

The Impact of Elastic Resistance Training on Some Specific Physical Capacities and the Performance Level of the Circular Kick (Mawashi-Geri) in Karate Girls in Sohag Governorate

***Dr. Fatma Ahmed Mahmoud Abdel Aal**

Introduction and Research Problem:

Sports training in its various forms has become an important process in modern societies. It has become a competitive field for all sectors of society and is considered the primary means of meeting the demands of sports activities and developing them according to the desired goals. As the level of competition among individuals increases, there is a growing need to adopt modern training methods to elevate these levels.

Elastic resistance training is one of the modern trends in sports training applied in the field, as well as one of the non-traditional training techniques and tools aimed at improving athletic performance. It can enhance the specific physical capacities required for the sport, contributing to the development of physical performance, especially among youth teams. It is characterized by safety, ease of use in any space suitable for training, and adds excitement for young athletes compared to traditional weights and other training equipment.

Elastic resistance training, a significant form of resistance training, can be practiced without the need for large spaces, and it works to develop muscular strength in the arms and legs, as well as enhance specific physical

qualities and general fitness. Mark Stone and B. Sand Connie (2006) mention that elastic resistance training requires proper body positioning during performance to achieve full benefits from the exercises. The body's position at the beginning, during, and at the end of each exercise is crucial to achieving effective resistance against the target muscle, leading to maximal muscle efficiency.

According to Ahmad Mahmoud (1991), Karate, like any other sport, includes various competitions, each with its characteristics, such as kumite (actual combat) and kata (movement patterns). Competitions may be individual or team-based, with separate categories for boys and girls.

Mohamed Alawi (1992) states that an athlete cannot master the basic motor skills of a sport without possessing the necessary physical abilities for the specific activity, and developing motor abilities occurs through the characteristics of the specialized sport.

Amr Halawish (2002) considers the circular kick (Mawashi-Geri) one of the most important kicks in Karate, particularly in Kumite, due to its unique advantages. Based on the researcher's experience as

* Lecturer in the Department of Sports Training and Movement Sciences – Faculty of Physical Education – Sohag University

a former player and coach at the Sohag Youth Center, and after observing various local championships, she noticed that some youth karate athletes were weak in specific physical capacities related to performing the circular kick (Mawashi-Geri), which led to poor performance and losses in several matches. Studies using elastic resistance training, such as those by Rasha Essam El-Din (2008), Sawsan Taqwa (2008), Sherine Ahmed Yousef (2008), and Samar Mostafa Hussein (2013), have emphasized the importance of resistance training in improving physical abilities and skill levels. The researcher found a lack of studies on the relationship between elastic cords, specific physical abilities, and the performance of the circular kick (Mawashi-Geri) among female Karate athletes. This prompted the researcher to design a training program using elastic resistance cords to improve specific physical capacities and the performance level of the circular kick among female Karate athletes in Sohag Governorate.

Objective of the Study:

The current study aims to examine the effect of elastic resistance training on some specific physical capacities and the performance level of the circular kick (Mawashi-Geri) among female Karate athletes in Sohag Governorate.

Hypotheses of the Study:

- There are statistically significant differences between pre- and post-test measurements in favor of the post-test in specific physical capacities (muscular strength, flexibility, balance)

among female Karate athletes in Sohag Governorate.

- There are statistically significant differences between pre- and post-test measurements in favor of the post-test in the performance of the circular kick (Mawashi-Geri) among female Karate athletes in Sohag Governorate.

Key Terms:

- **Elastic Cords:** These are tools used in resistance training, consisting of long strips made from high-quality rubber in varying resistance levels, suitable for different ages and performance levels through graduated resistance.

- **Kicks:** A form of attack using the legs, enabling the athlete to strike at a distance.

* **Circular Kick (Mawashi-Geri):** A striking kick performed with the foot that allows for long-distance impact. It is considered a preparatory stage for most kicks.

Methods and Procedures:

- **Research Method:** The researcher used the experimental method with a "single experimental group design," applying both pre- and post-test measurements, which fits the nature of the study.

