






Anticipated, simultaneous and posterior counter-attack efficiency in Ultimate Full Contact

Authors' Contribution:

-  **A** Study Design
-  **B** Data Collection
-  **C** Statistical Analysis
-  **D** Manuscript Preparation
-  **E** Funds Collection

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Abstract

Background & Study Aim:

Ultimate Full Contact is a hybrid combat sport, where the counter-attack technique takes on special importance. However, to the best of our knowledge, no study has analysed the dynamics of anticipated, simultaneous and subsequent counter-attacks as a distinct technical-tactical efficiency for the fighters' performance. This study aims to identify and characterize, according to the winning and losing athletes, the counter-attack dynamics (i.e., anticipated, simultaneous and posterior) according to the opponents' attacks, with the purpose of identifying the most efficient and distinct counter-attack forms of the winners.

Material & Methods:

One hundred and seventy fights were observed, integrating (n = 340) senior male athletes representing 38 countries, who participated in the WUFC World Championships; all technical-tactical counter-attacks made and effective, by winners and losers, were registered and analysed through Spearman's bivariate correlation, the Kalina method of measuring the dynamics of the fight (counterattacks efficiency) and Mann-Whitney U.

Results:

The results indicate that winners had significant advantage in all counteroffensive skills regarding their temporal responses, with the number of counter-attacks made and their efficiency both decreasing: anticipated, simultaneous and posterior. The counter-attack made by the losers was in the same order, but its efficiency was in opposite order with significant difference, except at posterior counter-attack. The anticipated counter-attack showed 100% efficiency.

Conclusions:

This study showed that winners counter-attacked more and more effectively, therefore showed greater efficiency. Anticipated counter-attack and simultaneous counter-attack proved to be the temporal responses that most contributed to winning a fight. It is important to develop prior defensive actions, which create a favourable fight distance and body stance for these counter-attacks, as well as developing related capacities (e.g. perception, anticipation, opportunity, timing, strategies).

Keywords:

anticipation • combat sports • dynamics of the fight • ground fighting; technical-tactical • opportunity • skills • stand-up fighting • timing

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Technique – *noun* a way of performing an action [43].

Tactics – *plural noun* the art of finding and implementing means to achieve immediate or short-term aims [43].

Combat sport – *noun* a sport in which one person fights another, e.g. wrestling, boxing and the martial arts [43].

Martial arts – *plural noun* any of various systems of combat and self-defence, e.g. judo or karate, developed especially in Japan and Korea and now usually practised as a sport [43] – “every combat sport is martial arts but not vice versa” [37].

Performance – *noun* the level at which a player or athlete is carrying out their activity, either in relation to others or in relation to personal goals or standards [43].

Skill – *noun* an ability to do perform an action well, acquired by training [43].

Defensive (defend) actions – the act of defending yourself or someone or something from attack.

Counterattacks (index of effective counterattacks – **EC**), which is the ratio of the number of scored counterattacks to the total number of counterattacks undertaken [5] – one of the basic indicators of measuring **the dynamics of the fight** using the Kalina method [37].

Relationship between attack and defence – Kotarbiński (creator of general theory of struggle) pays attention onto a seeming paradoxically of a statement: “(...) that any defence is a certain form of attack and only the reciprocal is not a truth not any attack is a defence” [44, p. 130]; “(...) attacks who undertakes actions for a events' changes' course directed to own struggle's aims that had existed, that defends himself or herself who counter-acts the attack” [44, p. 130].

INTRODUCTION

Ultimate Full Contact is a combat sport promoted by the World Ultimate Full Contact (WUFC) since 1988 [1]. It is characterized by an intermittent and complex structure concerning the physiological resources and technical-tactical dynamics (i.e., offensive, counteroffensive and defensive actions) [1]. The technical-tactical factor is evidenced as a determining dynamic in Ultimate Full Contact competitions [1]. Based on this dynamic, the counter-attack has been shown to be a very effective strategy in all fighting arts [2]. Therefore, the counter-attack is considered a safe and assertive strategy in combat (i.e., waiting for the opponent to prepare him/herself to attack, or attacks to counter-attack him/her), creating great psychological pressure on the opponent [3, 4]. In fact, the counter-attack consists of a defence-based action that seeks the opportunity to counter-attack, switching the fighter's behaviour from passive to active, which gives them greater control over the fight [4]. Kotarbiński lists just a counter-attack as a basic way of defence – see glossary “relationship between attack and defence”. Previous researches in judo [5-7] have shown that the counteroffensive dynamics (i.e., switching from defensive to offensive action) in combat is one of the characteristics of those winners with significantly higher effectiveness.

