

A STUDY OF THE DEVELOPMENT OF STRENGTH MOTOR QUALITY IN SECONDARY EDUCATION THROUGH TAEKWONDO – SPECIFIC MEANS

Gleveşanu Andreea Eveline

National University of Physical Education and Sports, Faculty of Physical Education and Sport,
Constantin Noica no. 140, 060057, Bucharest, Romania

Abstract

In sports there are a multitude of methods for developing "strong" motor quality, and very often training methods and methodical procedures specific to sports are applied in physical education classes in primary, elementary and middle schools in order to develop these motor qualities.

In the directed physical activity there are numerous training methods and methodical procedures to develop strength in children. Properly adapted to the specific characteristics of age and training of the students these methods and procedures may become effective in optimizing the process of gaining and improving this motor quality.

The aspects above were decisive in choosing this topic for further research, which aims to highlight the effectiveness of methodical procedures specific to Taekwondo in the development of strength and strong motor quality of fifth grade students in middle school.

Through this research the author wishes to make known the benefits of Taekwondo for young people who practice it not only as an extracurricular activity but also as a complementary one, as a booster in the practice of other sports, with great benefits to those who practice individual sports but especially to those who are engaged in sports games.

Keywords: motor quality, Taekwondo, strength, middle school students

1. INTRODUCTION

"Taekwondo is a unitary, exact, symmetrical system of self-defence and counterattack. It develops strength and speed so that the strokes of the hand or of the foot are instantly produced" (Dimciu 1996). Starting from the definition presented above, we can strongly state that Taekwondo is a complex sport that requires the development of all motor qualities and more. "Martial arts practice makes it possible for a child to develop good coordination very early on, and with his technical progress, he will gain better discipline and more confidence in himself" (Tudorel 2021).

The driving force is the "ability of the body to overcome a resistance (internal or external) through muscle contraction" (Chicomban & Turcu 2011). The author finds it important to discuss in more detail about motor quality, strength, because she believes it is essential for any Taekwondo practitioner in order to progress and improve their own practice and consequently, themselves. The level of strength influences greatly the speed in performing technical actions in Taekwondo.

The purpose of this research is to identify the Taekwondo-specific training methods and verify their effectiveness in the development of strength motor quality, for students of 12 years old, in the fifth grade of middle school. "Extracurricular activities are an informal way of achieving education. Caring responsibly about the children's free time, knowing their desires and respecting them, must be dominant in such activities" (Cioacla & Tudor 2010).

The main hypothesis of the research states that when practiced as an extracurricular activity, Taekwondo with its specific methods, complements effectively the methods and procedures used in physical education classes in middle school students, contributing to an important extent to the development of motor skills, specifically strength and speed.

Secondly, specific Taekwondo action techniques will positively influence the development of strength, expressed more specifically by upper limb strength, back muscle strength and abdominal muscle strength.

Below, there are listed in details the tasks which contributed to testing the above hypothesis of the research:

- Carrying out a proper analysis of the theoretical concepts of physical strength related to the driving force quality and of the methods and methodical procedures for its development.
- Carrying out a detailed analysis of middle school's PE curriculum regarding the acquisition and the quality of strength / force and motor skills at 12 years old students of 5th grade.
- Checking the efficiency of using Taekwondo-specific training methods in developing the motor quality strength at 12 years old students of 5th grade.

The theoretical importance of the research consists in the detailed analysis of the theoretical concepts regarding the strength / force as a motor skill and of the training methods specific to Taekwondo which aim its development.

The practical advantage of the research is that it verifies the effectiveness of Taekwondo-specific training methods on the development and improvement of strength and speed in middle school students.

"In Taekwondo, direct combat with the opponent requires a high level of effort to cope with the pace and the rhythm imposed by the opponent, by his actions, but especially to be able to trigger vigorous, dynamic actions throughout the competition" (Paunescu 2011).

2. MATERIALS AND METHODS

The research was conducted at Waldorf Sophia Primary School, between March 11, 2019 and September 20, 2019. The control group consists of 25 students of 5th grade, more specifically: 14 girls and 11 boys, aged between 11 and 12 years.

In order to achieve the research objectives, the working methodology covered the following stages:

- studying and analysing of the specialised bibliography;
- drawing the working hypothesis, establishing the subjects and the research strategy;
- organizing and conducting the pedagogical experiment;
- processing and interpreting the obtained data;
- formulating conclusions;

The experiment aimed to identify and verify means of action specific to Taekwondo in order to improve strength indices in fifth grade students.

The experiment started on March 11, 2019 with the support of the initial control tests and ended on September 20, 2019, with the support of the final tests.

The students participating in the experiment were subjected to the following three control tests:

Test 1. Throwing the medicine ball (2kg) forward with two hands above the head.