- **Population of the Study:** The study population consists of female Karate athletes at the Sohag Youth Center who hold a black belt (1st Dan), totaling 35 athletes registered with the Egyptian Karate Federation for the 2021/2022 sports season.

- **Sample of the Study:** The sample was selected purposefully from female Karate athletes at the Sohag Youth Center who hold a black belt (1st Dan), numbering 20 athletes, all registered

with the Egyptian Karate Federation for the 2021/2022 sports season.

Data Collection Tools:

The researcher used the following tools and equipment to collect the data for the study:

A. Review of Scientific References and Previous Studies:

B. The researcher reviewed references and previous studies in the field of sports training (such as studies 3, 4, 6, and 7) and in Karate (such as studies 1, 2, 5, 11, 12, and 18) to identify research that focused on elastic resistance training as well as studies on the performance level of youth Karate athletes.

B. Observation:

The researcher identified the research problem through scientific observation.

C. Personal Interview:

The researcher conducted personal interviews with experts (a total of 10 experts) to gather their opinions on the questionnaires used for the tests, which measure specific physical capacities, as well as to define the components of the proposed training program. (Appendix 1)

D. Expert Opinion Questionnaires Used in the Study:

- The researcher designed a data registration form for the athletes (including name, age, height, weight, and training age). (Appendix 2)
- An expert opinion survey form was created to determine the components and time periods of the proposed training program using elastic resistance training. (Appendix 3)

E. Tests for Specific Physical Capacities: (Appendix 4)

F. Circular Kick (Mawashi-Geri) Test: (Appendix 5)

Exploratory Study:

The researcher conducted an exploratory study on a sample from the study population and outside the main sample, consisting of 14 athletes. The study took place from Wednesday, June 8, 2022, to Tuesday, June 14, 2022. The aim was to conduct scientific procedures for the tests used and assess their suitability for the current study.

Scientific Procedures Used in the Study:

Validity:

The researcher used discriminative validity by finding the differences between two groups: one consisting of distinguished athletes (7 participants) and the other consisting of non-distinguished athletes (7 participants). This test was conducted on Wednesday, June 8, 2022. The researcher calculated the significance of the differences between the distinguished and non-distinguished groups to confirm the validity of the tests.

Reliability:

The researcher used the test-retest method with a time gap of 7 days between the first measurement (from Wednesday, June 8, 2022, to Tuesday, June 14, 2022) and the second application of the test. This was conducted on the distinguished group of 7 athletes from the study population, outside the main sample of the research.

Training Program Using Elastic Resistance Training:

The researcher referred to several specialized references in the field of triple jump, tests, and measurements to determine the contents and periods of the training program, including the program's duration, the number of weekly training sessions, the length of each training session, and the load cycle. The program was then presented to the experts for their input to select the elements of the program that are suitable for the age group under study.

General Objective of the Program:

The program aims to improve some specific physical capacities and the performance level of the circular kick (Mawashi-Geri) for youth Karate athletes in Sohag Governorate using elastic resistance training.

Steps for Preparing the Proposed Training Program:

The elastic resistance training program was designed through the following steps:

- Reviewing previous research and studies on elastic resistance training.
- Identifying the most important physical fitness elements related to the research problem (muscular strength, balance, flexibility).
- Designing elastic resistance training exercises that align with the above physical fitness elements.
- Presenting these exercises in the form of a questionnaire, with expert opinions sought to select the most appropriate exercises. (Appendix 6)
- Applying some elastic resistance exercises to the exploratory sample to

determine how to structure the training load.

