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# The teaching and learning of kickboxing: pedagogical recommendations

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**Abstract.** The training of kickboxing teachers is carried out by federations and confederations with the condition that they acquire a black belt, the highest degree of technical improvement. It has as a prerequisite years of practice in the modality and having passed the colored belt exams. Therefore, teachers are limited to repeating the movements and structures that were passed on by their teachers, without a theoretical and critical training of the teaching and learning process. In this sense, teaching sport to children, adolescents, recreational adults, adult competitors and the elderly are pedagogically different. Children must go through playful activities with diversified motor stimuli, from adolescence onwards there begins to be specialization, recreational adults for specialized training without forceful blows (so as not to injure, as most of them work), adults competitors for situations closer to competition and the elderly for light functional training and without bruising techniques. Other variables should be taken into account when planning lessons, such as student goals, age groups, available materials, and injury history. As it is a contact sport, didactic-pedagogical errors can increase the chances of injuries and dropout of students. Thus, it is important that there is a solid and continuous training on the part of these professionals. In the absence of teaching materials to assist these teachers in the teaching process, this article seeks to bring knowledge of sport pedagogy and recommendations to increase excellence in the teaching-learning process of teacher-students in different age groups in the kickboxing modality.

**Keywords:** Sport Pedagogy; Physical Education; Martial arts; Combat sports.

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## Introduction

Sport pedagogy brings different ways of teaching to different age groups (NASCIMENTO et al., 2009) in a scientifically based way (GALATTI et al., 2014). It was only in the 1960s and 1970s that sport education began to be based on sport pedagogy (LIGHT; DIXON, 2007). According to Rufino and Darido (2012), teaching based on the theories of sport pedagogy should not be exclusive

to the formal environment (in schools), but also in the informal environment (clubs and academies) including fight dojos (place where martial arts are practiced).

Kickboxing is a worldwide known and widely practiced combat sport (DA SILVA DUARTE et al., 2021). In 2018, the International Olympic Committee recognized it (DUGONJIĆ; KRSTULOVIC;

KUVAČIĆ, 2019), making it an Olympic sport in June 2021 (DA SILVA DUARTE et al., 2021a). This sport can be used both for competitive purposes and for health (DA SILVA DUARTE et al., 2021a). With regard to the training of these teachers on the world stage, the responsibility lies with the World Association of Kickboxing Organizations (WAKO), and in Brazil, the confederation affiliated with WAKO and responsible for the legality of certificates and supervision of the modality is the Brazilian Confederation of Kickboxing. (CBKB).

In the training process, the kickboxing practitioner trains for years and goes through the colored belt exams indicated by the teacher until reaching the black belt level (professor of the modality) (RITSCHHEL, 2008). In this system, the theoretical part is neglected in training, causing many teachers to reproduce the techniques and exercises learned from their teachers, without a critical view of the teaching and learning process (RUFINO, 2012).

Currently, there are review articles that address the teaching process in the following modalities: karate for children (PROENÇA; MANZATO; SANT'ANA, 2021, Brazilian jiu-jitsu (without targeting age group) (SCHMIDT; RIBAS, 2020) and judo for children (FRANCHINI, 1998), however, there is still a lack of literature in the teaching-learning process of the kickboxing modality and in different age groups (children, adolescents, recreational adults, adult competitors and the elderly). Considering the importance of theoretical knowledge to guide this process and the lack of materials with the modality on the subject in question, the present study aims to recommend pedagogical strategies for children, adolescents, recreational adults, adult competitors and elderly practitioners of kickboxing.

### *Kickboxing: Historical, physiological aspects and fundamentals*

Kickboxing is a modern combat sport that pushes athletes to push the limits of various aspects of physical fitness (SLIMANI et al., 2017). It arose from the dissatisfaction of karateka who were dissatisfied with the limiting rules of their modality (cadenced combat with blows without force), as they wanted more dynamic combat (RITSCHHEL, 2008). Then, in 1973, in Los Angeles, the first full contact karate world championship took place, which in 1980 was renamed kickboxing, which passes the idea of kicking boxing (CBKB, 2021). A formal kickboxing competition lasts for 3 rounds, 2 minutes long and with a 1-minute break between each round (OUERGUI et al., 2013). The objective of the fight is to win by points (hit hits on the opponent without the respective defense) or by knockouts/blunt force (OUERGUI et al., 2013), and may also end up by giving up and/or being interrupted by the referee.

Kickboxing is a sport in which punches, kicks and knees are allowed (LYSTAD, 2015). These offensive techniques make the glycolytic system demanded and movement during combat makes the oxidative system important, even for recovery between each round (SALCI, 2015). Kickboxing consists of four mat modalities: musical forms, point fight, light contact and kick light; and three in the ring: low kick, full contact and k1 (DA SILVA DUARTE et al., 2021a). The tatami modalities aim to be non-blunt scoring combats, the ring modalities, in addition to scoring, are allowed to knock out (OUERGUI et al., 2019). Ring modalities are similar to other modalities such as muay thai and savate (BUSE; SANTANA, 2008). Freme 1 presents the rules and characteristics of kickboxing modalities.

**Freme 1.** Characteristics and rules of the seven types of kickboxing in the amateur category

Modalities	Duration	Place	Permitted techniques
Musical Forms	1 minute and 30 seconds	Tatami	Presentation of varied martial arts techniques against an imaginary opponent
Point Fight	3 Rounds of 2 minutes with 1 minute break	Tatami	Punches and kicks above the waist in a cadenced fashion
Kick Light	3 Rounds of 2 minutes with 1 minute break	Tatami	Non-bruising punches and kicks above the knee
Light Contact	3 Rounds of 2 minutes with 1 minute break	Tatami	Non-blunt punches and kicks above the waist
Full Contact	3 Rounds of 2 minutes with 1 minute break	Ring	Punches and kicks above the waist with force
Low Kicks	3 Rounds of 2 minutes with 1 minute break	Ring	Punches and kicks above the knee with force
K1	3 Rounds of 2 minutes with 1 minute break	Ring	Punches Kicks and Knees with Concussion

Source: Arbitration Handout CBKB –WAKO (2021)

Regarding the physiology of the modality, in the study by Rydzik et al (2021) carried out in an international kickboxing competition in the k1 modality, significant increases in the lactate averages at baseline ( $2.2 \pm 0.9$  mmol/L), first round ( $11.3 \pm 1.4$  mmol/L), second round ( $13.1 \pm 1.2$

mmol/L) and third round ( $14.6 \pm 1.9$  mmol/L). The same was observed in heart rate during competition being at baseline ( $97.5 \pm 5.6$  bpm), first round ( $178.2 \pm 5.5$  bpm), second round ( $182.1 \pm 3.8$  bpm) and third round ( $185.0 \pm 3.4$  bpm) (RYDZIK et al., 2021). Another study in simulated combats in full contact

mode, the results showed a significant increase in lactate, growth hormone (GH), testosterone, cortisol and glucose, while the heart rate values during combat varied on average between 182 to 189 heartbeats per minute (OUERGUI et al., 2016).

As for the practice of kickboxing to improve health and quality of life, five weeks of kickboxing training three times a week was enough to improve aerobic fitness, anaerobic power, flexibility, power, speed and agility (OUERGUI et al., 2014), ie, it improves physical conditioning (DUARTE; FERRAZ, 2022). In addition, in another study, regular kickboxers had better quality of life and mental health compared to yoga practitioners (TSOS et al., 2017) and better mood compared to non-athletes (DUARTE et al., 2022).

