

KINESIOLOGY & COACHING

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Utilizing contextualized skills and coach intervention to optimize the performance of ultimate full-contact fighters

Submission: 1.01.2021; acceptance: 8.02.2021

Key words: combat sports, offensive efficiency, counteroffensive efficiency, defensive efficiency, ground fighting control

Abstract

Background. Ultimate Full Contact requires fighters to have high levels of offensive, counteroffensive, and defensive efficiency as well as ground fighting control, to achieve high performance and win fights. For this reason, and to enhance these skills, coaches must have comprehensive knowledge of all the relevant dynamics to organize and apply methodologies that facilitate performance improvement in a holistic way.

Problem and aim. The main aim of the present work was to provide coaches with relevant theoretical aspects that allow them to identify the optimal training strategies in an offensive, counteroffensive, and defensive efficiency as well as successful ground fighting control.

Methods. To search for relevant publications and ensure the quality of articles, main data bases were used (i.e., Web of Science, Scopus and PubMed). The utilized search strategy comprised specific search terms based on the research theme.

Results. The results showed that the Ultimate Full Contact training process must be contextually organized so that the fighters value a wide and versatile technical-tactical motor repertoire, skill efficiency and excellent conditioning of their motor capacity. In addition, the training process must start from a cognitive and dynamic-ecological perspective, articulating analytical and integrated training methods through systematic technical-tactical repetitions and exercises that are representative of the competition.

Conclusion. This study concluded that the training process must be developed holistically, and must contain technical-tactical exercises, which simultaneously consider attacks, counter-attacks, defense and fight control using adjusted physical loads. In addition, practical recommendations are also provided.

Background and Introduction

Ultimate Full Contact is a hybrid combat sport based on Pankration, with the technical influence of Taekwondo, Boxing, Full Contact, Kickboxing, Muay Thai, and Submission Grappling (i.e., combat sport where skills from Sambo, Jiu-jitsu, Wrestling, and other close fighting or hand-to-hand combat are authorized) [Pinto, 2016; Pinto *et al.* 2020a]. This is a combat sport of extreme complexity and intermittent intensity in which stand-up fighting and/or ground fighting with a higher variability of striking and submission grappling skills are allowed (i.e., kicks, punches, knee strikes, elbow strikes, ground and pound, takedowns, chokes, joint locks, blocking, dodging, slipping, parrying, displacements, immobilizations, escape, sprawl, sweeps/inversions, stances, and ground fighting control) in isolated or combined actions [James *et al.* 2016; Kirk *et al.* 2015; Miarka *et al.* 2017; Pinto *et al.* 2020a, 2020b; Pinto *et al.* 2020]. Strikes and wide takedowns/throws can be powerful and knockout (KO) can occur at any moment, which increases the emotional pressure on fighters [Hutchison *et al.* 2014; Pinto *et al.* 2020a, 2020b]. The fights take place in 10-minute rounds characterized by a context of high variability, unpredictability, and tenacity where the main fight outcome can be by decision, submission, technical knockout (TKO), or KO [Pinto, 2016; Pinto *et al.* 2020a, 2020b; Pinto *et al.* 2020]. Thus, fighters must have a great versatility of skills, rapid cognitive perception, interpretation and correct decisions, time of action, volition, and conditioned motor skills [Petri *et al.* 2019; Pinto *et al.* 2020b, 2020a; Shih, Lin, 2016].

However, as in all sports with a complex structure, the technical and tactical aspects are determining factors for fighter performance, while the physical factor is their conditioning [Castelo *et al.* 1998; Pinto, 2016; Pinto *et al.* 2020a]. The best fighters have been characterized by their distinct technical-tactical skills, which give them a greater chance of success [Atan, Imamoglu, 2005; Franchini, Takito, 2014; Miarka *et al.* 2016; Miarka, 2016; Pinto *et al.* 2020b]. Thus, to achieve success, fighters tend to develop fundamental fighting skills (e.g., skill versatility and automation, anticipation, perception, interpretation, decision-making, timing, unpredictability, ability to take advantage of opportunities and adaptation) that are optimized through technical-tactical training to enhance the ability to attack, counterattack, defend, and control their opponents during fights [Pinto *et al.* 2020b, 2020a]. Additionally, through technical-tactical training with adjustable physical loads, motor skills such as strength, speed, endurance, and flexibility are also optimally developed [Castelo *et al.* 1998; Pinto *et al.* 2020b, 2020a].