Foundations for Designing the Proposed Training Program:

The proposed training program was designed by identifying the best methods and principles for planning and preparing programs, based on expert opinions, references, and previous studies, as follows:

- Defining the timeline for implementing the proposed training program.
 - Identifying the main dimensions of the proposed training program.
 - Determining the proportions of the contents of the proposed training program.
 - Ensuring the program is suitable for the age group under study.
 - Ensuring safety and security factors.
 - Applying the principle of gradual progression from easy to difficult.
 - Considering individual differences between players according to the characteristics of the age group under study.
 - Focusing on proper formation of the load, the number of repetitions, sets within the units, and rest intervals between sets and repetitions.
 - The researcher consulted with experts in sports training, specifically in Karate (10 experts), through a survey regarding the components and periods of the training program. (Appendix 1)
- ### **Time and Proportional Distribution of Elastic Resistance Training Within the Training Program:**
- The proposed training program was designed according to scientific principles, reference research, and

expert opinions. The program includes the following components:

Determining the Duration of the Training Program:

The training program duration was set to eight weeks (two months), divided into two phases as follows:

- Phase 1 (General Preparation): Duration of 3 weeks.
- Phase 2 (Specific Preparation): Duration of 5 weeks.

Determining the Number of Training Units in the Program:

The number of training units was set at 3 per week for the sample under study, totaling 24 training units during the entire program.

Determining the Duration of Each Training Unit:

- Training unit time = 90 minutes, divided as follows: (10 minutes warm-up, 75 minutes main session, 5 minutes cool-down).
- Total time for the entire program = $8 \times 3 \times 90 = 2160$ minutes.
- Total time for the main session only (excluding warm-up and cool-down) = $8 \times 3 \times 75 = 1800$ minutes.
- Time for elastic resistance training = 720 minutes.
- Elastic resistance exercises are applied in the main session of the training unit.
- Proportion of elastic resistance exercises = 40% of the program time (720 minutes out of the total 1800 minutes of the main session).
- Time for general physical preparation = 360 minutes (20% of the program time, excluding warm-up and cool-down).

- Time for skill performance = 720 minutes (40% of the program time, excluding warm-up and cool-down).

Training Program Content:

The training program included elastic resistance exercises to improve certain physical capacities, as well as skill-based exercises to enhance the performance level of the circular kick (Mawashi-Geri) for the research sample.

Methods of Evaluating the Program:

The program was evaluated by comparing the pre- and post-test results in both physical fitness tests and the skill level of the circular kick for the research sample. Statistical methods were used to analyze these results in order to determine the impact of the proposed training program on the research variables.

Tools and Equipment Used in Implementing the Training Program:

Tools for Basic Variables (Anthropometric Measurements):

- Restameter for measuring height
- Medical scale for measuring weight (kg)
- Measuring tape
- Recording cards

Tools for Physical and Skill Capacities:

- Karate mat
- Cones
- Barriers
- Punch bags
- Official targets
- Flags
- Colored plastic hoops
- Measuring tape (centimeter)
- Training shirts

- Stopwatch
- Colored adhesive tapes

Procedures for Implementing the Research:

The researcher implemented the training program using elastic resistance exercises on the research sample as follows:

Pre-Measurements:

The researcher conducted pre-measurements for the variables under study on the research sample on Sunday, June 26, 2022. These measurements included the evaluation of specific physical fitness capacities and the skill level of the circular kick (Mawashi-Geri).

Implementation of the Training Program:

The researcher applied the training program using elastic resistance exercises on the research sample from Sunday, July 3, 2022, to Tuesday, August 30, 2022, for a period of 8 weeks, with 3 training units per week. This resulted in a total of 24 training units. The duration of each unit was set to 90 minutes. The researcher ensured the following during the implementation:

- Standardization of the training days, time, and location for the research sample.
- * Consistency in the measurement methods and order before and after the experiment.
- * Supervision of the researcher's application of the training program on the research sample.

Post-Measurements:

After completing the training program using elastic resistance exercises on the research sample, the

researcher conducted post-measurements on the research sample on Tuesday, September 3, 2022, under the same conditions and order as the pre-measurements. These included the evaluation of specific physical fitness capacities and the skill level of the circular kick (Mawashi-Geri).

