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Review article

Physical Training Methods to Improve the Physical Condition Components of Elite Taekwondo Athletes in The Kyorugi Category: A Systematic Review

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Abstract

Objectives. The study aimed to provide a systematic review of physical training methods to improve the physical condition components of elite taekwondo athletes in the kyorugi category.

Materials and methods. An extensive literature assessment of earlier research was carried out. The objective was to examine articles published between 2020 and 2024 that describe strategies for improving the physical condition component of taekwondo athletes. The electronic search was conducted using Google Scholar, PubMed, Web of Science, and Scopus. The articles that addressed methods for enhancing physical condition through exercise were compiled.

Results. Sixty publications used training approaches to enhance the physical condition component of elite taekwondo athletes in the kyorugi category. Based on the physical state that is assessed and improved, items are categorized. Among the physical training methods that can be applied in the Taekwondo category of kyorugi are plyometric training, circuit training methods, speed, agility, and quickness (SAQ) training; strength training, endurance training, flexibility training, reaction training, power training, coordination training, balance training, resistance training, and functional training.

Conclusions. After thorough analysis, several training techniques have been shown to be effective in enhancing the physical attributes of elite taekwondo athletes in the kyorugi category. These attributes include flexibility, response, strength, power, coordination, agility, speed, balance, and VO_2max.

Keywords: systematic review, taekwondo, kyorugi, physical condition components.

Introduction

The physical challenge of taekwondo is shown in the level of activity and physiological reactions that take place throughout a tournament. Corresponding physiological responses are associated with an individual's psychological condition. This is consistent with Nugroho's assertion that people may effectively and appropriately handle the stress they encounter and overcome obstacles in their lives, which is defined by control, commitment, and difficulties (A. R. Nugroho, 2023). In-depth individual counselling is required in order to offer substitute answers (Firmawati, 2023). The goal of counselling is to help people understand who they are, get past obstacles in their personal, social, emotional, or academic lives, and reach their full potential in a variety of spheres of life (Rababa et al., 2022). Similar to this, practicing taekwondo-in calls for excellent physical and psychological health (Ouergui et al., 2022). The degree to which a person's body is in good shape or not is determined by their physical state (Gallardo & Garcia-unanue, 2023). In order to withstand the physical demands of competing at a high level of competition, taekwondo-in must be in optimal physical condition (Ms & Jun, 2022). In addition to providing a structured strategy for reaching long-term professional objectives or official competition preparation, training sessions are an element of attempts to satisfy physical needs (Pryimakov et al., 2023).

Physical conditioning, which tries to enhance biomotor skills and optimize physiological capacity, is the most crucial aspect of taekwondo training (Sim et al., 2022). In line with the training objectives, physical training can also be accomplished in a manner that is focused on growth and structure (Hermawan et al., 2021; Jariono, Nugroho, et al., 2021; Jariono, Nurhidayat, Sudarmanto, et al., 2021; Jariono & Subekti, 2020; H. Nugroho et al., 2021). Due of the intricate technical and tactical content of taekwondo. The only methods utilized to determine the elements of physical condition are the tournaments and training of Indonesia's top taekwondo competitors. Since Taekwondo-in is a cohesive unit, it is impossible to dissect their performance into its component elements. As a result, training plans that are tailored to the needs of the sport are created. Because of this, the goal of this study was to evaluate the training methods employed to enhance the taekwondo-in physical condition component and to compile the results of all the studies. in order to observe the taekwondo athletes' physical conditioning training procedure.

Taekwondo has extensive technical and tactical content; thus, physical training can also be done in its own style that is aimed towards the training goal from a structural and developmental point of view. The components of physical fitness are determined by the championship activity itself. The physical state of elite taekwondo athletes is a functional unit that works as a whole; hence, it is impossible to dissect their performance into its component elements. This results in the creation of a training regimen tailored to the specific requirements of the sport. Therefore, in order to monitor the process of physical conditioning exercises that are in line with taekwondo athletes, this study attempts to investigate the training strategies used to enhance the physical condition of taekwondo-in and explain the findings of each study.