The execution of the counter-attack is directly influenced by the fighter's decision-making, and by taking advantage of the opportunities created [4]. Thus, tactical ability can play an important role during combat, which allows an advantage to be obtained quickly, and to use the opponent's possible mistakes to one's advantage [5]. Furthermore, intentional simulations create a latent response in the opponent, and the real intentional offensive must take place at that moment, instead of waiting for mistakes or for the opponent's attack [8]. In addition, the ability to continually manage the psychological refractory periods created by anticipations (i.e. response latency) is one of the essential characteristics for success in Ultimate Full Contact competitions [1].

In fact, playing in the counter-offensive becomes more rigorous when the sport develops under very broad rules, using complex and extremely powerful techniques, as in Ultimate Full Contact and other similar modalities (e.g., pankration, free-fight or mixed martial arts (MMA)) [1]. Effectively, in Ultimate Full Contact, an infinity of technical-tactical resources are allowed, ranging from the striker to the grappler, with stand-up fighting and / or on-ground fighting, aiming to effect blows or submit the opponent, in a context of high tenacity, variability, transience and unpredictability [1].

In this context, the high complexity of Ultimate Full Contact influences tactical behaviour, specifically in quality, quick-thinking and in the adequate understanding of the situation according to competitive requirements [1, 9]. Variability (i.e., pace of change) requires high perceptual demands, while transience (i.e., complexity of change) requires a capacity for efficient intervention through anticipation [9]. Thus, the response must be executed in time, according to the opponent's attack situation [4].

In Ultimate Full Contact, there are numerous standardized specific counter-attack strategies, namely between two right-handed fighters (i.e., orthodox stance), right cross counterpunch to a right low kick; counter-attack double-leg take-down to punch strikes; right spinning back or hook kick counter-attack to a right cross or left roundhouse kick; right cross counterpunch to left jab; left hook counterpunch to a right cross [10]. However, the counter-attack is directly related to the immediately previous defensive action (e.g., blocking, parrying, dodging, displacement, escape or jamming/intercepting) which creates a favourable fight distance and body stance for a prompt counter-attack [2, 3, 4, 10]. Thus, the correct application of counter-attack tactics requires that fighters have excellent attack and defence techniques, which have been demonstrated by the winners [4, 11]. However, even if the fighter opts for a more defensive style,

the attack/counter-attack is essential for success, since sooner or later one of the fighters will have to use offensive techniques to win the fight [12]. Corroborating this evidence, previous studies have reported that the offensive and / or counteroffensive was a decisive combat dynamic to defeat the opponent [2, 5, 13, 14]. Thus, any block (i.e., defensive action) must be followed by a counter-attack (i.e., offensive action); if the fighter constantly blocks the opponent's actions without counter-attack, he will eventually be hit [12, 15]. In addition, the effectiveness of the counter-attack requires maintaining the proper distance and must occur after escaping the opponent's attack, hitting them while they are still attacking and unbalanced as a result of the attack failure, or hitting them before they start' starts the offensive action [2, 3, 4, 12].

Therefore, the visual reaction time can be considered a critical capacity for performance and is essential for the performance of the best fighters [16-21]. Thus, the ability to anticipate is also essential for performance, given its relationship to time-sensitive interceptive actions [22]. In fact, anticipation is one of the fundamental tactical behaviours throughout the phases of perception and situational analysis, representing the ability to discern and predict the needs and consequences in the competitive situation [23, 24]. Consequently, anticipation depends on making eminently cognitive decisions related to the counter-attack [25]. An accurate anticipation of the opponent's intentions is vital for a quick offensive or defensive movement and is more correlated with the recognition of emotions of dynamic action [26]. Thus, anticipation is characterized as a process based on mental construction, pre-perception, pre-decision and pre-action, introducing the future into the present [27]. It is a process in which tactical experiences are fundamental, prioritizing the predictive activity of the development actions [28, 29]. In this approach, the anticipated response depends on the ability and quick perception to understand the situational variability of the fights [8]. The counter-attack of the expert fighters is based on an ideomotor response model (action programming) as opposed to an inexperienced counter-attack [8]. Excessive self-control in critical situations can delay the responses and benefit the opponent [8]. In this reasoning, in order to be successful in the anticipated spontaneous

responses, the fighter must develop the qualities and skills according to the different types of temporal responses quite common in the fights [8].