Statistical Treatments Used:

Based on the nature and objectives of the research, the following statistical treatments were used:

- Mean
- Percentage
- Skewness coefficient
- T-Test for statistical significance
- Standard deviation
- Correlation coefficient
- Kurtosis coefficient

Presentation and Discussion of Results:

In line with the research objectives and to test its hypotheses, the researcher will present the results obtained and discuss them through statistical treatments of the data, in accordance with the nature and hypotheses of the research.

First Hypothesis - Presentation and Discussion of Results:

There are statistically significant differences between the pre- and post-measurements, with the post-measurements showing improvements in certain physical fitness capacities (muscular strength, flexibility, and balance) for youth Karate athletes in Sohag Governorate.

The researcher found statistically significant differences between the pre- and post-test means, favoring the post-tests, with calculated T-values ranging from 2.88 to 8.42,

which were greater than the critical T-value at the 0.05 significance level.

The researcher attributes this improvement to the research sample's participation in the proposed training program, which included elastic resistance exercises, leading to enhancements in muscular strength, balance, and flexibility.

The results are consistent with the study by Ahmed Youssef Abdelrahman (2015), which found that using elastic resistance exercises led to improvements in physical variables and skill level. The results of the study by Samar Mustafa Hussein and Hatem Fathallah Mohamed (2013) also support this, showing that elastic resistance exercises improved physical variables such as back strength, leg strength, abdominal endurance, and muscular strength in fencing athletes.

Furthermore, the findings align with Rasha Essam El-Din's study (2008), which confirmed that elastic resistance exercises improved physical fitness components, particularly arm and leg muscular strength. Similarly, Souzan Takwa Haji (2008) found that elastic resistance exercises enhanced both physical and skill capacities in swimmers.

These results are also in agreement with Taha Hossam El-Din et al. (1997), who indicated that resistance training helps develop various fitness components. They highlighted that resistance training continuously stresses and pressures muscles, which, over time, leads to adaptations in muscle structure, including muscle size, strength, and

improvements in tendons and ligaments.

Moreover, the results are supported by the findings of Mariam Mustafa Mohamed (2015), who confirmed that using suspended training equipment led to improvements in arm and leg muscular strength. Similarly, the results are consistent with those of Samah Mohamed Abdel-Mooti (2016), who indicated that suspended training improved physical and skill capacities in swimmers. Additionally, Nesma Mohamed Farag (2016) found that the training program with resistance exercises led to significant improvements in balance, leg strength, abdominal muscles, trunk, and hip flexibility.

This matches the observations of Martin Tuma (2014), Jordi Richard Gonzalez (2012), and Bc. Martin Hajnovic (2010), who confirmed that resistance training aids in developing strength, flexibility, balance, and stability—qualities important both in sports and daily life.

Therefore, based on the above, the researcher confirms the validity of the first hypothesis: **"There are statistically significant differences between the pre- and post-test means, favoring the post-tests in terms of certain physical capacities (muscular strength, flexibility, balance) in youth Karate athletes in Sohag Governorate."**

Second Hypothesis - Presentation and Discussion of Results:

There are statistically significant differences between the pre- and post-test means, favoring the post-tests in

terms of the performance level of the circular kick (Mawashi-Geri) for youth Karate athletes in Sohag Governorate.

The researcher found statistically significant differences between the pre- and post-test means for the performance level of the circular kick (Mawashi-Geri), favoring the post-test scores. The calculated T-values ranged from 5.35 to 6.61, which were greater than the critical T-value at the 0.05 significance level.

The researcher attributes this improvement to the research sample's participation in the proposed training program, which included elastic resistance exercises. This resulted in enhancements in muscular strength, balance, and flexibility, leading to improved skill performance in the circular kick (Mawashi-Geri).