Materials and Methods

Database and Search Profile

This systematic review is carried out using electronic searches on Google Scholar, Web of Science, Scopus, and PubMed. The terms "training" and "Taekwondo" are combined while conducting electronic searches. The search strategy is divided into four parts. Initially, 800 papers were located by electronic searches of the PubMed, Web of Science, Google Scholar, and Scopus databases. The second round of screening involved 200 article titles and abstracts and 500 items were eliminated. There were now 100 articles after 100 things were removed for various reasons. The third step involves a comprehensive evaluation and analysis of the entire work, covering the title, abstract, methodology, results, discussion, and conclusion. Following a thorough review of the articles, forty were disqualified for not fulfilling the prerequisites for membership. Reading the relevant document is the fourth step. As of right now, fresh studies have yet to be included. Thus, a total of sixty publications exists. The systematic review started in January 2020 and will be updated every three months until March 2024. Table 1 outlines the search tactics for the databases Google Scholar, Web of Science, PubMed, and Scopus, as well as the historical context of the searches. Table 2 then explains the inclusion and exclusion criteria. Papers for meta-analysis were chosen using the PRISMA Statement for Meta-analysis, which covers Identification, Eligibility Screening, and Inclusion, after the literature was reviewed (Page et al., 2021) (Figure 1).

Methodological Quality Assessment

Eleven PEDros (Physiotherapy Evidence Database) criteria were used to evaluate the quality of the examined publications, and their methodological quality was also evaluated. Good articles help users overcome obstacles like time constraints and poor critical thinking abilities, and they also make it simpler to incorporate high-quality clinical research into clinical practice. According to Moseley et al. (2020), articles with a score of eight to eleven are regarded as having high methodological quality, articles with a score of four to seven are regarded as moderate, and articles with a score of four or less are not evaluated. Clinical practice guidelines and systematic reviews are not evaluated (Moseley et al., 2020).

Moderator Evaluation

Aiming to provide data with six or more subgroups for comparison (e.g., female versus male; Pencak Silat versus

Table 1. Shows the search technique (code line) and search history background for each database

The search's date	Databases	Keywords
January 2020	Google Scholar, PubMed	"Plyometric training", "Circuit Training",
March 2021	Google Scholar, Web of Science (Core Collection), Scopus, and PubMed	"Plyometric training", "Circuit Training", "Speed, Agility, and Quickness (SAQ)", "Strength", "Endurance", "Flexibility", "Reaction", "Power", "Coordination", "Balance", "Resistance", "training"
May 2022	Google Scholar, Web of Science (Core Collection), Scopus, and PubMed	"Plyometric training", "Circuit Training", "Speed, Agility, and Quickness (SAQ)", "Strength", "Endurance", "Flexibility", "Reaction", "Power", "Coordination", "Balance", "Resistance", "training"
June 2023	Google Scholar, Web of Science, Scopus (Core Collection), and PubMed	"Plyometric training", "Circuit Training", "Speed, Agility, and Quickness (SAQ)", "Strength", "Endurance", "Flexibility", "Reaction", "Power", "Coordination", "Balance", "Resistance", "training", and "Functional training"
March 2024	Google Scholar, Web of Science, Scopus, and PubMed (Core Collection)	"Plyometric training", "Circuit Training", "Speed, Agility, and Quickness (SAQ)", "Strength", "Endurance", "Flexibility", "Reaction", "Power", "Coordination", "Balance", "Resistance", "training", and "Functional training"

Table 2. Inclusion and exclusion criteria of a systematic review of physical activity

Classification	Criteria	
	Inclusion	Exclusive
Population	Athletes practicing taekwondo are in good health and have no limitations on their level of competition, gender, or age	Individuals with health issues (such as recent surgery or injury) are prohibited from participating in scheduled circuit training and plyometric exercise
Intervention	Programs that involve unilateral and bilateral leaps and last at least three weeks, such as plyometric training and circuit training, typically employ pre-stretching or Countermovement, which emphasizes cycles of stretch-shortening	The exercise intervention was devoid of any Plyometric workouts, circuit training (such as training treatments that focus solely on upper body plyometrics), or plyometric exercise interventions when combined with other training interventions, jump training programmes make up less than 50% of the whole training load (volume, e.g., number of exercises) (e.g., high-load resistance training)
Comparator	The group under control is traditional sports training, alternative training methods, physical activity, and sedentary	I do not have a control group
Result	At least one measurement was taken both before and after the intervention exercise that is related to aspects of physical condition (e.g., body fat; countermovement jump height) and sport-specific performance (e.g., kicking speed)	Primary data and follow-up need to be included