In fact, the way in which counter-attacks are developed highlights the differences in the athletes' performance, which emphasizes the importance of tactical consciousness throughout the fight [4]. However, previous studies only highlight the counter-attack efficiency, based on the ratio between effective and realized techniques [5-7, 13, 30], not taking into account the relevance of the tactical counter-attack efficiency in relation to the temporal responses (i.e., anticipation, simultaneous or posterior) to the opponent's attacks or intentions. In addition, the previous counter-attack studies were developed in combat sports, like judo, boxing, taekwondo, wrestling or karate, with limited rules when compared to Ultimate Full Contact. Thus, a gap in the literature is evident since to the best of our knowledge, no study has analysed the dynamics of anticipated, simultaneous and subsequent counter-attacks as a distinct technical-tactical efficiency for the performance of the Ultimate Full Contact Fighter. We anticipate the knowledge of our research will effectively contribute to improving representative training methods and consequently improve the athletes' technical-tactical performance [11, 14, 30, 31-35].

Therefore, this study aims, identifies and characterizes, according to the winning and losing athletes, the counter-attack dynamics (i.e., anticipated, simultaneous and posterior) according to the opponents' attacks, with the purpose of identifying the most efficient and distinct counter-attack forms of the winners.

MATERIAL AND METHODS

Subjects

Three hundred and forty, senior male athletes (master class – minimum level of national champions or high rank in different combat sports or martial arts, aged ≥ 8 , among all weight divisions) representing 38 countries participated in the study, including 170 (50.0%) winners and 170 (50.0%) losers, who had participated in the WUFC Ultimate Full Contact World Championship, held annually in Portugal between 2008 and 2017. These athletes were chosen, because they are

Stand-up fighting (jargon) – fighting in a vertical posture.

Ground fighting (jargon) – fighting in a horizontal posture.

Fighter – *noun* a competitor in a full-contact sport such as boxing or taekwondo [43].

Anticipation – *noun* the process of realising what may happen and doing what is necessary to prepare to deal with it [43].

Timing – the choice, judgement, or control of when something should be done (e.g., the moment of the attack in judo).

top athletes in the world, according to the WUFC world rankings [36]. The fights observed consisted of a total time of 43120 (253.65 ±203.65), where 33 (19.4%) were completed in the round's total time of 1x 10' (600") and resulted in a decision. However, 137 (80.6%) of the matches ended before the final time: 84 (49.4%) by submission; 18 (10.6%) by knockout (KO); 33 (19.4%) by technical knockout (TKO); and 2 (1.2%) by doctor stoppage (DS).

Instruments and procedures

The methodology was based on the Kalina method for analysis of struggle dynamics, with regard to the counterattacks (counteroffensive) efficiency [35,37], but grouping the techniques by their tactical behaviour, according to the different types of temporal responses [8]. Thus, the data collection was done by observing the video footage of the 170 fights (provided by WUFC World Ultimate Full Contact). The observation consisted of the necessary pauses and replays, in order to correctly obtain all the quantitative and qualitative information regarding the technical-tactical counter-attack actions performed as well as the effective ones, depending on the winning and losing athletes. The data were registered in observation grids, specifically created for this purpose in Microsoft's Excel Office 365 program, with all variables. The data collection (i.e., counter-attack technical-tactical actions) were guided by the following variables: counter-attacks – anticipated made, simultaneous made, posterior made, made total; counter-attacks – anticipated effective, simultaneous effective, posterior effective, effective total; counter-attacks – anticipated efficiency, simultaneous efficiency, posterior efficiency and total efficiency.