Kickboxing practitioners go through graduations that classify them into levels of knowledge (beginners, intermediate and advanced) (Table 1). These assessments analyze physical conditioning, correct execution of techniques and performance in combat simulation (RITSCHHEL, 2008). Once approved, the student receives a certificate and a track corresponding to his/her level (Table 1), the teacher's choice being the level/assessment, taking into account the technical level, frequency and time of practice. Only, in the black belt exam, the evaluation is up to the CBKB (in Brazil). As the grade of the belts increases, the exams become more demanding (more complex techniques, simulated fights with greater intensity and longer running time) (RITSCHHEL, 2008).

**Table 1.** The degrees of kickboxing bands and their classifications

Belt	Ratings
White	Beginner
Yellow	Beginner
Orange	Beginner
Green	Intermediary
Blue	Intermediary
Brown	Advanced/instructor
Black	Advanced/teacher

Source: The authors

### *Sport pedagogy*

Sport pedagogy is a sport science discipline that emerged from the popularity and growing interest of society in its practices (REVERDITO; SCAGLIA; PAES, 2009). It investigates educational practice specifically through sport, aiming at reflection, systematization, evaluation, organization and a critical view of the educational process through sport (PAES; MONTAGNER; FERREIRA, 2009). It is considered a new science and its applicability is not limited to the school (RUFINO; DARIDO, 2012). Sport pedagogy poses the questions of: how to teach, to whom, when and how best to do it (PAES; MONTAGNER; FERREIRA, 2009).

Each student is a unique being with their cultural, motivational, maturation and physiological aspects, therefore, it is of paramount importance in the didactic-pedagogical act that the teacher can take into account the biological individuality of his student: age, sex, goals and health status (COELHO; BURINI, 2009). Additionally Neuenfeldt (2008) argues that this principle of biological individuality should be taught even to students. According to Freire (2006) there are some basic principles that all sports teachers should follow, such as: teaching sports to everyone, teaching sports well to everyone, teaching more than sports to everyone and teaching people to enjoy sports.

Body fights must also be wrapped in the context of pedagogy (RUFINO; DARIDO, 2012). However, research on motor learning constituted

feedback as one of the main aspects in the learning process (UGRINOWITSCH et al., 2003). Feedback is the way to inform the learner about the results of their movements, being able to compare the planned action with the executed one (SCHMIDT et al., 2018). Some of them are "intrinsic" and "extrinsic" feedback (Organization Chart 1). When extrinsic feedback is absent, the student is led to use intrinsic feedback (UGRINOWITSCH et al., 2003).

There are also forms of positive and negative feedback, Da Silva (2018) says that positive feedback is the highlight on the part of the teacher of mastery/improvement of techniques, while negative feedback is criticism in the failure to perform the technique, lack of progress, among others. Positive feedback appears to improve the student's motivation to practice and perception of competence compared to negative feedback (GARCÍA; CARCEDO; CASTAÑO, 2019). Providing multiple information (increased feedback) during practice favors better performance in skill acquisition, and when increasing feedback is removed, it can have a negative effect on performance (JIMÉNEZ-DÍAZ; CHAVES-CASTRO; MORERA-CASTRO, 2020).

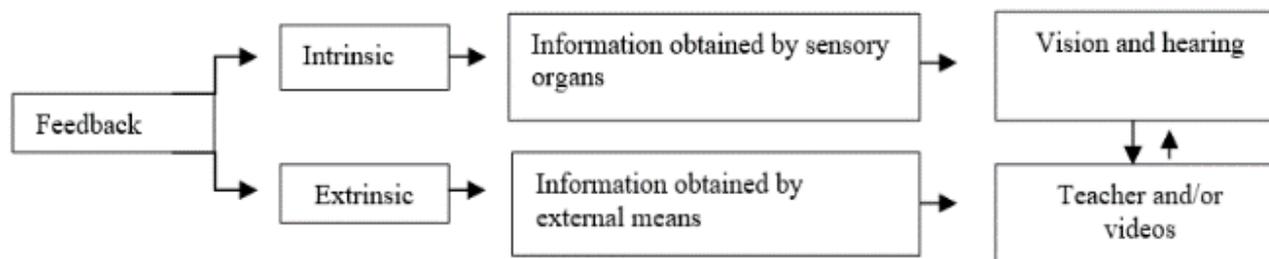
Another factor that influences motor learning is the way information is transmitted to the student, which can be through verbal instruction or demonstration (NOGUEIRA et al., 2021). However, the teacher must know the right moment and how to pass the feedback to the students.

There are some teaching methods that can be used during kickboxing classes:

a) Analytical method: Based on the repetition of movements, the contents are passed by parts (MOREIRA; MATIAS; GRECO, 2013).

b) Situational method: Imposing the student in a real simulated sport situation, this method is efficient for tactical training (PINHO et al., 2010).

The teacher/student relationship is fundamental in the teaching and learning process, and affective and cognitive aspects must be taken into account (HONORATO; SILVA, 2015). Batista and Nascimento (2015) argue that the teacher should promote conditions for the development of various skills including creativity, encouraging students to express their ideas and creating situations for students to solve.



Organizational Chart 1 – Types of feedbacks (adapted from Ugrinowitsch et al (2003)).

#### Teaching kickboxing to children

Childhood is the age of play, in which children remain involved and satisfied with the activity (DALLABONA; MENDES, 2004). Keeping classes fun makes children more likely to join, methods of excessive repetitions (analytical) are not interesting for this audience (FRANCHINI, 2021). In this context, specific opposition games are recommended without working on an early specialization such as: tag, undead (with names from the fundamentals of the modality), mirror, among others (BREDA et al., 2010). By definition, opposition games are the act of confrontation between pairs, trios or even groups, with the objective of defeating the opponent (SOUZA JUNIOR; DOS SANTOS, 2010). Opposition games are a good alternative for teaching fights to children and even working on the content of fights in School Physical Education, within the conditions of Brazilian schools (SANTOS; NUNES, 2020).

Longo et al (2017) argue that from six to twelve years old the child has to experience different types of different motor stimuli, from thirteen to eighteen years old is the specialization phase and from twenty-one years old the performance. Corroborating this, Lanaro Filho and Bohme (2001) suggest that children should experience different motor stimuli, and through the skills acquired over the years, they should follow specific sports modalities from adolescence onwards.

According to Pimentel, Galatti and Paes (2010) in sports initiation, coordinating activities, exercises and games are important, which aim to overcome possible motor difficulties. Another important role of the teacher is the orientation of anti-bullying aspects, being interesting a conversation circle at the end of the classes, as a study showed that it is an effective alternative to reduce aggression, learn to deal with bullying and

increase confidence (GRECO; CATALDI; FISCHETTI, 2019).

In sporting events, parents and teachers should not be charged for positive results in competitions, this can lead to demotivation and psychological problems in children (BREDA et al., 2010). The same authors recommend a festively competitive system in which there are no winners and losers. For children we recommend the musical forms modalities for being an individual presentation (without contact) and the point figure for being a combat without force and cadenced. For teenagers, include kick light and light contact, and for adults, include ring modalities.