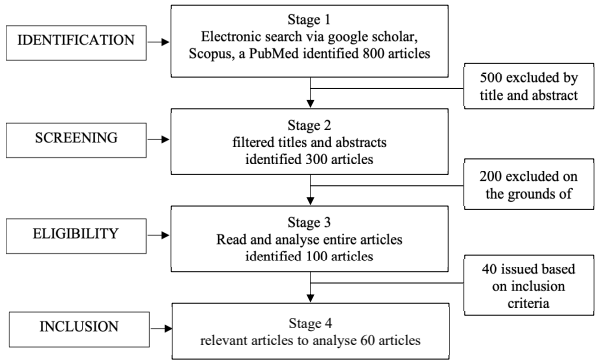

Fig. 1. Diagram of the search process flow

taekwondo; Physical Training Methods (PTM) and Physical Condition Components (PCC) less than eight weeks compared with PTM and PCC more than eight weeks), moderator analyzes were planned. For subgroup allocation, the median split technique (Moran et al., 2017, 2018) was applied as appropriate.

Results

Number of Results Reviewed

800 papers were located in the first round of computerized searches using Google Scholar, Web of Science, Scopus, and PubMed; no duplicate articles were discovered. The next step involved filtering 500 articles using the title and abstract; the second stage involved filtering again using the title and abstract; 200 articles were removed along with a justification; the third stage involved reading and analysing every article by determining the outcomes, leaving 100 articles to be reviewed overall. Out of the 100 articles, 40 were discarded, leaving 60 articles that satisfied the notability standards according to the PEDro scale. The physical condition component is used to group this item (table 3).

Exercise Significance Results

Regardless of gender, age, professional level, novice or expert athletes, or the kind of training done, of the 60 studies that were chosen and examined, an overall analysis of the 60 publications produced noteworthy findings regarding the physical state of taekwondo athletes.

Discussion

Plyometric Training

A workout regimen that improves both strength and speed is called plyometric training (Subathra et al., 2023). This exercise is necessary for taekwondo athletes because it tests their ability to respond forcefully and swiftly in both attacking and defending situations (Kim & Lee, 2023). Accordingly, it has been demonstrated that plyometric exercise increases explosive action (Thapa & Ramirez-campillo, 2023). This can be explained by the fact that several exercise kinds are done, which could affect the exercise's outcomes (Moran et al., 2023). As noted by Fischetti et al. When coupled with other activities, Fischetti, et.al. (Fischetti et al., 2018), which mixed weight training and plyometric training in a three-group experiment, produced varying results (Deng et al., 2023). Three groups were assigned: one for weight training exclusively, another for weight training combined with plyometric exercises, and a control group (Huang & Huang, 2023). After six weeks of training, the results demonstrated that plyometric training more successfully enhanced sprinting, acceleration, deceleration, and jumping than did weight training alone (Campillo et al., 2023). Better outcomes for enhanced muscle performance are obtained

Table 3. Features and outcomes of taekwondo athletes' physical condition component training programs