Ability examined: upper limb strength

Equipment needed: non-slippery, hard surface, chalk, medicine ball.

Execution instructions:

- ✓ Standing up with the medicine ball in both hands, above the head.
- ✓ The momentum consists in the extension of the torso with the ball over the head.
- ✓ Throwing the ball.
- ✓ Two tries are allowed and the best result is recorded in "m" and "cm".



Fig. 1. Test 1, graphic representation.

Test 2. Lifting the torso facing the floor for 30 seconds.

Skill examined: Strength of the back muscles.

Equipment needed: fixed ladder, stopwatch, yoga mat.

Execution instructions:

- ✓ Lying face down, palms touching the neck, knees stretched, feet fixed below the last step of the ladder or supported by a workout partner;
- ✓ The torso is being raised for 30 seconds at a signal. The chin must be raised above the level of the gym bench which may sit transversely, in front of the student;
- ✓ The action of lifting the torso up and down is performed at maximum speed, aiming to achieve as many repetitions as possible, correctly executed.
- ✓ The test is performed only once.



Fig. 2. Test 2, graphic representation.

Test 3. Lying on the back and lifting the torso for 30 seconds.

Ability examined: Abdominal muscle strength

Necessary equipment: fixed ladder, timer, yoga mat.

Execution instructions:

- ✓ Lying on your back, palms touching the neck, knees bent at 90°, feet fixed below the last step of the ladder or supported by a workout partner;
- ✓ The torso is being raised for 30 seconds at a signal, bringing the elbows forward, until they reach the knees;
- ✓ The action is being performed at maximum speed, aiming to achieve as many repetitions as possible, correctly executed.
- ✓ The test is performed only once;



Fig. 3. Test 3, graphic representation.

The experiment continued with the implementation of Taekwondo-specific means of action aimed at developing strength, to students of 11 to 12 years old from 5th grade during PE classes.

1. Reference objectives:

- ✓ developing the quality of strength through Taekwondo-specific means.
- ✓ solving the force-driven motor demands imposed by the requirements of the physical education curriculum.

2. Content of the activity: exercises intended for general strength.

Exercise 1 - Moving forward by right side jumping from one leg to the other. Work alternately with the right foot and the left foot 20x, 3-4 series.

Exercise 2 - Moving forward by jumping left to right from squatting to squatting position. Work 10x-3-4 series.

Exercise 3 - Standing with arms outstretched, bending knees and practicing squats with the back straight. Work 15x - 3-4 series.

Exercise 4 - Standing with legs apart, arms outstretched forward and practicing side bends. Executed 10x on one leg -4 series.

Exercise 5 - Standing forward with hands on the hips and practicing regular jumps by alternating the left and the right leg, keeping their amplitude. Work 20x - 3-4 series.

Exercise 6 – Working in pairs, sitting on the mat and facing each other, with the legs raised up sole on the sole, the exercise aims to push alternatively each leg opposing mutual resistance. Execute 20x - 3-4 series.

Exercise 7 – Jumping the rope on the same spot, with the knees up closer to the chest. Execute 10x - 3-4 series.

Exercise 8 - Jumping over obstacles (5) placed at a short distance, with stamping and landing on both legs. Execute 10x - 3-4 sets.

Exercise 9 - Jumping over obstacles (5) placed at a short distance, with stamping and landing on one leg alternatively. Execute 10x on one leg - 4 sets.

Exercise 10 – Executing pushups 10x-3-4 series.

3. RESULTS

In order to record, verify and analyse data it was used a quantitative, statistical-mathematical research method. This way, the data obtained from all three tests were analysed, along with the performance indicators of individual progress, the amplitude of the results obtained, the modulus, the median, the standard deviation and the coefficient of variability. Following the statistical data in the tables below, it can be observed a significant progress in all three tests.

The values of the results at the initial and final testing of the experiment are recorded in the following table:

Table 1. Initial and final test results.

	Initial testing	Final testing	Progress
Test 1	6,47	6,59	0,12
Test 2	39,12	41,3	2,18
Test 3	24,6	25,8	1,2

Regarding Test 1 - throwing the medicine ball, it was found that at the initial test a performance of 6.47 was obtained and at the final test a performance of 6.59, thus registering a progress of 0.12.

It was found that, in terms of Test 2 - lifting the torso from lying facing the ground a performance of 39.12 was recorded at the initial test, and at the final test a performance of 41.3, thus having a progress of 2.18.

Regarding Test 3 - lifting the torso from lying on the back and facing up, a performance of 24.6 was registered at the initial test, and at the final test a performance of 25.8, thus having a progress of 1.2.