#### Teaching kickboxing for teenagers

Adolescence is the stage of specialization in sport (LONGO et al., 2017), in this period the teacher/educator must also mediate the fundamental principles of life in society such as: solidarity, equality, mutual respect, cooperation, among others (GASPARI; SCHWARTZ, 2001). Although fights are considered violent sports, the teacher who works to comply with the rules and educational aspects may be reducing the aggressiveness of his students (BASIAGA-PASTERNAK et al., 2020). In this sense, students must also be taught to deal with defeats, respect and not underestimate the opponent and learn to work on social inclusion (JIMÉNEZ et al., 2021). In this way, the teacher has the role of leadership and guidance for the students, being responsible for the group (AHMADIZADEH et al., 2015).

The lifestyle taken in adolescence can impact health and quality of life in adulthood (SOUSA; SILVA; FERREIRA, 2014). Eventually, if the first experiences with the sport are pleasurable, the probability of enjoying the sport extends

throughout life (BALBINOTTI et al., 2007). Playfulness is an important tool that can also be used during classes, especially to recover the well-being and joy of adolescents who are in situations of abandonment (ROCHA; FERREIRA, 2018).

Morales et al (2020) propose five progressive phases of teaching combat sports to adolescents, these phases intend to reproduce different technical, tactical and physiological requirements of combat sports. In phase 1) they would be games to reduce the fear of being touched by colleagues (for example: cowboy, wheelbarrow, etc.). Phase 2) competition for objects (cloth around the waist and/or 4 to 5 clothespins on the shirt) attacking (trying to take it from the colleague) and defending (not letting the colleague take it off). Phase 3) compete for space (for example: pairs facing each other and an arc between them, holding the partner's shoulders the objective is to make the opponent step inside the arc). Phase 4) are competitions with contact (for example: touching a colleague's shoulder and/or knee while defending your own). Phase 5) compete for body position (for example: in front pairs in elbow flexion, the objective is to knock the colleague down with the arm).

However, in combat sports classes for teenagers, it is recommended that sparring does not involve blunt blows (DEMAREST; KOUTURES, 2016). It is the responsibility of teachers to be supervising, especially older students (ZETARUK et al., 2000).

#### *Teaching kickboxing for recreational adults*

The teaching of kickboxing to adults must take into account several aspects such as medical contraindications, levels of technical knowledge, physical conditioning and motivation. Understanding student motivation can be essential information for teachers to set up their classes with excellence (DA SILVA DUARTE et al., 2021). In the study by Da Silva Duarte et al (2021), the reasons that lead people to practice kickboxing were health and pleasure.

There are academies that separate classes by classes, with children, women, graduates, young adults and competitors. This makes the teaching process directed and facilitated. However, it is more common for the teacher to meet with a heterogeneous class, as a recommendation, the teacher can adapt (facilitate) the execution of the technique for novices and demand a better execution of advanced students (graduates). When the class is large, the teacher can ask graduate students for help in correcting the techniques of students with difficulties.

In this sense, the teacher should charge the students after teaching them and have the conviction that he has learned the technique. According to Burke et al (2011) thirty-eight hours of training are required for students to acquire the skills of offensive and defensive techniques. If the student is unable, during this period, the teacher should seek to understand the problem that is installed in

the gesture (fear, injury, demotivation, movement addiction) and create strategies to solve the problem. It is recommended that the techniques be worked with both bases (position used in combat modalities with the objective of positioning the fighter in front of his opponent), to prevent postural deviations, due to disproportionate muscle recruitment (FETT; FETT, 2009).

Sparring is a very specific form of training for the modality, which works on aspects of physiological demands and reaction time (COSWIG; RAMOS; DEL VECCHIO, 2016). From a practical point of view Del Vecchio et al (2018) recommend the use of protective equipment to avoid injuries during classes. On the other hand, we recommend (for non-competitive/athletes individuals) non-blunt blows, as it can scare the student, cause injuries and disrupt the learning process. Therefore, the teacher should guide the students in this regard and he should not do the same.

#### *Teaching kickboxing for elderly*

Aging is a natural and inevitable process characterized by biological and functional decline (capacities to perform daily activities), which can impact psychologically and quality of life (BAZZANELLA; PICCOLI; QUEVEDO, 2015). It is estimated that this population will increase in the coming decades (ROCHA, 2018). Making several diseases more susceptible such as diabetes, hypertension, osteoporosis, osteoarthritis and depression (KOCH et al., 2013). This increase in life expectancy (longevity) is an achievement, but concerns about the health and quality of life of this population arise (ROCHA, 2018).

Lifestyle can determine the level of health, well-being and quality of life, in which the elderly with higher socioeconomic and educational levels tend to have healthier habits (TAHERI et al., 2013). Physical exercise is essential for disease prevention in the elderly (PAILLARD; ROLLAND; DE BARRETO, 2015), however, better training is needed to work martial arts in this population, requiring knowledge of gerontology (FETT; FETT, 2009). Another important aspect is the request for a medical certificate annually for greater security for the professional who will work with this age group (BENEDETTI; GONÇALVES; MOTA, 2007).

Kickboxing studies with the elderly population are scarce, however, we will recommend methods that were used in studies with similar modalities with kickboxing (muay thai and karate) and/or that their methods/adaptations are easily transferred in the classes. In the study by Phanpheng, Larha and Hirantrakul (2020), adapted muay thai was used in twenty-eight elderly people aged between 70 and 75 years, in which the fundamentals of the modality were worked (punches, elbows, kicks and knees) prioritizing breathing and posture in 30-minute sessions three times a week for 12 weeks. The survey results showed a statistically significant decrease in systolic blood pressure pre-intervention ( $132.0 \pm 15.3$

mmHg) and immediately post-intervention ( $128.1 \pm 13.3$  mmHg). Decreased heart rate at rest, pre-intervention ( $82.1 \pm 9.5$  bpm) and post-intervention ( $79.2 \pm 7.5$  bpm). Balance increase by the Functional reach test, pre-intervention ( $13.7 \pm 1.3$  cm) and post-intervention ( $16.6 \pm 1.9$  cm). And the strength resistance of the lower limbs by the Chair stand test (number of times of sitting and standing in the chair for thirty seconds) (JONES; RIKLI; BEAM, 1999), pre-intervention ( $14.8 \pm 1.2$  reps) and post-intervention ( $19.7 \pm 1.9$  reps).

In another study, karate was adapted with progression of fundamentals, technical movement, technical movement with strokes and added gym equipment and chairs for light functional exercises (JANSEN; DAHMEN-ZIMMER, 2012). The authors concluded that there was an improvement in cognitive exercises and in depression scores when compared to the control group.

Tai chi chuan is a martial art recommended for the elderly, for being graceful movements, having approximately 108 postures (LAN; LAI; CHEN, 2002). Having benefits in cardiorespiratory function, strength, balance, flexibility and psychological profile (LAN; LAI; CHEN, 2002). The movements of tai chi chuan can and should be adapted to combat sports classes for seniors, since it is quite clear that its movements are beneficial and appropriate for seniors. However, in terms of motivation and adherence of the elderly to the physical exercise program, a study showed that playful exercises for the elderly make the social atmosphere more cheerful and were preferable compared to traditional light training (EHRARI et al., 2020), which may be a exploitable strategy on the part of the teacher. However, more studies and teaching materials are needed to guide the teaching of strike modalities for the elderly.

