechanics, hygiene, psychology and pedagogy, they, as well, being stimulated by the universality of the sports phenomenon, by the growth of competitiveness among athletes.

"Motor qualities are those aspects of human motricity that manifest in identical parameters of movement with the same standard of measurement, such as maximum force, and they are based on similar physiological and biochemical mechanisms" [9]. The multiple repetition of a technique from any martial art allows the fixation of the skill and the improvement of the technical-tactical actions, as well as the development of the muscular chains involved in the movement execution [8], [10]. Therefore, a motor quality specific to a martial art develops according to the way a technical procedure is executed, such as the number of repetitions, effort's intensity, duration of breaks, etc. [4], [13]. It is

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considered that in these conditions, a motor quality cannot be isolated, but on the contrary the other motor qualities are influenced to a greater or lesser extent [7]. Through structures of exercises or methodical procedures executed in a certain algorithmic sequence, with a specific dosage and a particular difficulty level, it is possible to act in order to develop any motor quality. In competitive judo all motor skills are involved to achieve a technique with maximum efficiency [2].

According to Bocioacă, L., [1], the strength in combat disciplines is the ability to execute specific technical procedures through muscular contractions of overcoming, surrender or maintenance, where appropriate, to any kind of internal or external resistance of the opponent.

Human's need to be strong has materialized while looking for solutions to develop the strength through work methodologies with different loads or with their own body weight. Nowadays, in general in the sports training field and especially in martial arts, strength has a great importance. There are specialists in this field who place it in the first place, considering it a support on which the other motor qualities are built. In all combat situations, you can be fast and precise in the techniques you execute, but if there is not that energetic focus (kime) achieved with the aid of this quality, everything is in vain [11]. All forms of strength can be found in judo, especially in performance sports. The one that has the highest manifestation is the general force, representing the development level of the entire muscular system and is characterized by an increased capacity of manifesting strength in different hypostases of life, such as in relationships, at work, in mass sports.

2. Material and Method

The study began with the hypothesis according to which the repetition of technical procedures of judo of hip throwing and shoulder throwing performed under difficult conditions will determine both the consolidation of skills and the development of specific strength in the muscles with a decisive role in success. In order to test this hypothesis, a set of tests was established as close as possible to the specific strength in judo, which were applied at an interval of three months. For three months, the group of older junior athletes (18-20 years old) participated, three times a week, in an experimental program that consisted in repeating the most significant techniques of hip throwing and shoulder throwing, but also other techniques that require complex muscle chains (of the arms, of the back, of the lower limbs), under difficult conditions. Among these techniques there can be identified: large hip throw, small hip throw, hip wheel, thrust throw and locking the leg, shoulder throw with one arm, shoulder throw by locking etc. Among the forms of execution of the techniques, the repetition of the procedures with lifting the partner, the repetition of the procedures with two partners, the repetition of the techniques by moving the semi-active partner, the repetition of the techniques with heavier partners, etc. stand out. The following tests were applied to evaluate and determine the level of development of the strength:

1. Jumping push-ups (with hand clapping and leg touching) for 30 seconds;

2. Holding in a hanging position after 8 chin-ups, with holding time;
3. Squat jumping (on a package of mattresses of one meter) and landing with a turn of 360, number of jumps in 30 seconds;
4. Extension of the torso to the gymnastic vaulting box from lying face down (with an 8kg medicine ball held at the nape), number of repetitions in 30 seconds;
5. Lifting the legs at the level of the head, from hanging to the wall bar, number of repetitions in 30 seconds.

3. Results and Discussions

Due to their age, when they are concerned about the development of strength, the athletes recorded significant increases in results, and on this occasion the uniformity of the group was highlighted. One of the factors that determined these values we consider to be the spirit of competition that was established between athletes during the tests.

For the "Push-ups with detachment" test, the results obtained from one attestation to another registered (Table 1) a distinctly significant difference ($p < 0.01$). This test (detachment push-ups), which evaluates the strength of the scapular-humeral belt and the back, has been adapted to highlight both the explosive force and the coordination.

