



EFFECTIVENESS OF TRADITIONAL AND MODERN METHODS OF PHYSICAL TRAINING IN KARATE

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Abstract

Physical training in karate has historically relied on traditional means (kihon , kata, kumite, general physical training), but in recent years modern methods of conditioning training (strength training, plyometrics, HIIT/ sprint intervals, core) have been increasingly introduced. Training, combined protocols). The purpose of this article is to briefly summarize research data on the effectiveness of traditional and modern approaches in karate and outline practical implications for training (especially for kumite). The literature has consistently shown that modern methods, especially plyometrics, strength, and interval protocols, produce significant improvements in power, jumping, speed-coordination, and certain specific qualities (change of direction, striking technique), provided they are adequately dosed and combined with specialized techniques.

Keywords: Karate, physical training, strength training, plyometrics, HIIT, core training, kumite, kata.

Introduction

The scientific novelty of the study lies in the generalization and comparative analysis of the effectiveness of traditional and modern methods of physical training in karate, as well as in identifying their complementary role in the development of key physical qualities that determine the competitive performance of athletes.

Karate is a martial art in which athletic performance is determined by a combination of technical mastery and the ability to demonstrate high speed-strength performance under short-term but repeated episodes of maximum



intensity. Kumite emphasizes explosive power, speed, and the ability to quickly change direction. of direction , CoD) and maintain the accuracy of the technique under time pressure. This is confirmed by the fact that in recent years , Karate-specific agility tests/ CoD to assess functionally significant qualities in elite athletes, emphasizing the role of these particular components of physical fitness in karate [1].

The traditional karate training system has historically been based on specialized techniques (kihon , kata, kumite , and their variations), ensuring highly specific motor experience and technical control. However, modern sports science and practice increasingly point to the need for targeted development of "basic" physical qualities that ensure the potential for performing techniques at high speed and power. In particular, studies on elite karatekas demonstrate significant links between maximum strength and sprint/jump characteristics, which indirectly justifies the inclusion of systemic strength training as the basis for developing power and speed [1].

Among the modern methods of physical training, the most studied in karate are plyometric training, high-intensity interval protocols (HIIT), combined (concurrent) programs and core training. training). Thus, in a comparative study of young karatekas, a 6-week plyometric program demonstrated more pronounced improvements in power and strength characteristics compared to traditional kumite -oriented training under comparable experimental conditions [2]. It has also been shown that a 4-week HIIT program using specific karate techniques can influence jumping performance and the speed of direction changes, while emphasizing the presence of interindividual variability in the response to training (responders / non-responders) [3].

A separate area is targeted core training, which is considered a means of improving force transmission, stabilization, and postural control during striking techniques. In a controlled study, an 8-week core program strength Training for young karatekas improved core performance endurance , agility, flexibility, sprinting, jumping, and kicking performance characteristics, making this module a promising training element, especially in youth sports [4]. Current data also supports the effectiveness of combined programs that include strength work and



short sprint intervals for the comprehensive development of physical performance in karatekas [5].

Despite the growing number of studies on specific methods, the question of the optimal balance between traditional and modern physical training methods remains a pressing issue in applied practice: which methods provide the greatest transfer to competitive performance, how to combine them without compromising the quality of technical work, and how to account for age, skill level, and individual adaptation variability. Therefore, the purpose of this article is to summarize the scientific literature on the effectiveness of traditional and modern physical training methods in karate and outline practical guidelines for their integration into the training process.

The review was conducted using a narrative analytical approach. The search for scientific sources was conducted in the international databases Scopus, Web of Science, PubMed, and Google Scholar. As key words were used combinations: karate, physical training, strength training, plyometric training, high-intensity interval training, core training, conditioning.

The review included peer-reviewed articles and reviews published primarily within the last 10–15 years, as well as key fundamental works on physical training in karate and striking martial arts. Selection criteria included the presence of a described training intervention or training process analysis, the use of objective indicators of physical fitness, and relevance to competitive karate.