#### *Teaching for competitive adults*

For an athlete to achieve high performance, it is necessary to submit him to rigorous training situations (SZMUCHROWSKI et al., 2012). Professionals responsible for sports performance should prescribe individualized training based on monitoring internal and external loads to avoid overtraining and/or injuries (BARTLETT et al., 2016). Currently, competitions are increasingly balanced, generating great emotional burdens on athletes and are often decided in the details (POÇAS et al., 2018). In kickboxing, athletes have the options of amateur and professional competitive events (AMBROŻY et al., 2020).

When training combat sports athletes, it is important for the teacher (here coach) to know that fighting is an open motor skill (SCHMIDT; WRISBERG, 2001). A continuous open skill is an unpredictable environment that requires greater attention, reaction time, quick decision making and motor control from its practitioners (SCHMIDT; WRISBERG, 2001). Closed motor skills are very common to be seen in martial arts academies, it is defined by Schmidt and Wrisberg (2001) as the

repetition of movements without predictability of the opponent, being a good method for technical learning.

However, for competitors it is always good to work on open motor skills, as it is the closest to competition, hoping that the athlete already has mastery of the technique. For these types of students, closed motor skills are a good mechanism to work on feints, movements, sequences of blows and physical conditioning. Ouergui et al (2014a) recommend training based on offensive strategy (punches and kicks) with technical efficiency in the duration of the combat.

For high-performance athletes, it is expected that they have technical mastery so that the coach can trace the tactic that will be used. Therefore, in the period away from the combat, technical aspects must be worked and as the period of combat approaches, combat simulations are necessary to work on tactics (RUDDOCK et al., 2021). We recommend that this same strategy be followed for inexperienced competitors as well. In this sense, it is important for kickboxers to be physically conditioned to withstand the time of combat (RYDZIK; AMBROŻY, 2021). That's why communication between the coach and the strength and conditioning professional is important to avoid planning conflicts (MATTHEWS; COMFORT, 2008).

Sparring is a form of specific training that can be used to improve combat fitness (OUERGUI et al., 2016a). In these activities, coaches have the option to increase or decrease the size of the combat area (6m x 6m, 4m x 4m and 2m x 2m) and also to change the number of athletes within the 2 minutes that will fight against 1 (1 vs. 1, 1 vs. 2 and 1 vs. 4) (OUERGUI et al., 2016a, 2021). In this sense, the greater the size of the combat area, the greater the use of kicks, on the other hand, the smaller the size of the area, the greater the combinations of punches and defenses (blocks, dodges and leaning back) (OUERGUI et al., 2021). Fighting different opponents during the 2 minutes makes the combat simulation more difficult, as he enters the fight rested and tends to deliver greater amounts of offensive blows (OUERGUI et al., 2021). These findings are important to guide coaches to strategies for the techniques they want to improve in their athlete (OUERGUI et al., 2021)

The kickboxers must be able to perform fast and accurate punches, for which the use of gauntlets is recommended (OUERGUI et al., 2016). In addition, the lactic anaerobic pathway must be well developed, using intermittent high-intensity exercises with modality-specific movements, both for the athlete to achieve the rate of glycolytic activation and aerobic fitness (OUERGUI et al., 2016). Therefore, we recommend that the trainer prepare lesson plans for each session to direct and organize the fundamentals to be worked on.

#### *Class Plan*

The lesson plan is nothing more than the teacher's intentional organization for teaching in

practice (BOSSLE, 2002). It is always good for him to outline a medium to long-term objective, taking into account the age group, the necessary skills and the students' level of knowledge. For this, the teacher must have knowledge and know how to teach (SEIXAS; CALABRÓ; SOUSA, 2017), knowledge of kickboxing such as history, modalities, rules, techniques and tactics. Table 2 demonstrates the technical fundamentals of kickboxing and table 3 tactical aspects.

Table 2 - Kickboxing Fundamentals

Punches	Kicks
Jab	Low kick
Cross	Medium Kick
Hook	High Kick
Uppercut	Step
Superman punch	Front kick
Giratory	Ashi Barai
	Spinning kick

Source: Table adapted from Ouergui et al (2013) and Cbkbmt (2016)

To plan a combat sports class, aspects such as warm-up, stretching and cool-down must be taken into account (COSTA; MEDEIROS; FUKUDA, 2011). Warming up is important to speed up the heart rate, increase body temperature and prepare the psychological for the activity (MCGOWAN et al., 2015). There are two types of warm-up, the general one (for example: running at low or moderate intensity, jumping jacks or jumping rope), whereas the specific warm-up is performed with specific gestures of the modality (ABAD et al., 2011) (figure 1). The different gestures of the specific warm-ups can be left to the teacher's creativity. In technical training, care should be taken with the athletes' fatigue, because according to Quinzi et al (2016), severe fatigue can compromise the technique. In warm-up, it is recommended that teachers try to vary the types of warm-up during classes.

Flexibility training is essential for combat sports, as a good range of motion is required to perform some techniques (DA SILVA et al., 2021). We have two types of flexibility manifestations: 1) dynamic - characterized as the maximum articular amplitude quickly and 2) static - the articular amplitude through muscle relaxation (CONTURSI, 1986). Dynamic kick training itself can improve kickboxers' flexibility (BUSE; SANTANA, 2008).

In this sense, stretching is often used at the beginning of the training program (NELSON et al., 2001). Continuous stretching is recommended, for more than six seconds, because the muscle spindle reflexively contracts the musculature at the time of stretching, so that this mechanism is canceled by the Golgi Tendon Organ (GTO), which relaxes the musculature (PRENTICE; VOIGHT, 2003). Stretching is also done at the end of the class, which would be at the time of calming down (COSTA; MEDEIROS; FUKUDA, 2011), and the body still warm can provide greater joint range (DELAVIER; GUNDILL, 2015).

However, we recommend static stretching at the beginning of the session to prevent possible strains and prepare the muscles for the dynamic flexibility that may be required in the session and at the end of the session for muscle relaxation when calming down. Figure 2 illustrates examples of active static stretching. Cooling down is important to reduce body temperature, the athlete lowers blood lactate, partially prevents possible depressions of the immune system, promotes a rapid recovery of the cardiovascular system (VAN HOOREN; PEAKE, 2018).

For the elaboration of the lesson plan, the teacher must know which foundation will be prioritized (technique, reaction time, tactics, physical conditioning). He should also take into account the training space and the materials available, according to Canestraro, Zulai and Kogut (2008) in the absence of material resources, the teacher should use his creativity. Table 4 shows a suggestive model for the structure of the class.

Another important tool is the use of music during classes. According to Kommers et al (2019) music during physical exercise is a disinhibitor of psychological discomfort. In one study, kickboxers reported that music is a motivating factor during class (SALINAS et al., 2020).

Table 3 - Types of tactics in kickboxing

Defensive	Let the opponent get tired by throwing blows Save energy Clinch
Offensive	Blow pressure Strike variations Feints
Defensive and offensive	Counterattack Movement

Source: The authors



Figura 1- Examples of movements that can be used in specific warm-up. (A) Fighting guard. (B) Jab. (C) Cross. (D) Knee.