Statistical analysis

The estimation and analyses of the results is based on the following indicators: sum (Σ); mean (M); median (Me); standard deviation (SD or \pm); minimum (Min); maximum (Max); interquartile range (IQR); The normality of the data was verified by the Kolmogorov-Smirnov test, confirming that there was no normal distribution. Thus, the analysis was performed using the non-parametric statistical tests, particularly the Spearman's bivariate correlation (r_s) and the Mann-Whitney U tests. Therefore, after an initial step, where the descriptive statistical values of each variable under study were obtained, we used the inferential statistics, using the first test mentioned above. The relation

intensity was verified, whether with positive or negative direction, and the significance between the variables related to the different technical-tactical counter-attack actions performed as well as the effective ones, comparing the values between the winning and the losing athletes. To interpret the relation intensity, the Cohen & Holliday's correlation magnitude scale was used, referred to as follows: very weak correlation and without significance ($r \leq 0.19$); weak correlation ($0.2 \leq r \leq 0.39$); moderate correlation ($0.4 \leq r \leq 0.69$); strong correlation ($0.7 \leq r \leq 0.89$); very strong correlation ($0.9 \leq r \leq 1$) [38]; In the correlations, the significance of $p < 0.01$ and $p < 0.05$ were determined.

From the study, the counter-attack efficiency variables were also calculated by the respective technical-tactical dynamics (i.e., anticipated, simultaneous and posterior counter-attacks) through the ratio between the number of effective actions and the number of made actions [31, 37]. After this procedure, the effect of winning or losing under the different efficiency variables was calculated using the Mann-Whitney U method, considering the significance of $p < 0.05$.

RESULTS

From the 170 matches observed (Table 1), the winners made a total of 274 (1.61 ±1.88) counter-attacks, with 242 effectives (1.42 ±1.59), while the losers made 138 (0.81 ±1.13) counter-attacks with 86 effectives (0.51 ±0.85). The winning athletes chose to play more counter-attacks than the losers. The winners made a greater number of counter-attacks, and effectives, except for the posterior counter-attacks made. The anticipated counter-attack form is 100% effective in both winning and losing athletes. It is also this form of counter-attack that is the most used by the winners, followed by the simultaneous counter-attack and lastly the posterior counter-attack. In the loser athletes, the opposite is true: that is, they usually use the posterior counter-attack, followed by the simultaneous and finally the anticipated (Table 1).

Through the intensities of the relation between the variables, a complete proximity can be confirmed with the anticipated counter-attacks made and effective ones, both by the winners and losers, verifiable by the values of $r_s = 1.00$. This correlation, considered as very strong, expresses the high efficiency of the early counter-attacks

Table 1. Descriptive data of technical tactical actions of counter-attacks made, and effective, by winners and losers.

Counter-attacks	Winners (n = 170)					Losers (n = 170)				
	Min–Max	Σ	M, SD	Me	IQR	Min–Max	Σ	M, SD	Me	IQR
Anticipated made	0–6	134	0.79 ± 1.07	0.00	1.00	0–3	29	0.17 ± 0.45	0.00	0.00
Simultaneous made	0–4	84	0.49 ± 0.80	0.00	1.00	0–2	49	0.29 ± 0.54	0.00	0.00
Posterior made	0–6	56	0.33 ± 0.71	0.00	1.00	0–4	60	0.35 ± 0.72	0.00	1.00
Made total	0–13	274	1.61 ± 1.88	1.00	2.00	0–6	138	0.81 ± 1.13	0.00	1.00
Anticipated effective	0–6	134	0.79 ± 1.07	0.00	1.00	0–3	29	0.17 ± 0.45	0.00	0.00
Simultaneous effective	0–3	72	0.42 ± 0.68	0.00	1.00	0–2	33	0.19 ± 0.45	0.00	0.00
Posterior effective	0–3	36	0.21 ± 0.49	0.00	0.00	0–2	24	0.14 ± 0.38	0.00	0.00
Effective total	0–9	242	1.42 ± 1.59	1.00	2.00	0–5	86	0.51 ± 0.85	0.00	1.00

in combat. With regard to the simultaneous counter-attack, the proximity between counter-attacks made and the effective ones is no longer so close; however, it is also a very strong relation in the winners, with $r_s = 0.941$ and strong in the losers, with $r_s = 0.801$, both with both positive and significant direction, considering the significance of $p = 0.01$. However, the posterior counter-attack shows lower, but strong relation intensities in the winners, with the value of $r_s = 0.805$, and moderate relation intensities in the losers, with the value of $r_s = 0.672$, both also significant at the $p < 0.01$ level (Table 2).

Counter-attack efficiency

Through the ratio between the counter-attacks made and the effective counter-attacks obtained, the efficiency variables by the grouping of athletes (winners and losers) show higher averages of efficiency by the winners in all variables (Table 3). With regard to the overall counter-attack efficiency, the averages confirmed the superiority of the winner

athletes. However, in the case of non-normal distribution data, it became more reliable to observe the mean ranks values (Table 4), but nonetheless, they were also found to be higher in the winners in all efficiency variables.