Table 2. Presentation of dynamics value - the indicator of individual progress

	Arithmetic Mean (Initial Test / Final Test)	Individual Progress Indicator
Test 1 - Throwing the medicine ball	6,47-6,59	1,85%
Test 2 - Lifting the torso from lying facing the ground	39,12-41,3	5,57%
Test 3 - Lifting the torso from lying on the back, facing up.	24,6-25,8	4,87%

Test 1 - Throwing the medicine ball registers an individual progress of 1.85%

Test 2 - Lifting the torso from lying facing the ground shows an individual progress of 5.57%

Test 3 - Lifting the torso from lying on the back, facing up, shows an individual progress of 4.87%

Table 3. Presentation of statistical indicators for Test 1 - Throwing the medicine ball

Calculation Formula	Statistical Results (Initial Test / Final Test)
Module	7,5-7,59
Median	6,45-6,53
Amplitude	2,15-2,17
Standard deviation	0,61-0,61
Coefficient of variability	0,37-0,38

Regarding the module, a value of 7.5 was obtained in the initial test and a value of 7.59 in the final test, thus registering a progress.

The median value at the initial test was 6.45, and at the final test 6.53, thus registering a progress.

Analysing the amplitude, it was found that a value of 2,15 at the initial testing and at the final testing a value of 2, 17, thus finding a progress.

The standard deviation recorded both at the initial test and at the final test, registers a value of 0.61, which does not indicate significant differences.

Analysing the coefficient of variability at the initial testing a value of 0.37 was found and at the final testing a value of 0.38, thus registering a progress.

Table 4. Presentation of statistical indicators at the Test 2 - Lifting the torso from lying facing the ground

Calculation Formula	Statistical Results (Initial Test / Final Test)
Module	43-45
Median	40-42
Amplitude	17-17
Standard deviation	3,84-3,89
Coefficient of variability	14,7-14,15

Regarding the module, a value of 43 was obtained at the initial test and a value of 45 at the final test, thus registering a significant progress.

The median value at the initial test was 40, and at the final test 42, thus registering a significant progress.

The amplitude recorded both at the initial test as well as at the final test, registers a value of 17 which does not indicate significant differences.

Analysing the standard deviation, it was found at the initial testing a value of 3.84 and at the final testing a value of 3.89, thus registering a progress.

Analysing the coefficient of variability, we find at the initial testing a value of 14.7, and at the final testing a value of 14.15, thus registering a progress.

Table 5. Presentation of statistical indicators at the Test 3 - Lifting the torso from lying on the back, facing up.

Calculation Formula	Statistical Results (Initial Test / Final Test)
Module	27-30
Median	25-27
Amplitude	5-7
Standard deviation	1,65-1,87
Coefficient of variability	2,74-3,5

Regarding the module, a value of 27 was obtained in the final test and a value of 30 in the final test, thus registering a significant progress.

The median value at the initial test was 25, and at the final test 27, thus registering a significant progress.

Analysing the amplitude, it was found a value of 5 at the initial testing and at the final testing a value of 7, thus registering a progress.

The standard deviation registered a value of 1.65 both at the initial testing and a value of 1.87 at the final testing, thus registering a progress.

Analysing the coefficient of variability, it was found a value of 2.74 at the initial testing and at the final testing a value of 3.5, thus registering a significant progress.

After interpreting the data, we may conclude that for both girls and boys, following the implementation of the proposed training model, the efficiency of the means of action was proven, thus confirming the working hypothesis.

4. CONCLUSIONS

At the end of the research, the following conclusions were reached:

- The strength / force level influences the speed capacity in performing the technical actions.
- In order to perform an effective stroke in the competitive fights using electronic Taekwondo vests, it is necessary to develop strength and force abilities.
- Strength is a basic motor quality needed for human motor activity.
- Strength as an ability, influences sports performance, ensuring the enhancement of other motor qualities.
- In the discipline of Taekwondo, strength / force is a decisive factor for executing effectively specific procedures.

The results of the experiment demonstrate the efficiency of the training program proposed for strength / force development, confirming the working hypothesis of the research.

Some of the practical and methodical recommendations which may be taken into account when using this training program are:

- A careful selection and age adjustment of the exercises designed to improve strength in order to prove their effectiveness.
- Implementing specific Taekwondo action techniques for improving strength.
- Personalizing the training according to students' needs.
- Following permanently the correct execution of the strength development exercises recommended.
- Training for improving strength in the presence of a workout partner or auxiliary devices.
- Testing frequently the level of strength.

REFERENCES

1. Chicomban, M & Turcu, I 2012, *Kinesiology*, Transilvania University Publish House, p. 65.
2. Cioacla, C, & Tudor, V 2010, *Didactis of physical education*, Discobolul Publish House, p. 9.
3. Dimciu, C. 1996, *Taekwondo*, Budo Collection, p. 12.
4. Păunescu, C. 2011, *Taekwondo*, Printech, p. 8.
5. Tudorel, S. 2021, *Karate Practitioners's Guide*, Old hearth, p. 101.