N.	Author, Year	Physical Condition Variable	Training Type	Sig.(p)
1	Bujak & Gierczuk, 2024	Power, physical performance	Anaerobic Performance and Competitive Experience	Sig.
2	Taha, 2024	physiological capacity and technical performance	Training Program Using High-Intensity Interval Training	Sig.
3	Vincent, 2024	Balance and Single-Leg	Functional performance	Sig.
4	Messaoudi et al., 2024	Plyometric – based conditioning activity (CA)	Combination with a plyometric-based CA during warm-up setups an individualized warm-up strategy and serves to improve the subsequent specific performances	Sig.
5	Boyanmis, 2024	Strength Measurement	Herman Tainer, Manual Tester, and Standing Long Jump	Sig.
6	Fadhila et al., 2024	Weight Loss	Circuit Body Weight Training	Sig.
7	Niewczas et al., 2024	Psychomotor skills	With training experience, body mass, and technical-tactical skill levels	Sig.
8	Thurlow et al., 2024	Physical Fitness and Physiological Adaptation	Repeated-Sprint Training	Sig.
9	Tropin et al., 2024	Strength performance	Static-dynamic exercises	Sig.
10	Lubis et al., 2024	Body composition, power, and kicking speed	Six-week plyometric, functional, and interval trainings	Sig.
11	Tomasz et al., 2024	Strength	Effective Mass on the Strength of Side and Turning Kick	Sig.
12	Kim & Lee, 2023	Physical Fitness and Electronic Hogu Hitting Ability	Basic physical fitness (muscle endurance, flexibility), isokinetic muscle function (knee endurance, low back strength),	Sig.
13	Arnando et al., 2024	Ability	Agility Training	
14	Li et al., 2023	lower limb explosive strength	Circuit strength combined with blood flow restriction training	Sig.
15	Khazaei et al., 2023	Bio motor capacities	Traditional resistance training and functional training	Sig.
16	Kim & Lee, 2023	Body Composition, Physical Fitness and Electronic Hogu Hitting Ability	12 Weeks Weight Training and Plyometric Training	Sig.
17	Kudryavtsev et al., 2023	Physical fitness and sport performance	Short-term functional training intervention	Sig.
18	Jeong et al., 2023	Effects of Taekwondo Training on Growth Factors in	A Systematic Review and Meta-Analysis of Randomized Controlled Trials	Sig.
19	Ouergui et al., 2023	Plyometrics, repeated techniques	Effects of conditioning activity mode, rest interval and effort to pause ratio on post-activation performance enhancement	Sig.
20	Nabilpour et al., 2023	Psychological skills, anaerobic fitness, and aerobic fitness	An investigation into the associations between	Sig.
21	Thapa & Ramirez-campillo, 2023	Physical Fitness	A Systematic Review with Meta-Analysis, Plyometric-Jump Training	Sig.
22	Nia et al., 2023	Limb Muscle Power Components, Leg Length, and Pelvic Flex	Contribution of Dollyo Chagi's Kick	Sig.
23	Abadi, 2023	Metacognitive Beliefs and Sports Performance	The Effect of Mental and Physical Training	Sig.
24	Hikmah et al., 2023	Increasing agility	ladder drill training effective	Sig.
25	Fajar et al., 2023SAQ, and Traning Circuit	Improving leg power and Dolyo Chagi kick speed	plyometric, SAQ, and circuit training methods	Sig.
26	Fajar, 2022	Power, Agility, and Resting Pulse	Plyometric Exercise and Ladder Drill	Sig.
27	Iwan Hermawan et al., 2022	Physical condition	Descriptive study	Sig.
28	Noor et al., 2022	Psychological and Physical Factors	Systematic Review	Sig.
29	Pryimakov et al., 2022	Physical development, speed and strength fitness	Relationships between the parameters	Sig.
30	Ambro, 2022	Physical Fitness	CrossFit Training	Sig.
31	Rydzik et al., 2022	Physical Fitness	Training Experience	Sig.

Table 3 (continued)