Therefore, it is essential that all fighting dynamics (i.e., offensive, counteroffensive, defensive, and ground fighting control) are subjected to special analysis by

coaches and fighters, which can be useful in planning programs that help to increase performance [Boguszewski, 2014a, 2014b, 2016; Boguszewski, Boguszewska, 2006; El Ashker, 2011; Koropanovski, Jovanovic, 2007; Pinto *et al.* 2020a, 2020b; Romashov *et al.* 2019; Slimani *et al.* 2017; Wasik *et al.* 2014]. This notion is in line with previous investigations [Pinto *et al.* 2020b, 2020a; Pinto *et al.* 2020] that approached fighting dynamics efficiency through the observation of fighter performance in competitions, where considerable technical-tactical knowledge has been observed among winners. Through this approach, the main conclusions have included: i) offensive efficiency depends on the relationship of specific fighting styles and their skills with adjustable distances, highlighting versatility, adaptability, and seizing opportunities as essential qualities; ii) defensive efficiency mainly involves evading actions; iii) counteroffensive efficiency mainly involves anticipated counterattacks (100% effective), followed by simultaneous and posterior counterattacks, respectively; iv) successful ground fighting control is characterized by the ability to take dominant positions; v) most fight outcomes are by submission. Although these results were obtained through independent investigations, there is a logical interrelation between their outcomes; for example: i) evading is mainly associated with anticipated or simultaneous counterattacks; ii) dominant positioning on the ground is associated with fight outcomes involving submission.

Acquiring representative references in a competitive context represents an optimal method for developing training methods and improving coach intervention [Adam *et al.* 2016; Atan, Imamoglu, 2005; Avakian *et al.* 2016; Badilin, 2014; Boguszewski, Boguszewska, 2006; Garcia, Oliva, 2016; Del Vecchio *et al.* 2011; Menescardi *et al.* 2019; Miarka *et al.* 2016; Miarka, 2016; Pinto *et al.* 2020b; Santos *et al.* 2011; Slimani *et al.* 2017] since competition performance is associated with contextualized training [Barna, 2013; Gonzalez, 2014; Lopez-Gonzalez, Miarka, 2013; Miarka *et al.* 2012]. Thus, the knowledge improved through sports science and the experience of coaches facilitates the optimization of training processes (i.e., contextualized methodologies and their application) and maximization of fighter performance [Pinto, 2016; Pinto *et al.* 2020a, 2020b; Pinto *et al.* 2020].

However, previous studies designed interesting practical applications that were independent and restricted to the conclusions found in each respective study. Also, the fighter training process requires coaches to have comprehensive knowledge of all dynamics in order to organize and apply holistic and integrated methodologies and exercises. In this manner, fighters can improve all dynamics and skills in a balanced way, which is an essential condition for improving performance [Pinto *et al.* 2020a, 2020b; Pinto *et al.* 2020].

Based on the literature review, the current study would focus on identifying and examining the most

highly recommended training strategies for achieving offensive, counteroffensive, and defensive efficiency, as well as successful ground fighting control while also considering the conditioning and physiological demands of fighters. Hence, The objectives of this study were: 1) to classify the conclusions of all previous investigations and recommend practical applications, and 2) to improve coaches' skills and fighters' performance.

Methods

Search strategy

The present work considered studies of Ultimate Full Contact or other full-contact combat sports studies, with a strong focus on the present topic of investigation. To search for relevant publications, the main databases (e.g., Web of Science, Scopus, and PubMed) were used to locate articles and theses in all years that were published in English, Spanish, and Portuguese. The following search keywords (including various combinations) were used: i) primary keywords: "combat sports" and "martial arts"; secondary keywords: "Ultimate Full Contact", "pankration", "free-fight", "MMA mixed martial arts", "shooto", and "vale tudo"; tertiary keywords: "technical-tactical", "offensive", "defensive", "counteroffensive", "attack", "counterattack", "ground fighting control", "training methods", and "coach intervention".

Results

Offensive efficiency development

Offensive efficiency expresses the ratio of effective attacks to the total number of attacks, with a higher ratio indicating greater offensive efficiency [Boguszewski, 2014a, 2014b, 2016; Boguszewski, Boguszewska, 2006; Koropanovski, Jovanovic, 2007; Pinto *et al.* 2020b; Pinto *et al.* 2020; Romashov *et al.* 2019; Slimani *et al.* 2017; Wasik *et al.* 2014]. This implies that offensive efficiency is associated with the number of successful attacks, which are offensive actions that achieve their objective (i.e., all strike skills that accurately hit the opponent's authorized anatomical regions or all successful submission grappling skills). This fighting dynamic is a characteristic exhibited by fight winners [Pinto *et al.* 2020b; Pinto *et al.* 2020]. Offensive Ultimate Full Contact efficiency depends on proper styles and respective skills adjusted with certain distances (i.e., long range, short range, and close range) [Pinto *et al.* 2020b]. Changing fight distances present different spaces between fighters, resulting in the need for different dynamics with high skill diversity (i.e., versatility, adaptability, and opportunity seizing) [Pinto *et al.* 2020b, 2020a]. The rapid adjustment of skills with proper and safe distances, as well as the ability to perform several motions at the correct time in different ways, are