The results of the two tests Table 1

No	*Used tests*	Initial test	Final Test	*T*	*p*
1.	Plyometric (plyo) pushups (Number of repetitions)	18,60±0,24	19,82±0,20	4,861	< 0,01
2.	Hanging Knees To Elbows (Number of repetitions)	9,50±0,28	11,15±0,25	5,482	< 0,001
3.	Lying face down plate neck resistance with the 8kg ball, held behind the head (Number of repetitions)	10,10±0,25	11,44±0,23	4,926	< 0,001
4.	360 Degree Squat Jump (Number of repetitions) in 30 s	5,90±0,18	9,61±0,45	5,306	< 0,001
5.	Hanging at the fixed bar after 8 pull-ups s)	9,32±0,26	12,60±0,35	4,802	< 0,001

Regarding the difference registered at the final test, we consider that the continuous and constant repetition of the judo techniques, where the arm muscles are required during the traction moments, determined a superior result. The execution of the procedures also requires a good coordination of all segments even in conditions of maximum stress [8]. Another factor that determined this increase of the explosive force can be attributed to the execution of the technical procedures in the conditions of the circuit work, when the executor must perform the skills in conditions of speed and with an increased force for the success of the movements. Also, in the case of a direct fight between two combatants, when the desire to win is high, a high effort is required which is based on force under speed, especially since the two fighters do not have a high level of technicality. At the test which assessed the strength of the abdominal muscles, "*Hanging Knees to Elbows*", there was registered a very significant

evolution (P< 0,001). In fact, this difference is directly visible (Figure 1) through the analysis of averages, where the group of athletes recorded an average of about 11 reps. Also, it should be remembered that many athletes perform exercises for the muscles, outside of training, as a measure to ensure a harmonious abdomen. This exercise, through the initial position, also requires the muscles of the forearm, which provides the grip to maintain the hanging position. Such a result was to be expected because the execution of the technical procedures in judo requires a constant grip on the partner.

We believe that this difference is also due to the high demands on the abdominal muscles, which intervenes in the execution of all martial arts techniques according to the Asian concept which states that the center of initiation of all actions is located in the pelvic area.

During the rounds of combat between athletes (competitive fighting) both the forearm and abdominal muscles are involuntarily strained.

The results of the "*Trunk Extension from the face lying at the gymnastics box*" trial register progress demonstrating the impact of planned physical activity and active participation of the athletes (Figure 1).

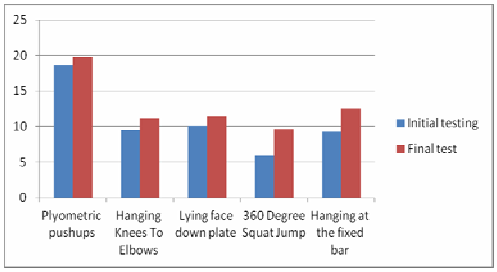

Fig. 1. *The dynamic of the recorded results of the two tests*

Thus, there were high values classifying the results as highly significant (P< 0.001), which was expected given that the mean increased by approximately 1.5 repetitions. The results obtained could have been expected from the initial testing because the demand on the abdominal muscles also involves the participation of the lumbar area. From the bio-mechanical analysis of the previous test, it is easy to see how the lumbar area is involved, which has a stabilizing role in the movement, which is an additional argument for the results recorded. The execution of judo procedures, demands to a quite high degree the lumbar muscles because there is a form of execution that involves lifting the opponent off the ground [2]. In these circumstances, the lumbar muscles are of particular importance in the success of the execution and the repetition of the procedures several times leads to its toning and development. The execution of partner lifting procedures has often been performed both for reinforcement of learning and as a station/workshop in circuits designed and performed. In conclusion, we could state that the results are better as a result of using the means of force according to a judicious planning, the conduct of the training and the demand on the back muscles (especially the lumbar muscles) in the execution of the over the hip and over the shoulder throwing techniques.

At the test “Plyometric jumps, from squatting, in height and come back with a return to 3600” the progress is significantly recorded (p <0,001) in the period between initial testing and final testing. This fact was expected because this test has in addition to the previous one a return to 3600 and a long time of

the jumps, respectively 30 seconds. In other words, the test evaluates the strength in resistance mode and the orientation in space. The orientation in space is a motor ability required in judo because almost all techniques have a return to 1800 to each execution as finality. At the same time, the recorded difference is motivated by the spatial character of execution of technical procedures from judo, of the need to coordinate the segments between them and between segments and the trunk. In specialty literature [6] is specified that orientation, coordination, balance skills require a large volume of repetition, a lasting neuromuscular effort. At the test "Hanging at the fixed bar, after performing 8 tractions" there was a progress of the hanging time, therefore, the very significant time difference recorded ($P< 0,001$) we consider that it is the effect of two particularities:

1. strain the muscles of the upper back and arms in procedures execution of judo;
2. increasing perseverance and desire for self-improvement installed as a result of practicing individual contact activities/physical exercises [5].