The differences between the winners and the losers were significant in all variables ($p < 0.05$), except for the posterior counter-attacks efficiency, with $p = 0.14$. Also, it is perceptible which variable makes the biggest difference between the winning and the losing athletes, observing the lowest U value: this value coincides with the anticipated counter-attacks efficiency variable, with $U = 9435.00$ and $p = 0.00$, followed by simultaneous counter-attacks efficiency and finally posterior counter-attack efficiency. Considering the counter-attacks efficiency Totality, the significant advantage of the winners in this combat dynamics is noticeable, which is confirmed by the higher rank's values and by the low value of $U = 8893.50$, with $p = 0.00$ (Table 4).

Table 2. Spearman correlation coefficients obtained between counter-attacks made and effective.

Counter-attacks	Anticipated effective				Simultaneous effective				Posterior effective			
	Winners (n = 170)		Losers (n = 170)		Winners (n = 170)		Losers (n = 170)		Winners (n = 170)		Losers (n = 170)	
	r_s	p-value	r_s	p-value	r_s	p-value	r_s	p-value	r_s	p-value	r_s	p-value
Anticipated made	1.000**	.	1.000**	.								
Simultaneous made					0.941**	0.000	0.801**	0.000				
Posterior made									0.805**	0.000	0.672**	0.000
Made total	0.785**	0.000	0.523**	0.000	0.572**	0.000	0.529**	0.000	0.365**	0.000	0.471**	0.000

** significant correlations $p < 0.01$

Table 3. Descriptive data of technical tactical actions of counter-attacks efficiency.

Counter-attacks	Winners (n = 170)				Losers (n = 170)			
	Average	Standard Deviation	Median	IQR	Average	Standard Deviation	Median	IQR
Anticipated Efficiency	49.41	50.14	0.00	100.00	14.71	35.52	0.00	0.00
Simultaneous Efficiency	20.06	34.23	0.00	33.33	11.86	29.13	0.00	0.00
Posterior Efficiency	17.55	37.78	0.00	0.00	10.74	29.45	0.00	0.00
Total Efficiency	64.92	45.75	100.00	100.00	29.41	42.88	0.00	75.00

Table 4. Mann–Whitney test effectuated between winners and losers, in the different variables of counter-attacks efficiency.

Counter-attacks	Winners (n = 170)		Losers (n = 170)		Mann–Whitney U	p-value
	Mean Rank	Sum of Ranks	Mean Rank	Sum of Ranks		
Anticipated Efficiency	200.00	34000.00	141.00	23970.00	9435.00	0.000
Simultaneous Efficiency	182.84	31083.50	158.16	26886.50	12351.50	0.002
Posterior Efficiency	175.50	29835.00	165.50	28135.00	600.00	0.136
Total Efficiency	203.19	34541.50	137.81	23428.50	8893.50	0.000

DISCUSSION

Overall, the results reveal that the winners stood out in all counter-attack technical-tactical effectiveness dynamics. The anticipated counter-attack was the most made and efficient action by the winners, followed by the simultaneous counter-attack and lastly by the posterior counter-attack.

Curiously, the counter-attacks made by the losers were in the opposite sequence to that of the winners, favouring the posterior counter-attack followed by the simultaneous and finally by the anticipated. However, the effectiveness order of the different counter-attack forms by winners and losers was the same. With regard to the effect of the winning and losing efficiency differences, a significant difference was observed between the anticipated counter-attacks efficiency groups and between the simultaneous counter-attack groups, but not in the posterior counter-attacks efficiency groups. In terms of the total counter-attack efficiency, a significant difference was also observed between the winners' and the losers' groups. These results, in the general counter-attack effectiveness perspective, are in accordance with the previous studies that also showed the higher counter-attack efficiency by the winners [5-7, 39]. Nevertheless,

the present study adds in relation to what was previously reported, the efficiency of the counter-attack related to the time of its execution in response to the opponent's attacks. In fact, the different types of temporal responses, quite common in the fights, interfere with the skills related to mental control mechanisms [8].