decisive fighting dynamics critical to improving fighter performance [Boguszewski, 2014a; Krabben *et al.* 2019; Pinto *et al.* 2020b, 2020a; Strossmayer, 2015; Wasik *et al.* 2014]. Fighters attack with appropriate skills according to specific distances and stimuli [Hristovski *et al.* 2006; Pinto 2016; Pinto *et al.* 2020b, 2020a; Riley *et al.* 2009]. These skills are related to different styles, which depend on distance variations [Pinto *et al.* 2020b, 2020a; Pinto *et al.* 2020] (see Table 1).

Table 1. Ultimate Full Contact: Relating fighting styles, distances, and offensive skills

Fighting styles	Fighting distances	Offensive fighting skills
Stand-up strike	Long range	Straight punches and kicks (e.g., jab, cross, overhand punch, spinning backfist, roundhouse kick, spinning back/hook kick, axe kick, front kick)
	Short range	Short punches and knees (e.g., hook, uppercut, knee strike, flying knee strike)
Ground strike	Close range	Clinch, takedowns/throws, ground and pound
		(e.g., grips, arm drag, single/double leg, suplex, fireman's throw, punching)
Submission grapple	Close range	Clinch, takedowns/throws, chokes and joint locks
		(e.g., grips, arm drag, double leg, suplex, fireman's throw, rear neck choke, guillotine choke, armbar, triangle choke, leg locks, heel hook)

Notably, takedowns and ground fighting skills are highly efficient fighting strategies; thus, stand-up fighters must develop defensive strategies to maintain a long range in order to be free to strike and avoid being taken down (i.e., through evasive displacements/footwork, proper balance, sprawling, punching, kicking, and knee striking) [Pinto *et al.* 2020b; Pinto *et al.* 2020].

The difference between winning or losing largely depends on ground fighting [Pinto *et al.* 2020b; Pinto *et al.* 2020]; however, ground fighting efficiency is related to stand-up fighting efficiency (i.e., punching, kicking, and takedowns) [Adam *et al.* 2015; Pinto *et al.* 2020b; Segedi *et al.* 2014]. Therefore, for fighters to be more efficient in offensive actions, they must develop technical-tactical versatility, stability, adaptability, and unpredictability in their attacks by seizing opportunities [Pinto *et al.* 2020b, 2020a; Wasik *et al.* 2014]. Additionally, it is not enough to act spontaneously and frequently according to opportunities [i.e., affordances] without cognitively perceiving, interpreting, and deciding on certain skills at the right time by adapting styles to distances [Pinto *et al.* 2020b]. Therefore, training methods should be based on the interaction of cognitive and dynamic-ecological models [Pinto *et al.* 2020b, 2020a] while considering cognitive demands [Afonso *et al.* 2012; Bolotin and Bakayev, 2018; Faro *et al.* 2020; Llorens, Alventosa, 2002; Russo, Ottoboni, 2019;

Tod *et al.* 2015] and the dynamic-ecological approach [Araujo *et al.* 2006; Hristovski *et al.* 2006; Krabben *et al.* 2019; Riley *et al.* 2009; Robles Rodriguez *et al.* 2018; Sanchez-Garcia *et al.* 2016; Vilar *et al.* 2012] using both analytical and integrated methods [Pinto *et al.* 2020b, 2020a]. This can be achieved through fighting skill repetition and sparring to promote adjustable structural and functional skill development [Pinto *et al.* 2020b, 2020a]. Thus, in accordance with the same authors, the analytical method can be developed by fighters performing attacks or combinations of specific attacks that are characteristic of each style by associating adjusted distances and repeating the same actions several times to automate their skills. The integrated method can be developed through formal combat while considering the competition rules or through modified/conditioned combat to emphasize certain gestures and behaviors (e.g., one fighter is allowed to use only striking skills while the other can only use submission grappling skills) to assess effective actions. In this aspect, fighter experience (i.e., repeated practice or a number of fights) is a factor fundamental for performance development and improvement [Castelo *et al.* 1998; De Quel, Bennett, 2019; Russo, Ottoboni, 2019].