**Figure 2** – Examples of active static stretching that can be used both at the beginning and at the end of classes. (A) Stretching of the quadriceps muscles (rectus femoris, vastus lateralis, vastus medialis and vastus intermedius). (B) Stretching of the vastus external and gluteus muscles. (C) Stretching the hamstring muscles. (D) Stretching of the adductor magnus muscles. (E) Stretching the pectorals, obliques, glutes and vastus external. (F) Stretching of the rectus abdominis and oblique muscle

**Table 4** - Items for preparing the lesson plan

Class objective:	Physical conditioning; reaction time; technical and/or tactical training.
What materials are available?	Punching bags; gloves; mouthguard; shin guards; ropes; Agility ladder, etc.
Initial part:	Warming up: general and/or specific and stretching..
Development of goals::	Physical conditioning exercises; time motion; technical and/or tactical training.
Cool down	Stretching; meditation; conversation circle, etc.

Source: The authors

## Conclusion

In order to improve the quality of classes, the teacher must conduct them in an appropriate and adapted way for different age groups. Children must go through playful sessions with diversified motor stimuli, only in adolescence should the specialization process begin. Recreational adults should go through kickboxing training with care for non-blunt punches to avoid injury. The elderly, on the other hand, should undergo light functional exercises, having in the specific part the non-bluntness in the blows as well. Adult competitors must go through stimuli and situations closer to the reality of competition. Combat sports teachers should not limit themselves only to technical and tactical knowledge, seeking knowledge of sport pedagogy to guide the teaching process.

In this context, the lesson plan becomes an important tool for organizing and directing sessions, taking into account the materials available and the age group worked in that session. However, teachers must be prepared for possible adaptations and improvisations in unplanned situations. For this, federations must offer theoretical and practical training courses in the form of continuing education in different sciences that complement the safe and quality teaching and learning process. Additionally, the theories presented in this article can be applied to other combat sports (boxing, savate, kung fu, muay thai, karate). However, further studies should be carried out to understand the effect of different training programs on kickboxing motor learning.

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## References

ABAD, C. E. C. C.; PRADO, M. L.; UGRINOWITSCH, C.; TRICOLI, V.; BARROSO, R. Combination of general and specific warm-ups improves leg-press one repetition maximum compared with specific warm-up in trained individuals. *Journal of Strength and Conditioning Research*, v. 25, n. 8, p. 2242–2245, 2011.

AHMADIZADEH, Z.; GHOTNAIN, S.; DIANAT, F.; AGHAJANIAN, M. Comparison leadership styles of coaches and satisfaction of male and female athletes in Martial arts. *Journal of Novel Applied Sciences*, v. 4, n. 5, p. 619–622, 2015.

AMBROŻY, T.; RYDIK, Ł.; KEDRA, A.; AMBROZY, D.; NIEWCZAS, M.; SOBILO, W.; CZARNY, W. The effectiveness of kickboxing techniques and its relation to fights won by knockout. *Archives of Budo*, v. 16, n. October, p. 11–17, 2020.

BALBINOTTI, C. A. A.; BARBOSA, M. L. L.; JUCHEM, L.; BALBINOTTI, M. A. A.; SALDANHA, R. P. A. *Motivação à Prática Regular de Atividade Física Regular Relacionada ao Prazer em Adolescentes do sexo Masculino*. Coleção Pesquisa em Educação Física, v. 6, n. 2, p. 13–18, 2007.

BARTLETT, J. D.; O'CONNOR, F.; PITCHFORD, N.; TORRES-RONDA, L.; ROBERTSON, S. J. Relationships between internal and external training load in team sport athletes: evidence for an individualised approach. *International Journal of Sport Nutrition and Exercise Metabolism*, v. 12, n. 2, p. 230–234, 2016.

BASIAGA-PASTERNAK, J.; SZAFRANIEC, L.; JAWORSKI, J.; AMBROZY, T. Aggression in competitive and non-competitive combat sports athletes. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, v. 20, n. 2, p. 17–23, 2020.

BATISTA, E. C.; NASCIMENTO, A. B. Percepção de Acadêmicos quanto ao Estímulo à Criatividade por Parte de seus Professores. *Revista Brasileira de Ensino Superior*, v. 1, n. 2, p. 54–63, 2015.

BAZZANELLA, N. A. L.; PICCOLI, J. C. J.; QUEVEDO, D. M. DE. Qualidade de vida percebida e atividade física: um estudo em idosas acima de 80 anos participantes de um programa municipal de saúde da terceira idade na Serra Gaúcha, Rs. *Estudos Interdisciplinares sobre o Envelhecimento*, v. 20, n. 1, p. 249–270, 2015.

BENEDETTI, T. R. B.; GONÇALVES, L. H. T.; MOTA, J. A. P. DA S. Uma proposta de política pública de atividade física para idosos. *Texto & Contexto - Enfermagem*, v. 16, n. 3, p. 387–398, 2007.

BOSSLE, F. Planejamento de ensino na educação física - uma contribuição ao coletivo docente. *Movimento (ESEFID/UFRGS)*, v. 8, n. 1, p. 31–39, 2002.

BREDA, M.; SCAGLIS, A. J.; PAES, R. R.; GALATTI, L. R. *A pedagogia do esporte aplicada às lutas*. São Paulo: Phorte, 2010.

BURKE, D. T.; PROTOPAPAS, M.; BONATO, P.; BURKE, J. F.; LANDRUM, R. Martial arts: Time needed for training. *Asian Journal of Sports Medicine*, v. 2, n. 1, p. 31–36, 2011.

BUSE, G. J.; SANTANA, J. C. Conditioning strategies for competitive kickboxing. *Journal of Strength and Conditioning Research*, v. 30, n. 4, p. 42–48, 2008.

ANESTRARO, J. DE F.; ZULAI, L. C.; KOGUT, M. C. Principais dificuldades que o professor de educação física enfrenta no processo ensino-