In general, the counter-attack proved to be a very efficient combat dynamic, regardless of the way it is performed (i.e., different types of temporal responses regarding the opponent's attack), given that there are notably high values of correlation between the techniques performed and the effective ones in the three ways. Previous studies (2, 4, 5-7, 13, 30, 31, 34, 39) have also shown the counter-attack as the technically most effective dynamic, its execution causing a connection of counter speeds between the fighters, and quite often leads to knockdowns and knockouts of the opponent [2]. However, in the present study, it has been added to the previous acknowledgement that the anticipated counter-attack stands out with a positive and very strong correlation of $r_s = 1.00$, which means 100% effectiveness. In fact, anticipation proves to be an essential capacity in terms of performance, which goes against what has been previously described in some studies [16, 17, 19, 20, 22, 26, 40] that

identify it as a quality of expert fighters. Although less efficient than the anticipated counter-attack, the counter-attack that is made simultaneously to the opponent's attack also proved to be very efficient and was used more often by the winners, while the posterior counter-attack, was used more often by the losing fighters than the winners (0.35 ± 0.72 vs 0.33 ± 0.71), although with less effectiveness ($r_s = 0.672$ vs 0.805 ; $p < 0.01$). Perhaps due to the lower quality of execution, as evidenced in taekwondo analyses [40], where the winners showed 2187 total attempts, of which 9% attacks and 7% defence were successful; non-winners had 2352 total attempts, achieving 5% success for attack and 2% for defence. Even though non-winners attempted more than winners, the winners had higher successfulness in attacking and defensive tactics [40].

The counter-attack performance requires the capacity to seek the opportunity with excellent previous defence followed by spontaneous attacks/counter-attacks, keeping an appropriate distance and supple dodging and moving through a tactical consciousness [2]. This defence – attack cycle was evidenced by expert fighters' actions that resembled counter-attack dynamics before a stimulus, while the beginner fighters' actions resembled defensive patterns without counter-attack [41]. Therefore, from the present investigation, where the anticipated and simultaneous counter-attacks are the tactically most performed and efficient, it can be inferred that, from the defence actions normally prior to the different counter-attack time execution – the jamming, the dodging or move/displacements (i.e. those more associated with the anticipation and simultaneous counter-attacks) – are more efficient action types than the blocks or the parries (i.e. those more associated with the posterior counter-attack) [2-4, 10, 12, 15, 42]. In fact, by prioritizing the defensive actions such as jamming and dodging or moving a counter-attack can take place at the moment that the opponent is preparing to start the attack (action timing) or simultaneously to the opponent's attack, causing their attack to be lost [3, 12, 42]. Also, in a study based on top-ranking professional boxing match replays, it was considered that lateral movements (i.e., dodging or lateral displacements) with counter-attacks, as a technical-tactical action, is highly recommended in combat [42]. While, blocking requires impacts and occupation of the members who carry them out, so these actions must

be carried out as a last resort and, when they are carried out, too much time should not be spent just blocking, but a counter-attack should be made immediately [3, 12, 15].

This information emphasizes the following qualities and abilities in the execution of a counter-attack: seizing the opportunity; anticipation; fast perception; precise interpretation and decision-making; exact timing; right distance and balance; combat strategy; opponent strategies study; efficiency in tactical-technical defence and attack/counter-attack automation and adaptation; efficiency in psychological refractory periods management (i.e. response latency); mental control; and the fighter's behavioural patterns (i.e. intended and spontaneous actions) [1-4, 8-13, 15, 16, 18, 20, 21, 26, 30, 34, 39-42].

Finally, compared the differences were compared between the counterattack's efficiencies according to the different times of their responses, once the previous studies had analysed the counter-attack efficiency in terms of the generally effective techniques related to the made techniques [5-7, 13, 30, 31]. With regard to this, it was verified that the winning or losing effect difference was significant under the anticipated and simultaneous counter-attack efficiency, except for the posterior counter-attack efficiency. The biggest difference between the winning or losing effect was registered in the anticipated counter-attack, followed by the simultaneous and finally the posterior counter-attacks. In this specific analysis, it was found that anticipation is also the most efficient time for a counter-attack. This information reinforces the importance of the capacity for anticipation in sports [1, 2, 8, 9, 12, 16, 18, 20, 21, 26, 40, 41]. With regard to the generality of counter-attack efficiency, this proved to be a significant combat dynamic in the winning or losing effect (mean ranks: 203.19 vs 137.81; $U = 8893.50$; $p = 0.00$) with the percentages (0.65 vs 0.29). Effectively, the counter-attack is the winning athletes' predominant dynamic, which is also supported by the following studies: where the counter-attack efficiency was very high in the winners (0.66 vs losers 0.13) [5]; where the counter-attack effectiveness index registered 0.43 for gold medalists and 0.00 for silver medallists [6]; where the winners demonstrated significantly higher counter-attack effectiveness than the losers (0.67 vs 0.00 $p < 0.001$) [7].