Counteroffensive efficiency development

The counteroffensive dynamic consists of seeking the opportunity to safely counter an opponent's attack at the moment they prepare themselves to attack, or attacking to gain control over the fight while placing emotional pressure on an opponent [Hao, 2019; Wallace, 1981]. Counteroffensive efficiency is a fundamental fighting dynamic in fighter performance, as evidenced by fight winners [Boguszewski, 2011, 2014b, 2016; Boguszewski, Boguszewska, 2006; Hao, 2019; Strossmayer, 2015; Wasik *et al.* 2014]. Varying temporal counterattack response is a considerable factor in counterattack efficiency, with anticipated and simultaneous counterattacks being the most efficient forms [Pinto *et al.* 2020b, 2020a]. This includes counterattacking the opponent when he/she attacks or intends to attack or evade and hit him/her when he/she is unbalanced due to his/her attack failure [Hao, 2019; Lee, Modric, 1975; Romashov *et al.* 2019; Wallace, 1981]. In this respect, anticipated counterattacks proved to be 100% effective [Pinto *et al.* 2020b, 2020a]. Therefore, perception capacity and the ability to discern and predict competitive constraints are fundamental to identifying the emotions of dynamic actions and anticipate cognitive decisions [Pinto, 2016; Sagnol, Bisciotti, 1997; Shih, Lin, 2016]. However, regardless of whether counterattacks are anticipated, simultaneous, or of posterior temporal form, they are generally a highly efficient fighting dynamic [Hao, 2019; Lee, Modric, 1975; Pinto *et al.* 2020a, 2020b]. Therefore, technical-tactical training must include counterattack dynamics, and base defenses [Hao, 2019; Lee, Modric, 1975; Pinto *et al.* 2020a].

These adjustable defensive actions are very important to creating favorable fight distances and body stances for timing various counterattacks (i.e., jamming or evading, dodging, slipping, and displacements are more strongly associated with anticipation and simultaneous counterattacks, while blocking or parrying are more strongly associated with posterior counterattacks) [Lee, Modric, 1975; Wallace, 1981]. Additionally, counterattack training must consider capacity development in the areas of anticipation, opportunity seizing, action timing, fighting strategies, and appropriate skills in response to opponents' attacks [Hao, 2019; Lee, Modric, 1975; Pinto *et al.* 2020a], all of which depend on rapid perception, interpretation, and anticipation [Asia, Warkar, 2013; Fontani *et al.* 2006; Mori *et al.* 2002; Roi, Bianchedi, 2008; Rosalie, Muller, 2013; Russo, Ottoboni, 2019; De Brito, Silva, 2011]. Some counterattack strategies are highly efficient, such as fighters purposely revealing their intent (either simulated or feint) to invite their opponents to attack so that they can immediately counterattack with a planned skill [Ottoboni *et al.* 2015; Pinto *et al.* 2020b, 2020a].

Thus, to improve training processes and theoretical knowledge, the development of programmed counterattack strategies for certain attacks is recommended [Hao, 2019]; for example, between two right-handed fighters (orthodox stance): i) one attacks with a jab while the other anticipates it with an outside slip and right counterpunch ("overhand" or "cross"); II) one fighter attacks with straight punches while the other jams him with a double-leg takedown; III) one fighter attacks with a left roundhouse kick while the other anticipates it with a right spinning back/hook kick [Pinto *et al.* 2020b, 2020a]. After automating skills, fighter complexity increases through unpredictable attacks that can be performed by a training partner or coach using plastrons (i.e., focus mitt work) [Pinto *et al.* 2020b, 2020a].

Defensive efficiency and ground fighting control development

When a fighter attacks, their defensive and fighting control skills must always be ensured to avoid being hit by an eventual counterattack [Pinto *et al.* 2020b, 2020a], which is a winning characteristic [Adam, Sterkowicz-Przybycien, 2018; El Ashker, 2011; Forbes *et al.* 2004]. In fact, winners were revealed to be efficient in both offensive and defensive dynamics [Adam, Sterkowicz-Przybycien, 2018; Boguszewski, 2014a, 2014b, 2016; Boguszewski, Boguszewska, 2006; Forbes *et al.* 2004; Pinto *et al.* 2020b]. Successful evasion skills [i.e., dodging, slipping, and displacements] are the defensive actions most often used by winners, while losers most often used blocking actions [Pinto *et al.* 2020b, 2020a]. The characteristics of winners' defenses are mainly linked with moves that avoid impact and facilitate anticipated or simultaneous counterattacks [Lee Modric, 1975]. Also, winners were more successful in escaping and

sprawling, which is associated with defensive dynamics to avoid being taken down and losing the fight on the ground by submission skills or ground and pound [Pinto *et al.* 2020].