N.	Author, Year	Physical Condition Variable	Training Type	Sig.(p)
32	Harbili et al., 2022	Strength	bilateral isokinetic and isometric strength differences	Sig.
33	Taati et al., 2022	Aerobic power, anaerobic fitness, and agility performance	Specific field test for estimating aerobic power, anaerobic fitness, and agility performance	Sig.
34	Ouergui et al., 2022	Psychological and Physical Performances	Low Dose of Caffeine Ingestion Combined with Conditioning Activity	Sig.
35	Rocchi et al., 2022	Endurance and power	High intensity functional training	Sig.
36	Srianto & Siswantoyo, 2022	Speed and Flexibility	Biomotor Analysis	Sig.
37	Ansharudin et al., 2022	Agility and Speed	Traditional Sports Practice	Sig.
38	Rocchi et al., 2022	Endurance and power	High intensity functional training	Sig.
39	Jariono, Nurhidayat, Nugroho, et al., 2021	Special preparatory physical condition training program, pre-competition physical condition training program, main competition physical condition training program, transition physical condition training program, and compiling an exercise program	Strategies to improve jump service skills	Sig.
40	Waffak et al., 2022	Agility	Water exercise and sand exercise training methods	Sig.
41	Gen, 2021	Athletic Performance	Plyometric Training Program	Sig.
42	Alfian Noha Zulkarnain, Agus Kristiyanto, 2021	Speed and agility	Body weight strength training and plyometric	Sig.
43	Ruddock et al., 2021	High-Intensity Conditioning	Practical Recommendations	Sig.
44	Baek et al., 2021	Training on Body Composition	Training on Body Composition: A Systematic Review and Meta-Analysis	Sig.
45	Fachrezzy et al., 2021	Physical condition, self-confidence, and comparison of leg muscle explosive power and core stability	Kicking ability	Sig.
46	Junior, 2021	Strength-endurance	Developing	Sig.
47	Chun et al., 2021	Anaerobic Power and Dynamic Postural Stability	Core Balance and Plyometric Training	Sig.
48	Ojeda-aravena et al., 2021	General and Specific Physical Fitness	Technique-Specific Protocol with High-Intensity Intervals	Sig.
49	Sung et al., 2021	Preliminary Study of Pre-Season Taekwondo Preparation Strategy	Personal Isolation Training	Sig.
50	Yilmaz, 2021	Performance	Different Flexibility Studies	Sig.
51	Enrique et al., 2020	Improves specific performance	High-intensity interval training	Sig.
52	Zadoroznha, 2020	Tactical training of elite athletes in Olympic combat sports	Practice and experience	Sig.
53	Khayyat et al., 2020	Physical, physiological and psychological	Descriptive	Sig.
54	Silva et al., 2020	Acute weight loss and physical performance	12 hour-fasting promoted by breakfast omission	Sig.
55	Alp & Gorur, 2020	Explosive Strength and Anaerobic Power Performance	Comparison of Taekwondo and Karate Athletes	Sig.
56	Lee et al., 2020	Functional ankle instability	Plyometric versus ankle stability exercises on lower limb biomechanics	Sig.
57	Prieske et al., 2020	Anthropometry, Body Composition, and Physical Fitness	An Exploratory Study	Sig.
58	Vasconcelos et al., 2020	High-Intensity Interval Training in Combat Sports	A Systematic Review with Meta-Analysis	Sig.
59	Orkun AKCAN et al., 2020	Body Composition and Muscular Strength	High Intensity Interval Training in Different Forms Applied to Combat Athletes	Sig.
60	Torrealba et al., 2020	Performance	high-intensity interval training in hypoxia	Sig.

by gradually increasing the number of plyometric activities (Henrique et al., 2023).

Circuit Training Methods

According to Stojanović et al (Stojanović et al., 2023) the circuit training approach consists of a sequence of exercises where each post has a single type of action. The number of posts can range from 4 to 12. One of the more sophisticated training techniques for enhancing general physical health, including the fundamental biomotor components, is circuit training (Ziyaiyan et al., 2023). Circuit training is defined as training that consists of a set of distinct exercises performed consecutively and continuously at each post during a single lap (Sunarto et al., 2023). Leg muscle explosiveness can be greatly increased by circuit training, especially circuit training that incorporates strength and speed training movements (Subathra et al., 2023).

Speed, Agility, and Quickness (SAQ) Training

One of the training techniques that has gained popularity is speed, agility, and quickness (SAQ), which affects the development of fundamental skills to help athletes become more proficient with greater speed and accuracy (Sharma, 2023). One of the most effective contemporary sports training techniques is SAQ exercise, which promotes quick movements and enhances agility, response speed, fitness, explosiveness, and non-aerobic capacity (Ateef Abdul-Khaleq Ahmed, 2023). The activities in the training program are suitable for enhancing speed and agility, and they also lead to the creation of a more relevant and functional motor program that regulates intricate intramuscular coordination (Singh, 2023). Via neuromuscular growth, SAQ can also acquire the ability to govern gestures. Reprogramming the neuromuscular system to increase mobility efficiency is intended to enhance multidirectional mobility and explosiveness.