- aprendizagem do ensino fundamental e sua influência no trabalho escolar. VIII Congresso Nacional de Educação-EDUCERE, 2008. Disponível em: [http://www.pucpr.edu.br/eventos/educere/educere2008/anais/pdf/872\\_401.pdf](http://www.pucpr.edu.br/eventos/educere/educere2008/anais/pdf/872_401.pdf)
- CBKB. 2021. Confederação Brasileira de KickBoxing. Disponível em: <https://www.cbkb.com.br/site/cbkb/historiakickboxing>. Acesso em: 18 de outubro de 2021.
- CBKBMT. (2016). Confederação Brasileira de Kick Boxing e Muay Thai. Nomenclatura e técnica do kickboxing. Disponível em: <http://www.cbkbmt.comunidades.net/nomenclatura-e-tecnica-do-kick-boxing> Acesso em: 02 de novembro de 2021.
- COELHO, C. DE F.; BURINI, R. C. Atividade física para prevenção e tratamento das doenças crônicas não transmissíveis e da incapacidade funcional. *Revista de Nutrição*, v. 22, n. 6, p. 937–946, 2009.
- CONTURSI, T. L. B. Flexibilidade e alongamento. Rio de Janeiro: Sprint. 1986.
- COSTA, P. B.; MEDEIROS, H. B. O.; FUKUDA, D. H. Cool-down Strategies for Combat Sports. *Journal of Strength and Conditioning Research*, v. 33, n. 6, p. 71–79, 2011.
- COSWIG, V. S.; RAMOS, S. D. P.; DEL VECCHIO, F. B. Time-Motion and Biological Responses in Simulated Mixed Martial Arts Sparring Matches. *Journal of Strength and Conditioning Research*, v. 30, n. 8, p. 2156–2163, 2016.
- DA SILVA DUARTE, J. D. R.; PASA, C.; KOMMERS, M. J.; DE FRANÇA FERRAZ, A.; FETT, W. C. R.; DE OLIVEIRA, R. G.; FETT, C. A. Aspectos motivacionais para a prática do Jiu-Jitsu Brasileiro e o Kickboxing em indivíduos do sexo masculino. *Brazilian Journal of Health Review*, v. 4, n. 3, p. 12247–12256, 2021.
- DA SILVA DUARTE, J. D. R.; RODRIGUES, H. H. N. P.; CUNHA, M. G.; DE MACEDO, A. F.; SALINAS, J. A. R.; CLAUDINO, T. X.; PASA, C.; FETT, W. C. R.; FETT, C. A. Dietary intake in kickboxing fighters. *Brazilian Journal of Development*, v. 7, n. 4, p. 42409–42424, 2021a.
- DA SILVA, J. M. R. O uso do feedback extrínseco no processo de ensino-aprendizagem dos esportes de invasão em contexto escolar. [Tese] Universidade Federal do Rio Grande do Sul, 2018.
- DALLABONA, S. R.; MENDES, S. M. O lúdico na educação infantil: jogar, brincar, uma forma de educar. *Icpg*, v. 1, n. 4, p. 107–112, 2004.
- DEL VECCHIO, F. B.; FARIAS, C. B.; DE LEON, R. C.; ROCHA, A. C. C. A.; GALLIANO; COSWIG, V. S. Injuries in martial arts and combat sports: Prevalence, characteristics and mechanisms. *Science and Sports*, v. 33, n. 3, p. 158–163, 2018.
- DELAVIER, F.; GUNDILL, M. Guia de Musculação Para Esportes de Combate. Barueri: Manole, 2015.
- DEMAREST, R. A.; KOUTURES, C. Youth participation and injury risk in martial arts. *Pediatrics*, v. 138, n. 6, p. 1–9, 2016.
- DUARTE, J. D. R. DA S.; FERRAZ, A. DE F. Studies on martial arts, fights and sports combat with police: a systematic review. *Scientific Electronic Archives*, v. 15, n. 3, p. 77–83, 2022.
- DUARTE, J. D. R. DA S.; PASA, C.; KOMMERS, M. J.; FERRAZ, A. DE F.; HONGYU, K.; FETT, W. C. R.; FETT, C. A. Mood profile of regular combat sports practitioners: a cross-sectional study. *Journal of Physical Education & Sport*, v. 22, n. 5, p. 1206–1213, 2022.
- DUGONJIĆ, B.; KRSTULOVIĆ, S.; KUVAČIĆ, G. Rapid Weight Loss Practices in Elite Kickboxers. *International Journal of Sport Nutrition and Exercise Metabolism*, v. 29, p. 583–588, 2019.
- EHRARI, H.; LARSEN, R. T.; LANGBERG, H.; ANDERSEN, H. B. Effects of Playful Exercise of Older Adults on Balance and Physical Activity: a Randomized Controlled Trial. *Journal of Population Ageing*, v. 13, n. 2, p. 207–222, 2020.
- FETT, C. A.; FETT, W. C. R. Filosofia, ciência e a formação do profissional de artes marciais. *Motriz*, v. 15, n. 1, p. 173–184, 2009.
- FRANCHINI, E. O ensino e a aprendizagem do judô. *Corpoconsciência*, v. 2, n. 1, p. 31–40, 1998.
- FRANCHINI, E. Providing youth-friendly martial arts training: brief recommendations. *ICM Insign*, v. 8, n. 2, p. 18–26, 2021.
- FREIRE, J. B. Pedagogia do futebol. Campinas: Autores Associados. 2006.
- GALATTI, L. R.; REVERDITO, R. S.; SCAGLIA, A. J.; PAES, R. R.; SEOANE, A. M. Pedagogia do Esporte: Tensão na ciência e o ensino dos jogos esportivos coletivos. *Revista da Educacao Fisica*, v. 25, n. 1, p. 153–162, 2014.
- GARCÍA, J. A.; CARCEDO, R. J.; CASTAÑO, J. L. The Influence of Feedback on Competence, Motivation, Vitality, and Performance in a Throwing Task. *Research Quarterly for Exercise and Sport*, v. 90, n. 2, p. 172–179, 2019.