However, when fighting on the ground, winners tend to take dominant positions with more control over their opponents (i.e., mount control, side control, and back control), while the losers used more closed guard, immobilization, sweeps, and half guard [Pinto *et al.* 2020b; Pinto *et al.* 2020]. Moreover, winners' ground fighting control was predominantly associated with a more stable and favorable strategy to strike (i.e., ground and pound) or make opponents submit (i.e., through chokes or joint locks) [Del Vecchio *et al.* 2011; Pinto *et al.* 2020b; Pinto *et al.* 2020], while the losers were forced to maintain defensive attitudes [Adam *et al.* 2015; Del Vecchio *et al.* 2011; Miarka *et al.* 2016; Pinto *et al.* 2020].

Therefore, in training procedures, it is recommended to develop defensive fighting skills based on evasion (i.e., dodges, slipping, and displacements) or jamming to reduce impacts and create good conditions for anticipated or simultaneous counterattacks. Also, the development of defensive skills (e.g., sprawling and escaping) is fundamental to avoid being taken down and submitted to the ground via submission skills or ending by TKO or KO [Pinto *et al.* 2020b; Pinto *et al.* 2020]. In terms of ground fighting control, it is important to develop technical-tactical skills such as mount, back and side control, which are stable positions that can be used to dominate opponents, thereby creating favorable situations to attack or make opponents submit (i.e., tap out) [Pinto *et al.* 2020b; Pinto *et al.* 2020]. These are presented as efficient defense and control actions that must be automated through systematic repetitions and situational development (that is, in an analytical and integrated manner); for example: i) one fighter strikes and the other attempts to evade (i.e., appropriate dodging, slipping, or displacements) while using block or parry as a last resort; ii) one fighter attempts the single- or double-leg takedown while the other defends through sprawling or both fighters attempt any takedown or throw and escape at the same time; iii) grappling without submission skills to always seek the best positioning or control over the opponent [Pinto *et al.* 2020b; Pinto *et al.* 2020].

The physical factor in conditioning technical-tactical performance

As previously noted, the extreme technical-tactical variability in Ultimate Full Contact involves various efforts and is characterized by intermittent physiological intensity [Amtmann, 2004; Del Vecchio *et al.* 2015; Kazemi *et al.* 2010; Lopez-Gonzalez, 2011; Markovic *et al.* 2008; Pinto, 2016; Pinto *et al.* 2020a, 2020b]. The intensity of skills differs according to the contextual complexity [I.e., fighter level and competition characteristics] [Kirk *et al.* 2015]. Striking and high-amplitude

takedowns are often linked to powerful blows and hard impacts of higher intensity, while defenses, displacement, stances, or strategical moments of control are mainly associated with lower intensity [Del Vecchio *et al.* 2015; Kazemi *et al.* 2010; Lopez-Gonzalez, 2011; Markovic *et al.* 2008; Pinto, 2016]. The physical contact in Ultimate Full Contact is constant and full, with the opposition of maximum force (i.e., isometric contraction) used mainly in ground fighting and full impacts (i.e., collisions from high-amplitude takedowns/throws and strikes and counter strikes) of high power (i.e., explosive and reactive force) [Pinto, 2016]. Notably, certain takedown skills have shown greater intensity than strikes [Kirk *et al.* 2015]. Additionally, ground grappling is more strongly associated with strength and resistance (mainly through the use of glycolytic energy resources) [Hao, 2019; Rodriguez *et al.* 2018], while striking skills are more strongly associated with high intensity [mainly through the lactic or alactic power system] [Avakian *et al.* 2016; Chaabene *et al.* 2014; Chernozub *et al.* 2018; Petri *et al.* 2019; Tornello *et al.* 2013].