Strength Training

According to (Gäbler et al., 2018) strength is the most crucial element that forms the basis for other physical condition elements and is a prerequisite for nearly all sports. To grab the coach's attention, you must therefore increase the strength component's capacity. Strength is a physical attribute that can be enhanced to the fullest extent possible based on the demands of each sport (Jamka et al., 2022). Sports games will not require the same level of strength needed for weightlifting (Murlasits et al., 2017). The ability of a muscle to execute continuous or repetitive work against resistance with maximum effort is another definition of muscle strength (Jamka et al., 2021).

Endurance Training

Anaerobic endurance is required in taekwondo sports for competitive levels of play. Taekwondo competitors must use all of their physical prowess to execute attacks in the fast-paced, high-tempo championship (Demir, 2023). One of the most important components of motor skills is endurance, which comes from a student's psychological ability to support movement at any given time (Bahtra et al., 2023). The capacity of muscles to sustain high-intensity activities or static positions is known as muscle endurance (Markov et al., 2023). A condition that emphasizes the ability to work continuously in an aerobic environment is called endurance. The ability to perform a task for a long period of time without experiencing excessive fatigue is called endurance (Matomäki et al., 2023). When it comes to muscle training, endurance is the capacity to train a muscle or set of muscles in a specific amount of time, whereas the body's organs' capacity to function within a specific time frame is measured by the energy system (Bruggisser et al., 2023).

Flexibility Training

The development of athletic accomplishments depends heavily on the flexibility component. Because other aspects of physical conditions are significantly impacted by flexibility. One of the things that leads to subpar performance and ineffective technique is a lack of flexibility, which can also result in excessive stress and tears in the muscles during exercise (Vetter et al., 2023). According (Bouguezzi et al., 2023) state that insufficient flexibility is the reason for both inadequate endurance and a lack of speed. The muscles will have to work harder to overcome the resistance of dynamic and prolonged exercises if there is insufficient flexibility (Warneke, Wohlann, et al., 2023). One may become faster and more agile, and their energy consumption may even decrease, by expanding their range of motion in their ankles, pelvic, buttocks, and shoulder joints. to enable sportsmen to exert more energy and work for longer (Warneke, Wirth, et al., 2023). Elevated testing of flexibility could be linked to strain-induced modifications in the muscle-tendon complex (Wohlann et al., 2023). According to (Sobrinho et al., 2023), multicomponent training in conjunction with flexibility training improves joint angles and body alignment while also lowering blood pressure.

Reaction Training

The ability to initiate a kinetic response as fast as possible in response to a stimulus is known as reaction speed (Rozi et al., 2023). The degree to which the perception situation, the kinetic response to be executed, and the state of the physical environment are recognized all influence how quickly an individual reacts (Sullivan & Jeong, 2022). Having quick reactions is crucial for enhancing athletic performance. Reaction speed is immediately used to generate effective, efficient, and economical motions, facilitate the mastery of advanced methods, coordinate multiple movements, and aid in self-adjustment to the opponent and his surroundings (Romanenko et al., 2022).The sports involved will be impacted by speed. in connection with power. This is due to the fact that power output increases with speed. This is so because power is built through speed.

Power Training

The attack or defence's computed value is determined by how accurately, rapidly, steadily, and strongly it strikes the target field; this power is essential to any strategy that is used (Taati et al., 2022). The power in question is the strength associated with the arms and legs, which are the

fighting equipment used in taekwondo (Rocchi et al., 2022). A taekwondo practitioner with strong arm muscles can execute punches and other arm-powered attacks with ease. This along with their excellent coordination will allow them to score the desired number of points.