- GASPARI, J.; SCHWARTZ, G. Adolescência, esporte e qualidade de vida. *Motriz*, v. 7, n. 2, p. 107–113, 2001.
- GRECO, G.; CATALDI, S.; FISCHETTI, F. Karate as anti-bullying strategy by improvement resilience and self-efficacy in school-age youth. *Journal of Physical Education and Sport*, v. 19, n. 5, p. 1863–1870, 2019.
- HONORATO, F. L. DE A.; SILVA, A. F. DA. Avaliando a relação professor-aluno na aprendizagem de uma escola pública do município de Aguiar-PB, sob o prisma da psicanálise. *Revista Brasileira de Educação e Saúde*, v. 5, n. 1, p. 51–57, 2015.
- JANSEN, P.; DAHMEN-ZIMMER, K. Effects of cognitive, motor, and karate training on cognitive functioning and emotional well-being of elderly people. *Frontiers in Psychology*, v. 3, n. FEB, p. 1–7, 2012.
- JIMÉNEZ-DÍAZ, J.; CHAVES-CASTRO, K.; MORERA-CASTRO, M. Efectividad del feedback aumentado en el desempeño de destrezas motrices: un meta-análisis. *MHSalud: Revista en Ciencias del Movimiento Humano y Salud*, v. 18, n. 1, p. 1–23, 2020.
- JIMÉNEZ, E. M.; CHAVES-CASTRO, K.; MORERA-CASTRO, M. The social stereotype of Italian adolescents during sports practice. *Retos*, v. 2041, n. 39, p. 614–619, 2021.
- JONES, C. Jessie; RIKLI, Roberta E.; BEAM, William C. A 30-s chair-stand test as a measure of lower body strength in community-residing older adults. *Research quarterly for exercise and sport*, v. 70, n. 2, p. 113-119, 1999.
- KOCH, R. F.; LEITE, M, T; HILDEBRANDT, L, M; LINCK, C. K; TERRA, M. G; GONÇALVES, L. T. H. Depressão Na Percepção De Idosas De Grupos De Convivência. *Journal of Nursing UFPE/Revista de Enfermagem UFPE*, v. 7, n. 9, p.5574–5582, 2013.
- KOMMERS, M. J; RODRIGUES, R. A. S; GOMES, G; ZAVALA, A. A. Z; FETT, W. C. R; FETT, C. A. Body combat™ classic music improves adolescent's state of mind. *Journal of Physical Education (Maringá)*, v. 30, n. 1, p. 1–9, 2019.
- LAN, C.; LAI, J. S.; CHEN, S. Y. Tai chi chuan: An ancient wisdom on exercise and health promotion. *Sports Medicine*, v. 32, n. 4, p. 217–224, 2002.
- LANARO FILHO, P.; BÖHME, M. T. S. Detecção, seleção e promoção de talentos esportivos em ginástica olímpica. *Revista Paulista de Educação Física*, v. 15, n. 2, p. 169–185, 2001.
- LIGHT, R.; DIXON, M. A. Contemporary Developments in Sport Pedagogy and their Implications for Sport Management Education. *Sport Management Review*, v. 10, n. 2, p. 159–175, 2007.
- LONGO, R. A; TERTULIANO, I. W; SENA, A. B. D; MORÃO, K. G; VERZANI, R. H; MACHADO, A. A. A permanência de crianças e jovens nos esportes: olhares para iniciação e especialização esportiva. *Caderno de Educação Física e Esporte*, v. 15, n. 2, p. 121–132, 2017.
- LYSTAD, R. P. Injuries to Professional and Amateur Kickboxing Contestants: A 15-Year Retrospective Cohort Study. *Orthopaedic Journal of Sports Medicine*, v. 3, n. 11, p. 1–5, 2015.
- MATTHEWS, M.; COMFORT, P. Applying complex training principles to boxing: A practical approach. *Strength and Conditioning Journal*, v. 30, n. 5, p. 12–15, 2008.
- MCGOWAN, C. J; PYNE, D. B; THOMPSON, K. G; RATTRAY, B. Warm-Up Strategies for Sport and Exercise: Mechanisms and Applications. *Sports Medicine*, v. 45, n. 11, p. 1523–1546, 2015.
- MORALES, J; FUKUDA, D. H; CURTO, C; ITEYA, M; KUBOTA, H; PIERANTOZZI, E; LA MONICA, M. Progression of Combat Sport Activities for Youth Athletes. *Strength & Conditioning Journal*, v. 42, n. 3, p. 78–89, 2020.
- MOREIRA, V. J. P.; MATIAS, C. J. A. DA S.; GRECO, P. J. A influência dos métodos de ensino-aprendizagem-treinamento no conhecimento tático processual no futsal. *Motriz: Revista de Educação Física*, v. 19, n. 1, p. 84–98, 2013.
- NASCIMENTO, J. V; RAMOS, V; MARCON, D; SAAD, M. A; COLLET, C. Formação acadêmica e intervenção pedagógica nos esportes. *Motriz. Journal of Physical Education. UNESP*, v. 15, n. 2, p. 358–366, 2009.
- NELSON, A. G; ALLEN, J. D; CORNWELL, A; KOKKONEN, P. Inhibition of maximal voluntary isometric torque production by acute stretching is joint-angle specific. *Research Quarterly for Exercise and Sport*, v. 72, n. 1, p. 68–70, 2001.
- NEUENFELDT, D. J. Esporte, Educação Física e Formação Profissional. Lajeado: UNIVATES. 2008.
- NOGUEIRA, N. G. H. M; PAULON, D. A; FERREIRA, B. P; FERNANDES, L. A; LAGE, G. M. O conhecimento do professor de Educação Física sobre aprendizagem motora. *Pensar a Prática*, v. 24, p. 1–22, 2021.
- OUERGUI, I; HSSIN, N; FRANCHINI, E; GMADA, N; BOUHLEL, E. Technical and tactical analysis of high level kickboxing matches. *International Journal*

- of Performance Analysis in Sport, v. 13, n. 2, p. 294–309, 2013.
- OUERGUI, I; HSSIN, N; HADDAD; FRANCHINI, E; BEHM, D. G; WONG, D. P; GMADA; BOUHLEL, E. The effects of five weeks of kickboxing training on physical fitness. *Muscles, Ligaments and Tendons Journal*, v. 4, n. 2, p. 106–113, 2014.
- OUERGUI, I; HSSIN, N; FRANCHINI, E; GMADA, N; BOUHLEL, E. Time-motion analysis of elite male kickboxing competition. *Journal of Strength and Conditioning Research*, v. 28, n. 12, p. 3537–3543, 2014a.
- OUERGUI, I; DAVIS, P; HOUCINE, N; MARZOUKI, H; ZAOUALI, M; FRANCHINI, E; GAMDA, N; BOUHLEL, E. Hormonal, Physiological, and Physical Performance During Simulated Kickboxing Combat: Differences Between Winners and Losers. *International Journal of Sports Physiology and Performance*, v. 11, n. 4, p. 425–431, 2016.
- OUERGUI, I; HOUCINE, N; MARZOUKI, H; DAVIS, P; FRANCHINI, E; GMADA, N; BOUHLEL, E. Physiological responses and time-motion analysis of small combat game in kickboxing: Impact of ring size and number of within-round sparring partners. *Journal of Strength and Conditioning Research*, v. 31, n. 7, p. 1840–1846, 2016a.
- OUERGUI, I; BENYOUSSEF, A; HOUCINE, N; ABDELMALEK, S; FRANCHINI, E; GMADA, N; BOUHLEL, E; BOUASSIDA, A. Physiological Responses and Time-Motion Analysis of Kickboxing: Differences Between Full Contact, Light Contact, and Point Fighting Contests. *Journal of Strength and Conditioning Research*, n. 20, p. 1–6, 2019.
- OUERGUI, I; DELLELI, S; BOUASSIDA, A; BOUHLEL, E; CHAANEME, H; ARDIGO, L. P; FRANCHINI, E. Technical–tactical analysis of small combat games in male kickboxers: effects of varied number of opponents and area size. *BMC Sports Science, Medicine and Rehabilitation*, v. 13, n. 1, p. 1–8, 2021.
- PAES, R. R.; MONTAGNER, P. C.; FERREIRA, H. B. *Pedagogia do esporte: iniciação e treinamento em basquetebol*. Rio de Janeiro: Koogan, 2009.
- PAILLARD, T.; ROLLAND, Y.; DE BARRETO, P. S. Protective effects of physical exercise in Alzheimer's disease and Parkinson's disease: A narrative review. *Journal of Clinical Neurology (Korea)*, v. 11, n. 3, p. 212–219, 2015.
- PHANPHENG, Y.; LARHA, W.; HIRANTRAKUL, A. Effects of Wai Khru Muaythai Training To Balance Ability in the Elderly. *Sport Scientific & Practical Aspects*, v. 17, n. 1, p. 53–59, 2020.
- PIMENTEL, R. M.; GALATTI, L. R.; PAES, R. R. Sport pedagogy and later sport initiation: perspectives from basketball modality. *Pensar a Prática*, v. 13, n. 1, p. 1–13, 2010.
- PINHO, S. T; ALVES, D. M; GRECO, P. J; SCHILD, J. F. G. Método situacional e sua influência no conhecimento tático processual de escolares. *Motriz. Revista de Educação Física. UNESP*, v. 16, n. 3, p. 580–590, 2010.
- POÇAS, R. D; VOSER, R. C; JUNIOR, M. A. S. D; AIMI, G, A; MARQUES, P. A; HEIN, A. P. Treinamento funcional como método de treinamento de atletas de alto rendimento. *Revista Brasileira de Prescrição e Fisiologia do Exercício*, v. 12, n. 77, p. 694–700, 2018.
- PRENTICE, W. E.; VOIGHT, M. L. *Técnicas em reabilitação musculoesquelética*. Porto Alegre: Artmed, 2003.
- PROENÇA, V. H. L. DE; MANZATO, M. H.; SANT'ANA, P. G. Metodologias de ensino do karatê-do shotokan para crianças. *Motrivivência*, v. 33, n. 64, p. 1–19, 2021.
- QUINZI, F; CAMOMILLA, V; DI MARIO, A; FELICI, F; SBRICCOLI, P. Repeated kicking actions in karate: Effect on technical execution in elite practitioners. *International Journal of Sports Physiology and Performance*, v. 11, n. 3, p. 363–369, 2016.
- REVERDITO, R. S.; SCAGLIA, A. J.; PAES, R. R. Sport pedagogy: current panorama and conceptual analysis of the main approaches. *Motriz. Journal of Physical Education. UNESP*, v. 15, n. 3, p. 600–610, 2009.
- RITSCHER, J. *The kickboxing handbook*. The Rosen Publishing Group, 2008.
- ROCHA, A. W. DA; FERREIRA, F. M. N. S. Ludicidade: uma ferramenta para o desenvolvimento integral de crianças e adolescentes em situações de acolhimento. *Revista Diálogos Interdisciplinares*, v. 1, n. 2012, p. 39–52, 2018.
- ROCHA, J. A. D. O envelhecimento humano e seus aspectos psicossociais. *Revista FAROL*, v. 6, n. 6, p. 77–89, 2018.
- RUDDOCK, A; JAMES, L; FRENCH, D; ROGERSON, D; DRILLER, M; HEMBROUGH. High-Intensity Conditioning for Combat Athletes: Practical Recommendations. *Applied Sciences*, v. 11, n. 22, p. 1–14, 2021.
- RUFINO, L. G. B. *A Pedagogia das Lutas Caminhos e Possibilidades*. Jundiaí: Paco. 2012.