According to Mohamed Hassan Allawy (1997), a lack of flexibility in athletes impacts strength, speed, and coordination, negatively affecting skill performance and increasing the risk of muscle and ligament injuries. (14: 247)

Wajih Shamandy (1993) mentions that recent years have seen increased attention from experts in sports and physical education to study various aspects of athletes' performance. This is done to improve their achievements, with motor abilities such as strength, speed, agility, and flexibility playing a crucial role in achieving high athletic levels. These abilities significantly influence the individual's physical and motor condition, enabling them to meet the demands of training and competition. (18: 263)

Ahmad Mahmoud (1991) points out that Karate, like any sport, has multiple competitions, each with its own characteristics. These include kumite (combat) and kata (forms), as well as individual and team competitions for both boys and girls. (1: 28)

Both Imad Al-Sarss and Wajih Shamandy (1993) agree that strength, speed, flexibility, agility, and reaction time are the most important physical abilities required for Karate athletes, and these are essential for reaching high athletic levels. (36: 11), (18: 18)

Wajih Shamandy (1993) further emphasizes that flexibility is a key physical component in Karate, particularly for executing technical and tactical skills. It is essential for performing moves with the legs and arms, such as side or circular kicks and trunk twists to deliver powerful and fast punches. This flexibility is important in both kata and kumite, where the range of motion plays a critical role in effective performance. (11: 17)

Amr Helawish (2002) notes that the circular kick is one of the most important kicks in Karate, especially in kumite, due to its numerous advantages. (12: 52)

Based on the above, the researcher confirms the validity of the second hypothesis: "There are statistically significant differences between the pre- and post-test means for the performance of the circular kick (Mawashi-Geri), favoring the post-test scores in youth Karate athletes in Sohag Governorate."

Conclusions:

Based on the objectives and hypotheses of the research, the study sample, and the statistical analyses of the data, the following conclusions were made:

- The training program using elastic resistance exercises has a positive impact on improving specific physical abilities (muscular strength, flexibility, balance) in youth Karate athletes.
- The training program using elastic resistance exercises also positively impacts the improvement of skill performance in the circular kick (Mawashi-Geri) for youth Karate athletes.

Recommendations:

Based on the research goals, hypotheses, and results, the researcher recommends the following:

- The proposed training program using elastic resistance exercises should be incorporated into the training process for Karate.
- Gradual progression should be followed when training with elastic resistance exercises, from easy to difficult.
- Attention should be given to using elastic resistance exercises to improve skill performance in Karate.
- A combination of elastic resistance exercises and skill development should be incorporated in Karate training.
- Further studies should be conducted to examine programs for improving physical abilities and their effects on defense and offensive levels in Karate for youth.
- More studies similar to the current research should be carried out on other sports and with different samples.

References:

Arabic References:

1. **Ahmed Mahmoud (1991):** "Developing Certain Specific Physical Abilities and Their Impact on the Performance Level of Punches and Kicks for Karate Juniors Aged 10–12 Years", Ph.D. Dissertation, Faculty of Physical Education, Alexandria University.
2. **Ahmed Youssef Abdel Rahman (2015):** "The Effect of a Training Program Using Resistance Bands on Some Physical and Skill Variables of Karate Players", Unpublished Research, Faculty of Physical Education for Boys, Benha University.
3. **Hanan El-Sayed Abdel Fattah (2005):** "The Effect of a Program Using Resistance Belts on Some Physical, Biochemical Traits and the Performance Level in the 200m Sprint", Published Research, Journal of Scientific Methodology and Behavior, Tanta University, Issue 4.
4. **Rasha Essam El-Din (2008):** "The Effect of a Proposed Program Using Resistance Bands on Muscular Power of the Legs and Arms and Performance Level in Shot Put", Third International Scientific Conference for Curriculum Development in Light of Modern Trends, Faculty of Physical Education for Girls, Zagazig University.
5. **Saeed Hussein (2010):** "A Training Program Based on Certain Skill Performance Determinants and Its Effect on the Effectiveness of the Roundhouse Kick for Karate Players", Unpublished Master's Thesis, Faculty

of Physical Education, Tanta University.