One explanation for the difference between the two tests would be that the execution of judo procedures involves the muscles of the forearm which is responsible for the grip on the partner's kimono. We remember this aspect because it probably appeals to the muscles of the forearm, both during the tractions next to the dorsal muscles and brachial biceps. Moreover, the difference can be explained by the fact that the execution of the technical procedures in judo involves in the first stage the grip that appeals to the muscles of the forearm, then the imbalance that requires the muscles of the back and arms. From this description we can deduce that the muscles of the forearm, respectively the flexors of the fingers participate in maintaining the hanging position, are required throughout the execution of the procedures.

As experts say [3], there is a stage in which the execution of technical procedures has a moment of general strain, especially in the phase of acquiring skills, but nevertheless, maintaining a grip that provides a state of safety during the fight in judo (sparring), it requires constant tension. So, most judo athletes (judoka) [13] claim that during matches they feel the need to relax their forearm muscles. At the same time, the practice of contact sports leads to the formation of specific behavioural attitudes, to the formation of perseverance, determination, and desire to achieve goals [12].

Therefore, a motor quality specific to a martial art develops depending on how a technical procedure is performed, such as the number of repetitions, the intensity of effort, the duration of breaks, etc. We consider that in these conditions, one cannot isolate a motor quality, but on the contrary the other motor qualities are influenced to a greater or lesser extent.

Through structures of exercises or methodical procedures executed in a certain algorithmic succession, with a certain dosage and with a certain degree of difficulty, it is possible to act for the development of any specific motor quality.

4. Conclusions

The experimental justification of the effectiveness of the strength development program for judoka athletes by

performing technical procedures under special conditions was made by statistical analysis of the average performance of the samples included in the study and highlights the following:

- the athletes made a different progress from one test to another, where the difference between the two values constitutes the significance threshold of P <0.001, and only in the tests "Flotations with detachment" and "Plyometric jumps" the difference is significant at P < 0.01.
- the strength assessment tests highlight the influence of practicing judo-specific means in training and developing strength skills in different muscle groups.

At the same time with the development of strength, there was a consolidation of judo techniques, highlighted by the ease of their execution in different situations.

The results of the experimental study based on the proposed methodology demonstrate that judo techniques performed under different conditions can substantially influence the motor and psychomotor qualities of athletes.

References

1. Bocioacă, L.: *Puterea în Judo (Power in Judo)*. București, Editura Bren, 2003, p.60-84.
2. Chirazi, M.: *Inițierea în judo – jocuri și exerciții cu partener (Initiation in judo – games and exercises with a partener)*. Iași, Editura PIM, 2006, p.54.
3. Frazzei, F.: *Judo de la centură alba la centură neagră (Judo from whitw belt to black belt).* București, Editura Budo Best, 2006, p.164.
4. Hantău, I.: *Manual de Judo (Judo Handbook)*. București, Editura Didactică și Pedagogică, R. A., 1996, p. 83-85.
5. Hantău, I.: *Structura antrenamentului la judo (Training stucture in judo)*. București, Editura Printech, 2000, p.81.
6. Hantău, I., Manolachi, V.: *Pregătirea fizică a judocanilor de performanță-manual pentru instituțiile cu profil sportiv (Physical training of performances judokas – manual for sports institutions)*. Chișinău, Editura Tipografică Centrală, 2000, p.93-96.
7. Muraru, A.: *Lecții de Judo (Judo lessons)*. București, Editura Sport-Turism, 1995, p. 9.
8. Sava, A.: *Optimizarea pregătirii psihice în judo – considerații teoretice (Optimizing mental in judo – theoretical considerations)*. Bacău, Editura Alma Mater, 2014, p.72.
9. Șerbănoiu, S., Tudor, V.: *Teoria și metodica educației fizice și sportului (Theory and methodology of phisysical education and sports)*. București, Editura ANEFS, 2007, p. 46.
10. Ștefănuț, S.: *Antrenamentul sportiv în Judo (Judo sports Training)*. Craiova, Editura Scrisul Românesc, 1983, p.261.
11. Todiriță, B.A.: *Jocuri de mișcare aplicate în judo pentru copii (Motion games applied in judo for children)* p.168.
12. Tüdöş, Ş.: *Generarea și regenerarea psihică. Principii, legități, soluții (Psychic generation and regeneration. Principles, legalities, solutions)*. București, Editura Sper, 2004, p. 162.
13. Ueshiba, M.: *Arta Păcii – învățăturile fondatorului aikido-ului (The Art of Peace – the teachings of the founder of Aikido)*. Brașov, Editura Mix, 2001, p. 192.

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