Therefore, the physiological factor conditions for technical-tactical efficiency [Kirk *et al.* 2015; Pinto *et al.* 2020a]. This implies that both strong technical-tactical skills (i.e., determinant factors) and high physical fitness (i.e., conditioning factor) are required for optimal fighting performance [Amtmann, 2004; Chernozub *et al.* 2018; Franchini *et al.* 2011; Franchini, Takito, 2014; Miarka *et al.* 2020; Pinto *et al.* 2020a]. Based on this reasoning, the training process should involve various technical-tactical exercises that are carefully regulated with physiological load to obtain adjustable adaptations since physiological conditioning can influence technical-tactical performance [Amtmann, 2004; Chernozub *et al.* 2018; Pinto *et al.* 2020a]. Such training can include: i) certain combination repetitions of technical-tactical skills performed with higher or lower intensity during the regular fight time; ii) formal sparring or restricted sparring to emphasize the development of specific efforts (e.g., only stand-up fighting or only ground fighting); iii) intermittent or interval methods with passive or active recoveries [Pinto *et al.* 2020a, 2020b]. These recommendations can be useful in developing effective training strategies in Ultimate Full Contact and can be a useful tool for coaches in developing exercises that are representative of the demands imposed during combat.

Coach Intervention

Through the practice of observing the performance of fighters in competition, coaches can improve training processes via representative exercises. This observation is crucial to the methodological planning conducted by coaches, which helps to create methodologies and strategies for optimizing fighter performance [Pinto, 2016; Pinto *et al.* 2020a]. More prepared coaches can interact more efficiently with fighters during training through

appropriate feedback, methods, and strategies [Pinto, 2016; Pinto *et al.* 2020a]. A skillful coach has scientific training in sports sciences as well as knowledge acquired through practical experience and observation, with the ability to articulate knowledge to practice. Based on this reasoning, it is possible to develop fighters by optimizing their competitive performance (i.e., offensive, counteroffensive, and defensive efficiency as well as successful fighting control) [Pinto, 2016]. Coaches assume a prominent role in fighters' performance (i.e., physical, technical-tactical, and psychological) by maintaining a scientific-pedagogical focus [Meyer, 2018; Milazzo *et al.* 2016; Pinto, 2016; Pinto *et al.* 2020a].

Table 2. Analytical training model with some suggested practical applications

Models	Forms	Exercises
Analytical model	Pair workout (one-to-one)	Ex. 1: With the fighters face to face, one performs repeated single or combination attack skills while the other performs the respective defenses and/or counterattacks, alternating between offensive and defensive/counteroffensive actions (1r x 10')
		Ex. 1: Ultimate Full Contact shadow boxing using skills such as single and combination attacks (I.e., punches, kicks, and knees), counterattacks, displacements, dodges, slips, single- and double-leg takedowns, suplex moves, sprawls, and moves on the ground (1r x 10')
	Individual workout	Ex. 2: Shadow workout using only boxing skills (e.g., jab, cross, hook, uppercut, overhand, displacements, dodging, slipping) or other specific skills (e.g., only boxing and kicking) (1r x 10')
		Ex. 3: Systematic repetition of kicking skills in front of a mirror (e.g., roundhouse kicks, spinning back/moon kicks, front kicks, sidekicks, ax kicks) (1r x 10')
		Ex. 4: Punching/kicking bag workouts (1r x 10')
		Ex. 5: a) Interval training, e.g., one minute of running punching in place and one minute in plank (I.e., active recovery), repeated five times (total time: 10'); b) intermittent training, e.g., 15 or 30 seconds of clapping push-ups/sprawls/mountain climbers with a pause (I.e., passive recovery) of 30–60 seconds between repetitions (reps) (total time: 10'); c) intermittent training, e.g., 10 seconds of running and punching in place/power roundhouse kicks in a heavy bag with a pause (I.e., passive recovery) of 10–20 seconds between reps (total time: 10')

Legend: 1r = 1 round; 10' = 10 minutes

Practical applications

Besides the general scientific principles of training (i.e., methodological, biological, and pedagogical), it is important to consider the specific theoretical basis of the Ultimate Full Contact training process. This should mainly involve technical-tactical exercises (i.e., determinant factor) developed using appropriate physiological

loads [i.e., conditioning factor] under the regular fight time (1round x 10') (i.e., representative of competitions) (see Tables 2, 3, and 4). In this manner, it is possible to improve skills with adjustable physical intensities (i.e., intermittent efforts). The development of optimal speed, strength, endurance, and flexibility are fundamental to motor conditioning for improved technical-tactical performance. Thus, the following physical efforts are related to the different technical-tactical skills: i) anticipation and reaction time are mainly associated with attack/counterattack; ii) isometric strength is mainly associated with submission grappling on the ground; iii) explosive strength is mainly associated with full-contact strikes and wide takedowns/throws; iv) alactic anaerobic resistance (ATP-CP – phosphate system) is associated with intensive actions or combinations of very intensive actions (two to five actions); v) the lactic anaerobic (glycolytic) system is associated with the exchange of intensive actions above 10/15 seconds; vi) aerobic resistance [oxidative system] is associated with the process of recovering after a bout of actions. All efforts, intensities, and decision-making should be regulated by the regular fighting time (1round x 10').