6. Samah Mohamed Abdel-Moaty (2016): "The Effectiveness of TRX Suspension Training on Certain Specific Physical Abilities and Performance Level of 100m Freestyle Swimmers", Scientific Journal of Physical Education and Sport Sciences, Faculty of Physical Education for Boys – El-Haram, Helwan University, Issue (76), Part (4).

7. Samar Mostafa Hussein & Hatim Fathallah Mohamed El-Hefny (2013): "The Effect of Some Proposed Exercises Using Resistance Bands on Some Physiological, Physical, and Skill Variables of Fencing Players", Published Research, Scientific Journal of Assiut University.

8. Sawsan Taqawi (2008): "The Effect of Training with Resistance Bands Underwater on Some Physical and Kinematic Abilities of Crawl Stroke Swimming Juniors", Unpublished Master's Thesis, University of Bahrain.

9. Sherine Ahmed Youssef El-Gendy (2008): "The Effectiveness of Using Resistance Bands on Muscle Strain Significance, Motor Speed, and Their Relation to Performance Level in Fencing", Published Research.

10. Talha Hussein Hossam El-Din, Wafaa Salah El-Din Mohamed, Mostafa Kamel Ahmed, Saeed Abdel-Rashid (1997): Scientific Encyclopedia in Sports Training, Vol. 1, Markaz Al-Kitab for Publishing, 1st ed., Cairo.

11. Emad El-Sers (2001): "The Effect of a Training Program on the

Development of Physical and Skill Traits Specific to Karate Players", Unpublished Ph.D. Dissertation, Faculty of Physical Education, Tanta University.

12. Amr Halawesh (2002): "Dynamic Characteristics of the Hip Joint and Its Active Muscles as a Basis for Performing the Reverse Straight Punch and Reverse Semi-Circular Kick", Unpublished Ph.D. Dissertation, Faculty of Physical Education, Tanta University.

13. Mohamed Allawi (1992): Sports Training Science, Dar Al-Maaref, Cairo, 12th ed.

14. Mohamed Allawi (1997): Sports Training Science, Dar Al-Maaref, Cairo.

15. Mariam Mostafa Mohamed (2015): "The Effect of a TRX Suspension Training Program on Developing Physical Fitness Elements Related to Some Offensive Skills in Female Basketball Players", Unpublished Master's Thesis, Faculty of Physical Education for Girls, Helwan University.

16. Mofty Ibrahim Hammad (2000): Fundamentals of Muscle Strength Development Using Resistance, Arab Thought Center, Cairo.

17. Nesma Mohamed Farag (2016): "The Effect of a Whole Body Resistance Exercise Program on the Performance Level of Some Basic Skills in Rhythmic Gymnastics and the Physical Traits of Female Students at the Faculty of Physical Education", Unpublished Ph.D. Dissertation,

Faculty of Physical Education,
Mansoura University.

18. Wageeh Shamandy (1993): "The Effect of Using Specific Exercises to Develop Speed-Power Strength of Muscle Groups Involved in Side Straight Punch Skill for Karate Players", Unpublished Master's Thesis, Faculty of Physical Education for Boys, Alexandria University.

Secondly, English References:

1) **Bc. Martin Hajnovič:** TRX (Závesný trénink), Diplomová práce, masarykova univerzita, Fakulta sportovních studií, Brno, 2010.

2) Jon Galen Beshop (2002): fitness through Aerobics dory fox san francisco.

3) **Jordi Martínez, Carlos Beltrán, Iván Alcalá, Richard Gonzalez:**

Application of TRX and RIP training to the development of strength endurance in tennis, ITF Coaching and Sport Science Review, 11 November 2012.

4) **Mark Gbrario (2002):** The complete Guide to Rebated Resistance Exercises sbry products INC Mundelein Illinos.

5) **Mark Ston, B.Sand Connie, MA(2006):** The Complete guide to Rubberized Resistancsies.

6) **Martin Tůma:** Využití TRX v tréninku juda, Bakalářská práce, masarykova univerzita, Fakulta sportovních studií, Brno, 2014.

7) **Sacks, A.,:**"Triple Jumb Technique, Track and Field,2000