The literature analysis was qualitative in nature and aimed at comparing the effectiveness of traditional and modern methods of physical training and identifying general patterns of their influence on the physical performance of karatekas.

Traditional physical training methods in karate have historically developed in close connection with technical and tactical training and are aimed at developing physical qualities through specialized motor actions. The main traditional methods include kihon (repeated execution of basic techniques), kata (formalized sets of movements), kumite and its training forms, as well as elements of general physical training using one's own body weight.



The effectiveness of traditional methods is due to their high specificity for competitive activity. Regular practice of kihon and kumite promotes the development of speed endurance, motor coordination, and the ability to maintain technique under fatigue. According to review studies, systematic karate training is associated with improved lower extremity muscle strength, flexibility, and overall physical fitness in athletes of various ages and skill levels [6].

However, research points to certain limitations of traditional approaches. Despite their positive impact on overall fitness, traditional methods do not always ensure optimal development of maximum strength and explosive power, which are critical for competitive effectiveness, especially in the kumite discipline. Comparative studies note that the gains in speed and strength using traditional training alone are inferior to the effects of targeted conditioning programs [2].

Table 1 - Traditional methods of physical training in karate and their main effects

Method	Content	Developed qualities	Restrictions
Kihon	Repeating basic techniques	Coordination, local endurance, technical precision	Limited effect on maximum strength
Kata	Complex motor forms	Coordination, flexibility, muscle control	Low specificity to competitive kumite pace
Kumite (training)	Sparring and tactical tasks	Specific endurance, reaction speed	High load variability
Classical general physical training	Bodyweight exercises, running	General physical fitness	Insufficient target power load

Thus, traditional physical training methods provide the necessary specific foundation and are an essential component of the karate training process. However, for the targeted development of key physical qualities that determine competitive effectiveness, these methods require supplementation with modern conditioning tools.



In recent years, modern physical training methods borrowed from sports training and conditioning theory have been increasingly incorporated into karate training. Their primary goal is the targeted development of speed and strength, power, the ability to perform repeated high-intensity work, and fatigue resistance, which are directly relevant for competitive performance, particularly in the discipline of kumite.

One of the most studied methods is plyometric training, aimed at developing explosive strength and muscle contraction speed. Experimental studies show that incorporating plyometric exercises into karate training leads to significant improvements in jumping power, speed, and strength compared to traditional training [2]. This is due to increased neuromuscular activation and enhanced efficiency of the stretch-shortening cycle.

HIIT), including the use of specific karate techniques, has also become widespread. Such protocols have been shown to improve speed-strength performance, agility, and the ability to maintain high levels of performance in conditions similar to competition [3]. However, the authors note significant individual variability in the training effect.

Strength training is an important element of modern training, considered the foundation for developing power and speed. Research involving elite karatekas reveals a close relationship between maximum strength and sprint and jumping performance, confirming the need for systematic strength training throughout the year [5].

Special attention is paid to training the core muscles training), aimed at improving stabilization, force transmission, and postural control. In randomized trials, 8-week core programs were used in young karatekas. training led to improvements in agility, jumping, sprinting and some characteristics of striking technique performance [4].



Table 2 - Modern methods of physical training in karate and their effects

Method	Main focus	Main effects
Plyometric training	Explosive strength, power	Improved jump, speed, RFD
HIIT (including specific)	Anaerobic performance	Improved CoD , jump, re-power
Strength training	Maximum strength	Increase in power potential, mediated by an increase in speed
Core training	Stabilization and force transmission	Improving agility, sprinting, and striking techniques

Thus, modern physical training methods demonstrate high effectiveness in developing key physical qualities that determine performance in karate. Their use allows them to compensate for the limitations of traditional methods and ensure a higher level of physical fitness in athletes when rationally integrated into the training process.