Ultimate Full Contact training should focus on the holistic and balanced development of all fighting dynamics (I.e., offensive, counteroffensive, defensive, and ground fighting control) since high performance is associated with their interrelationship (e.g., an attacking fighter must simultaneously consider an efficient defense to avoid being hit). Also, the stand-up striker style is highly efficient and supports ground fighting, where most fights outcomes occur (i.e., mainly by chokes and ground and pound). Moreover, takedowns are more efficient fighting skills since they make the transition from standing to ground fighting. Regarding defense skills, evasion (i.e., dodging, slipping, displacements, jamming) is the most efficient and is related to prior defense when performing an anticipated or simultaneous counterattack. Thus, training content should include the integral skills used in stand-up fighting and ground fighting since greater versatility facilitates improved performance through adapting to contextual variation. Additionally, skill development should be related to the specific styles (i.e., stand-up striker, ground striker, and submission grappler) most appropriate for each fighter (i.e., based on individual characteristics and experience). Moreover, these skills must be adjusted for different fighting distances (i.e., long range, short range, and close range). Therefore, training methods should articulate cognitive and dynamic-ecological models (i.e., analytical and integrated or situational methods) (see Tables 2, 3, and 4) mainly through systematic repetitions of technical-tactical exercises and sparring – to create a large technical-tactical repertoire of fighting strategies and qualities (i.e., attention, concentration, rapid perception and interpretation, correct decision-making,

skill automation, versatility, stability, skill combinations, anticipation, timing, seizing opportunities, unpredictability, correct balance and distances, displacements, fluidity, and agility). By utilizing these methods, it is possible to improve discipline and volitional capacity as a fundamental condition to achieve self-confidence, self-overcoming, a positive attitude, and fighting control.

Analytical model – technical-tactical repetitions in isolation or combinations forming attacks, counterattacks, defenses, and ground fighting control developed one-to-one (i.e., with a pair of fighters) or individually using equipment (e.g., mirrors, heavy bags, punching balls) (Table 2). The main objective is to automate and develop overall technical fighting skills and specific physical motor conditioning.

Integrated model – The integrated model is characterized by contextualized training through formal sparring (i.e., contest-representative workout) and phased sparring (i.e., modified or conditioned: sparring under specific actions/conditions to emphasize specific technical-tactical development) (Table 3). The main objective is to develop representative or situational technical-tactical skills and specific physical efforts while considering the most critical situations during a fight.

Table 3. Integrated training model with some suggested practical applications

Model	Forms	Exercises
Integrated model	Formal sparring	Ex. 1: The fighters (face to face) fight (i.e., sparring) according to Ultimate Full Contact competition rules (1r x 10')
		Ex. 1: Both fighters use only punching skills (1r x 10')
		Ex. 2: Both fighters use only grappling skills without submission skills (1r x 10')
	Restricted sparring	Ex. 3: One fighter uses only striking skills while the other uses only submission grappling skills (1r x 10')
		Ex. 4: Both fighters are only authorized to strike a restricted anatomical zone (e.g., abdominal or body) (1r x 10')
		Ex. 5: Sparring in small spaces (i.e., smaller than the formal competition area) (1r x 10')
		Ex. 6: With fighters in certain positions (i.e., situational competition moments), one of them is in a dominant ground fighting (e.g., mount) attack (i.e., ground and pound) while the opponent (i.e., in the bottom position) attempts to immobilize and invert the position (i.e., escape, sweep); the same workout can be done with a fighter inside the closed guard (1r x 10')

Legend: 1r = 1 round; 10' = 10 minutes

Mixed model (i.e., analytical and integrated) – The mixed model involves pad work/focus mitt training with an experienced coach (master) that is highly knowledgeable about the competitive context and intentionally strives for technical action perfection, technical-tactical behavior, or both in a balanced manner, with the advantage of being able to focus on certain details (i.e., critical points). This training method is highly efficient since the coach can assume the role of an opponent, interacting

with students/fighters to more easily assess their performance in a contextualized manner while helping to improve their fighting skills through feedback (Table 4). The main objective of this model is to simultaneously automate and improve technical-tactical behaviors and respective physical conditions that are representative of the competition while focusing on relevant aspects.