Coordination Training

Technical proficiency and physical prowess have a major role in taekwondo skills (Brach et al., 2022). Coordination is one of the physical qualities a taekwondo athlete needs to have in order to execute offensive moves (Lyuchkova et al., 2022). The capacity to combine a wide range of movements into one or more targeted motion patterns is known as coordination (Miftachurochmah & Sukamti, 2022). Exercises that include flexing the body are designed to strengthen the muscles, respiratory system, and central nervous system. Regular exercise routines that incorporate balance and agility exercises will improve motor coordination.

Balance Training

Exercises for improving balance can also assist prevent injuries to the body and increase strength, flexibility, and ability (Mccrum et al., 2022; Sarasso et al., 2022). The capacity to keep the neuromuscular system in an efficient position or attitude to move, whether attacking or defending, is known as balance.

Resistance Training

For optimal results, resistance training (RT) combined with aerobic training is recommended (Serafim et al., 2023). As a result of this knowledge growing and the desire to increase physical activity, various RT techniques have been developed (Way et al., 2023). This approach gives little weight to aesthetics or sports performance enhancement when evaluating health, well-being, and quality of life (Burgos-jara et al., 2023). Resistance training is a type of physical activity that uses specialized equipment to enhance muscular function and shape (Weakley et al., 2023). In order to increase muscle strength, endurance, mass, growth, and hypertrophy, this exercise will teach muscles to contract against the instruments utilized (Jukic et al., 2023).

Functional Training

Specialized physical exercises that develop strength throughout the body are part of functional training (Raphael et al., 2023). The athlete's mobility and stability will improve when they execute the exercises during functional training appropriately (Wang et al., 2023). Exercises known as "functional training" involve the use of basic instruments or no tools at all, such as one's own body weight (Oliveira et al., 2023). Sports motions that are modified to the body's movements during everyday activities are generally referred to as functional training (Pantoja-cardoso et al., 2023).

Conclusions

Following a detailed examination, it was discovered that a large number of training regimens were created with the goal of enhancing the taekwondo competitors' physical attributes, such as strength, muscular strength, speed and acceleration, flexibility, agility, explosiveness, and balance.

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Conflict of interest

All authors declare no conflict of interest.

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Методи фізичної підготовки щодо покращення складових фізичного стану елітних спортсменів з тхеквондо у категорії «кьоругі»: Систематичний огляд

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Реферат. Стаття: 13 с., 3 табл., 1 рис., 120 джерел.

Мета дослідження. Метою дослідження було проведення систематичного огляду методів фізичної підготовки щодо покращення складових фізичного стану елітних спортсменів з тхеквондо у категорії «кьоругі».

Матеріали та методи. Здійснено комплексний літературний аналіз попередніх досліджень. Завдання полягало у дослідженні статей, опублікованих між 2020 та 2024 роками, які описують стратегії поліпшення показників складової фізичного стану спортсменів з тхеквондо. Електронний пошук здійснювався за допомогою наукометричних баз даних Google Scholar, PubMed, Web of Science та Scopus. Було відібрано статті, в яких розглядалися методи покращення показників фізичного стану шляхом виконання фізичних вправ.

Результати. Шістдесят публікацій містили інформацію щодо застосування тренувальних підходів для покращення складової фізичного стану елітних спортсменів з тхеквондо у категорії «кьоругі». Залежно від фізичного стану, показники якого оцінюються та покращуються, статті класифіковано за категоріями. Серед методів фізичної підготовки, які можуть застосовуватися в тхеквондо категорії «кьоругі», варто зазначити пліометричні тренування, методи кругового тренування, тренування на швидкість, спритність і моторність (SAQ); силові тренування, тренування на витривалість, тренування на гнучкість, тренування на розвиток реакції, силові тренування на здатність долати опір за найкоротший проміжок часу, тренування на координацію, тренування на рівновагу, тренування з опором і функціональні тренування.

Висновки. Після проведення ретельного аналізу було встановлено ефективність кількох тренувальних методик щодо покращення фізичних якостей елітних спортсменів з тхеквондо у категорії «кьоругі». До таких якостей належать гнучкість, швидкість реакції, сила, потужність, координація, спритність, швидкість, рівновага та показник максимального споживання кисню (VO_2max).

Ключові слова: систематичний огляд, тхеквондо, кьоругі, складові фізичного стану.

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