From these results, it is recommended to develop technical-tactical training processes that focus the development of counter-attack dynamics. Highly effective counter-attacks should assist as orientation to coaches and athletes for high-level competition [13]. However, the training process should place emphasis on the anticipated counter-attack form (i.e., time action). The capacities, qualities and abilities for the development of anticipation must be integrated and representative of the competitive context (i.e., opportunity sense, fast perception / interpretation, precise decision-making, exact timing, strategies, adjustable distance, balance, automated and adaptive defences and counter-attack actions). It is important to develop defence actions that precede the counter-attacks (i.e., blocking, parrying, dodging, displacement, escape and jamming/interception). However, it is important to prioritize dodging, displacement and jamming, which are more related with anticipated and simultaneous counter-attacks, because these are the base-defences with which to counter-attack the opponent before they start the attack, or to counter-attack the opponent while they are still attacking and unbalanced as a result of having lost the attack in the void [2, 3, 4, 12]. It should be noted that, in order to have success in the counter-attack, it is necessary to master both defence and attack actions [4].

CONCLUSIONS

The counter-attack technical-tactical dynamics and its effectiveness are included in the factors that influence the performance in combat sports. In fact, in the analysis carried out on the technical-tactical effectiveness of the counter-attack, it was the winning athletes who stood out in all the counter-attack dynamics related to the different time of responses.

The anticipated counter-attack was the preponderant action by the winners, followed by the simultaneous counter-attack and lastly by the posterior, while the losing athletes revealed the reverse order of preponderance. However, with regard to the counter-attack's effectiveness, the same order was verified by both winners and losers, with the anticipated being the most effective action, followed by the simultaneous and finally the posterior. It should be noted, at the posterior

counter-attack level, that the losing athletes perform this action more often than the winners, albeit less effectively. This is may be due to the lower quality of execution.

In general, the counter-attack proved to be a very efficient combat dynamic, regardless of the way it is executed, as there were high values of correlation between the techniques made and the effective ones in the three counter-attack forms. The anticipated counter-attack stands out with a positive correlation of $r_s = 1.00$, which means 100% effectiveness. The ability to anticipate proves to be an essential factor in the performance of Ultimate Full Contact fighters.

Therefore, it is inferred that from the immediately previous defensive actions to the counter-attack executions: the jamming, dodging and slipping (i.e., more associated with anticipated or simultaneous counter-attack) will be more efficient types of action than blocking or parrying (more associated with posterior counter-attack).

The effect of winning or losing is significant under the variables of anticipated and simultaneous counter-attack efficiency, except for the efficiency of the posterior counter-attack. The biggest difference between the effect of winning or losing was registered on the anticipated counter-attack level, followed by the simultaneous and finally the posterior. The counter-attack efficiency, in general, proved to be a significant combat dynamic in the winning or losing effect.

Thus, the results of this study can be useful for coaches in order to enhance the performance of their fighters. Therefore, it is important to organize technical-tactical training processes to develop the counter-attacks and their base-defences, focusing on the anticipation responses and their related qualities, skills and capacities (e.g., seizing opportunity, quick perception/interpretation, timing, distance, balance, certain and correct techniques). The objective is to train discerning athletes, capable of perceiving and anticipating the opponent's intentions, developing a high decision-making capacity to neutralize the opponent's attacks and increase the efficiency and effectiveness of the attack/counter-attack [1].

HIGHLIGHTS

- The counteroffensive efficiency related with its temporal responses is a decisive and determinant combat dynamic in the fighter's performance.
- In general, the counter-attack, regardless of the temporal form executed (anticipated, simultaneous, posterior), is a very efficient combat dynamic.
- The anticipated and simultaneous counter-attacks are the most efficient forms.

- Technical-tactical training processes with counter-attack dynamics and its base-defences must be considerable to improve the performance of the Ultimate Full Contact fighters.

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