Table 4. Mixed training model (i.e., analytical and integrated combined) with some suggested practical applications

Model	Form	Exercises
Mix model (i.e., analytical and integrated)	Assisted workout (pad work/focus mitt training)	Ex. 1: The fighter repeatedly performs a certain technique or combination in the plastron while his/her coach analyses and highlights certain essential features (1r x 10')
		Ex. 2: The fighter repeatedly performs a certain technique or combination in the plastron while the coach occasionally attacks, which requires the fighter to perform specific defenses/counterattacks (1r x 10')
		Ex. 3: The fighter performs certain single or combination skills (i.e., attacks, defenses, counterattacks, and footwork) according to the positioning of plastrons, attack simulations, and displacements performed by the coach (1r x 10')

Legend: 1r = 1 round; 10' = 10 minutes

All training sessions should be completed with calisthenic exercises, plyometric exercises, isometric exercises, and stretching exercises to emphasize the development of resistance strength, static strength, explosive strength, and flexibility (e.g., crunches, pull-ups, chin-ups, squats, push-ups, bench dips/triceps dips, mountain climbers, sprawls, bunny hops, clap push-ups, jump push-ups while moving forward, rope jumping, planks, wall sits, and stretching and flexibility exercises).

Conclusion

This study allowed us to conclude that it is essential that the fighters have a high capacity for cognitive interpretation to decide the specific skills to use at the right time, so that they will be successful in their actions, which will bring them closer to winning the fight.

In addition, the training process must be contextually organized and scientifically conducted for the fighters, in order to improve a broad and versatile technical-tactical motor repertoire, the efficiency of skills and the conditioning of the ideal motor capacity. Thus, coaches must schedule training through a cognitive and dynamic-ecological perspective, articulating analytical

and integrated training methods through systematic technical-tactical repetitions and exercises that are representative of the competition (that is, formal or restricted sparring).

Ultimately, the training process must be developed holistically through technical-tactical exercises, simultaneously considering attacks, counter attacks, defense and fight control using adjusted physical loads. Furthermore, intermittent and interval training with passive and active recovery, respectively, is highly recommended to improve the specific physical fitness of Ultimate Full Contact fighters.

Acknowledgments

This work is supported by national funding through the Portuguese Foundation for Science and Technology, I.P., under project UID04045/2020.

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Wykorzystanie umiejętności kontekstowych i interwencji trenera w celu optymalizacji wyników walk *full contact*

Słowa kluczowe: sporty walki, sprawność ofensywna, sprawność kontrnatarcia, sprawność defensywna, kontrola walki w parterze

Streszczenie

Tło. Walki *Ultimate Full Contact* wymagają od zawodników wysokiego poziomu efektywności w ofensywie, kontrataku i defensywie, a także kontroli walki w parterze, w celu osiągnięcia wysokich wyników i wygrywania walk. Z tego powodu, a także w celu zwiększenia tych umiejętności, trenerzy muszą posiadać wszechstronną wiedzę na temat wszystkich istotnych dynamik, aby zorganizować i zastosować metodologie, które ułatwiają poprawę wyników w sposób holistyczny.

Problem i cel. Głównym celem niniejszej pracy było dostarczenie trenerom istotnych aspektów teoretycznych, które pozwolą im określić optymalne strategie treningowe w zakresie efektywności ofensywnej, kontrfensywnej i defensywnej oraz skutecznej kontroli walki w parterze.

Metody. Aby wyszukać odpowiednie publikacje i zapewnić jakość artykułów, wykorzystano główne bazy danych (tj. Web of Science, Scopus i PubMed). Zastosowana strategia wyszukiwania obejmowała specyficzne terminy wyszukiwania oparte na temacie badań.

Wyniki. Wyniki wykazały, że proces treningowy *Ultimate Full-Contact* musi być kontekstowo zorganizowany tak, aby walczący doceniali szeroki i wszechstronny repertuar ruchowy techniczno-taktyczny, sprawność w działaniu i doskonałe kondycjonowanie zdolności motorycznych. Ponadto, proces treningowy musi rozpoczynać się z perspektywy poznawczej i dynamiczno-ekologicznej, artykułując analityczne i zintegrowane metody treningowe poprzez systematyczne powtórzenia techniczno-taktyczne i ćwiczenia reprezentatywne dla zawodów. Wnioski. W niniejszym opracowaniu stwierdzono, że proces szkolenia musi być opracowany holistycznie i musi zawierać ćwiczenia techniczno-taktyczne, które jednocześnie uwzględniają ataki, kontrataki, obronę i kontrolę walki z wykorzystaniem dostosowanych obciążeń fizycznych. Ponadto przedstawiono również zalecenia praktyczne.