- RUFINO, L. G. B.; DARIDO, S. C. Pedagogia do esporte e das lutas: em busca de aproximações. *Revista Brasileira de Educação Física e Esporte*, v. 26, n. 2, p. 283–300, 2012.
- RYDZIK, Ł.; MACIEJCZYK; CZARNY, W; KEDRA, A; AMBROZY, T. Physiological Responses and Bout Analysis in Elite Kickboxers During International K1 Competitions. *Frontiers in Physiology*, v. 12, n. July, p. 1–8, 2021.
- RYDZIK, Ł.; AMBROŻY, T. Physical fitness and the level of technical and tactical training of kickboxers. *International Journal of Environmental Research and Public Health*, v. 18, n. 6, p. 1–9, 2021.
- SALCI, Y. The metabolic demands and ability to sustain work outputs during kickboxing competitions. *International Journal of Performance Analysis in Sport*, v. 15, n. 1, p. 39–52, 2015.
- SALINAS, J. A. R; DA SILVA, B. G; DA SILVA DUARTE, J. D. R; FERREIRA, J. C. Música como fator de percepção motivacional em praticantes de kickboxing. II Congresso Internacional de Ciências da Saúde. Anais...Ceará: Journal of Human Growth and Development, 2020
- SANTOS, S. L. C. DOS; NUNES, J. D. S. Jogos de oposição: inovação pedagógica para o ensino das lutas na educação física escolar. *Horizontes - Revista de Educação*, v. 9, n. 16, p. 1–14, 2020.
- SCHMIDT, R. A; LEE, T. D; WINSTEIN, C; WULF, G; ZELAZNIK, H. N. Motor control and learning: A behavioral emphasis. *Human kinetics*, 2018.
- SCHMIDT, R. A.; WRISBERG, C. A. Aprendizagem e performance motora: uma abordagem da aprendizagem baseada no problema. 2 ed. São Paulo: Artmed, 2001.
- SCHMIDT, V. A. DE O.; RIBAS, J. F. M. A lógica interna das lutas corporais: implicações iniciais para o ensino-aprendizagem-treinamento do brazilian jiu-jitsu. *Motrivivência*, v. 32, n. 61, p. 01–19, 2020.
- SEIXAS, R.; CALABRÓ, L.; SOUSA, D. A Formação de professores e os desafios de ensinar Ciências. *Revista Thema*, v. 14, n. 1, p. 289–303, 2017.
- SILVA, T. L. T. B; SILVA, J ,G; MACEDO, F. N; SANTANA, M. N .S; DE MELO, V. U; MOTA, M. M. Avaliação Dos Níveis De Flexibilidade De Faixas Pretas De Jiu-Jitsu Da Categoria Master. *Brazilian Journal of Development*, v. 7, n. 2, p. 15755–15765, 2021.
- SLIMANI, M; CHAABENE, H; MIARKA, B; FRANCHINI, E; CHAMARI, K; CHEOUR, F. Kickboxing review: Anthropometric, psychophysiological and activity profiles and injury epidemiology. *Biology of Sport*, v. 34, n. 2, p. 185–196, 2017.
- SOUSA, Z. A. A. DE; SILVA, J. G.; FERREIRA, M. A. Knowledge and practices of teenagers about health: implications for the lifestyle and self care. *Escola Anna Nery - Revista de Enfermagem*, v. 18, n. 3, 2014.
- SOUZA JUNIOR, T.; DOS SANTOS, S. Jogos de oposição: nova metodologia de ensino dos esportes de combate. *Lecturas - Revista Digital de Educación Física y Deporte*, v. 14, n. 141, p. 1–4, 2010.
- SZMUCHROWSKI, L; CLAUDINO, J. G. O; ALBUQUERQUE NETO, S. L; MENZEL, H. J. K; COUTO, B. P. Determinação do número mínimo de saltos verticais para monitorar as respostas ao treinamento pliométrico. *Motricidade*, v. 8, n. 2, p. 383–392, 2012.
- TAHERI, M; MOHAMMADI, M; PAKNIA, B; MOHAMMADBEIGL; A. Elderly Awareness on Healthy Lifestyle during Aging. *Tropical Medicine & Surgery*, v. 01, n. 05, p. 1–5, 2013.
- TSOS, A; TERTULIANO, I. W; COCA. A. A; PEREIRA, F. A. S; GIMENEZ, R. Physical and mental health components condition in the life quality of students who regularly practice kickboxing and yoga. *Physical Activity Review*, v. 5, p. 37–43, 2017.
- UGRINOWITSCH, H; TERTULIANO, I, W; COCA. A. A; PEREIRA, F. A. S; GIMENEZ, R. Frequência de feedback como um fator de incerteza no processo adaptativo em aprendizagem motora. *Rev. bras. ciênc. mov*, v. 11, n. 2, p. 41–47, 2003.
- VAN HOOREN, B.; PEAKE, J. M. Do We Need a Cool-Down After Exercise? A Narrative Review of the Psychophysiological Effects and the Effects on Performance, Injuries and the Long-Term Adaptive Response. *Sports Medicine*, v. 48, n. 7, p. 1575–1595, 2018.
- WAKO. (2020). World Association of Kickboxing Organizations. Rules. Disponível em: <<http://wako.sport/en/page/rules/32/>> Acesso em: 18 de novembro de 2021.
- ZETARUK, M. N; VIOLAN, M. A; ZURAKOWSKI, D; MICHELI, L. Karate injuries in children and adolescents Merrilee. *Acta Chirurgiae Orthopaedicae et Traumatologiae Cechoslovaca*, v. 32, p. 421–425, 2000.