A comparative analysis of traditional and modern physical training methods in karate reveals that these approaches are not mutually exclusive, but serve different yet complementary functions in the training process. Traditional methods ensure highly specific motor activity and the development of technical mastery, while modern methods focus on the targeted development of fundamental physical qualities that determine competitive performance potential. Traditional training (kihon , kata, kumite) promotes the development of coordination, specific endurance, and the ability to maintain technique under fatigue. However, literature indicates that its potential for developing maximum strength and explosive power is limited. In turn, modern methods (strength and plyometric training, HIIT, and core) training) demonstrate a more pronounced effect in improving the parameters of power, speed and change of direction, which are important for competitive performance in kumite .

From a modern sports training theory perspective, the most justified approach is an integrated one, in which modern conditioning methods complement traditional technical training without compromising its volume or quality. This approach enhances an athlete's physical potential and ensures a more effective transfer of physical qualities to competitive performance.



Table 3 - Comparative characteristics of traditional and modern methods of physical training in karate

Criterion	Traditional methods	Modern methods
Main focus	Technique, tactics, specificity	Strength, power, conditioning
Developed qualities	Coordination, specific endurance	Maximum strength, explosive power, CoD
Degree of specificity	High	Medium-high (when adapting to karate)
Transfer to result	Direct (through technology)	Indirect (through physical potential)
Restrictions	Insufficient power development	Risk of decreased specificity during isolation

Consequently, the optimization of the physical training of karatekas is achieved not by replacing traditional methods with modern ones , but through their rational combination, taking into account the training objectives, skill level and individual characteristics of the athletes.

Effective physical training in karate should be based on the principle of a rational combination of traditional and modern training methods. Traditional methods (kihon , kata, kumite) should be considered as the basis of specific training, ensuring the transfer of physical qualities to competitive activity. Modern methods (strength and plyometric training, HIIT, core) training) should be used for the targeted development of speed-strength and conditioning qualities that are limited in the framework of traditional training.

When planning the training process, it is necessary to take into account the age, skill level, and individual response of athletes to the load, as well as to ensure a gradual integration of conditioning tools without reducing the volume and quality of technical work.

Thus, an analysis of scientific literature demonstrates that traditional and modern physical training methods in karate serve complementary functions. Traditional methods provide highly specific and technically focused training, while modern methods are more effective in developing key physical qualities: strength, power, and speed. An integrated approach, in which modern conditioning methods are rationally incorporated into the training process, enhances athletes' physical



potential and contributes to improved competitive effectiveness in karate, is the most justified.

References

1. Xu Y ., et al . Sequencing effects of concurrent resistance and short sprint interval training on physical performance in male karate athletes // [Electronic resource]. – Mode access : <https://pmc.ncbi.nlm.nih.gov/articles/PMC12641751/>
2. Ioannides C ., et al . Effect of a 6-week plyometric training on power, muscle strength and rate of force development performance in young competitive karate athletes // Studia Universitatis Babeş-Bolyai , Educatio Artis Gymnasticae . – 2020. – PDF. – [Electronic resource]. – Mode access : <https://efsupit.ro/images/stories/iunie2020/Art%20236.pdf>
3. Ojeda - Aravena A ., et al . Effects of high-intensity interval training with specific techniques on physical fitness in karate athletes // Frontiers in Physiology. – 2021. – [Electronic resource]. – Mode access : <https://pubmed.ncbi.nlm.nih.gov/34887776/>
4. Kabadayi M ., et al . Effects of core training on physical fitness of youth karate practitioners // International Journal of Environmental Research and Public Health. – 2022. – [Electronic resource]. – Mode access : <https://pubmed.ncbi.nlm.nih.gov/35627351/>
5. Cinarli F . S ., et al . Maximum strength, sprint and jump performance in elite male karate athletes // Journal of Sports Science and Medicine. – 2024. – [Electronic resource]. – Mode access : <https://www.jssm.org/researchjssm-24-205.xml.xml>
6. Piepiora PA The health effects of karate training: A review of 21st century research // Healthcare. – 2025. – Vol. 13, No. 1. – Article 54. – DOI: <https://doi.org/10.3390/healthcare13010054>.