

TACTICAL AND TECHNICAL PERFORMANCE ANALYSIS OF THE MALE 65 KG CATEGORY AT THE BRAZILIAN SHOTOKAN KARATE CHAMPIONSHIP

ANÁLISE DO DESEMPENHO TÉCNICO-TÁTICO DURANTE O CAMPEONATO BRASILEIRO DE KARATÊ SHOTOKAN

Marcelo Romanovitch Ribas^{1,2}, Meire Ane Schimitka Pereira¹, Thiago Alexandre Barbosa¹, André Domingos Lass² and Julio Cesar Bassan²

¹UniDomBosco University Centre, Curitiba-PR, Brasil.
²Federal University of Technology, Curitiba-PR, Brasil.

RESUMO

O objetivo do presente estudo foi identificar as técnicas mais utilizadas por medalhistas e atletas derrotados durante o Campeonato Brasileiro de Karatê Shotokan de 2017. Onze lutas envolvendo treze atletas com 28.5 ± 3.7 anos que disputaram a categoria 1º. KYU até 65 kg foram investigados. A análise foi realizada por seis especialistas por meio da observação e registro de técnicas utilizando planilha tática e técnica de Scout de Karatê. O teste Anova foi utilizado para comparar as ações e técnicas mais utilizadas. O teste do qui-quadrado para amostras independentes foi utilizado para verificar a existência de diferenças significativas entre as técnicas utilizadas pelos atletas vencedores e derrotados ($p < 0.05$). Os resultados mostram que o ataque mais frequente durante as lutas foi "Mawashi geri", 26.3 ± 1.5 vezes, seguido de "Gyaku zuki" com 19.5 ± 2.0 vezes ($p < 0.01$). A ação tática mais visualizada durante os combates foi o ataque com 47.5 ± 5.5 vezes ($p < 0.01$). "Mawashi geri" foi o ataque mais usado ($p = 0.01$) pelos vencedores 71.4% quando comparado com os atletas derrotados 28.6%. Em conclusão o ataque "Mawashi geri" foi a decisão mais assertiva usada na categoria até 65 Kg.

Palavras-chave: Artes Marciais. Karatê. Análise.

ABSTRACT

The aim of the present study was to identify the most used techniques by medalists and defeated athletes during the Brazilian Shotokan Karate Championship of 2017. Eleven fights involving thirteen athletes (28.5 ± 3.7 yrs.) who competed in the category "up to 65 Kg 1st KYU" were investigated. Analysis were conducted by six specialists through the observation and register technique using the tactical and technical spreadsheet Scout Karate. The Anova test was used to compare actions and techniques mostly used. The Chi-square test for independent samples was used to verify the existence of significant differences among the techniques used by the winning and defeated athletes ($p < 0.05$). Results show that the most frequent attack during fights was the "Mawashi geri", 26.3 ± 1.5 times, followed by "Gyaku zuki" with 19.5 ± 2.0 times ($p < 0.01$). The most visualized tactical action during combats was the attack with 47.5 ± 5.5 times ($p < 0.01$). "Mawashi geri" was the mostly used attack ($p = 0.01$) performed by winners (71.4%) when compared with the defeated athletes (28.6%). The results indicate that the "Mawashi geri" attack was the most assertive decision used in the category "up to 65 Kg 1st KYU".

Keywords: Martial Arts. Karate. Analysis.

Introduction

Combat sports are nowadays in the spotlight within the sportive scenario and Karate is one of the most popular disciplines worldwide Chaabène et al.¹, being performed in two different disciplines, named Kata and Kumite². The Kumite is made of explosive, offensive and defensive bouts of short and long periods of time, lasting from 0.3 ± 0.1 to 1.8 ± 0.4 seconds and making a ratio of effort and pause of 2:1^{3,4}. Each technical move has its own scoring value, where head kicks and falls followed by an attack are worth three points, trunk kicks and punches in the back including the posterior area of the head are worth two points while both head and trunk punches are given one point each⁵. The highest scorer is declared as winner⁶. Due to varied scoring possibilities, the Karate athlete needs to be prepared for a quick response in order to employ either defense or attacking technical/tactical moves⁷. Such scenario provides dynamism and enhanced technical variety in the competitions, thus making them more attractive to the public^{8,9}.

Should the technique skills not be performed in a conscious, precise way and well-

positioned distance, the athlete could be penalized and have their final score altered⁵. Given the fast and explosive actions interchanged with movements of low power in both upper and lower limbs, Karate is defined as an intermittent sport Chaabène et al.¹, of anaerobic profile with aerobic imprint^{4,10}. However, it is recognised that in order to improve the skills and capacities linked to its practice, it is required to investigate the progress of both tactical/technical performance¹¹. The markers of performance evaluation for these tools should be focused on the tactical, technical, biomechanical and general aspects of the discipline. These conditions contribute to the understanding of physiological, technical and tactical demands of various sports¹². Performance analysis during competition also provide useful information to coaches and athletes themselves regarding the sport physiology Tornello et al.¹³, contributing to the design of specific physical assessments Coswig et al.¹⁴ and, subsequently, to suitable training periodizations aiming to improve athlete performance and injury prevention¹⁵⁻¹⁷.

In a study analysing the most applied techniques during combat, Laird and McLeod⁵ showed that winners employed the punch more often than the losers, maybe because it requires less time to be executed thus allowing better protection. Other studies Chaabène et al.¹⁸ and Tabben et al.¹⁹ observed that during the Kumite, elite Karate athletes performed more often techniques based on upper limbs while the Mawashi geri chudan was the most commonly employed lower limb technique. Another variable considered in notational studies is related to the tactic employed by the athlete during combat, a skill that when linked with the technique could result in enhanced performance²⁰. Two tactical behaviours in Kumite Karate, perception and anticipation, have not been thoroughly investigated to date. Karate athletes must react to extreme and quick movements in a short period of time in order to neutralize incoming attacks thus avoiding the opponent win²¹.

After analysing movement timing, tactics and technique in 30 male and 30 female elite Karate athletes, Tabben et al.¹⁹ revealed that attack and blocking were more frequent amongst the winners than in those who were defeated in combat. According to the same study, such tactics characterize the main determining factor regarding combat outcome. While there are reports within the literature worldwide, to the authors knowledge there is no such type of research with Brazilian athletes to date. Thus, learning the improvement in both skills and techniques of Karate becomes necessary to comprehend the evolution of the technical/tactical performance in this combat sport Collet et al.¹¹, being real or simulated competitions the best environment to do so^{9,18,22}. Therefore, the aim of the present study was to identify the most commonly used tactics and techniques by the winners and losers in the male “up to 65 Kg 1st KYU” category at the Brazilian Shotokan Karate Championship of 2017.

Material and methods

This crossover-designed study took place during the Brazilian Shotokan Karate Championship of 2017. Thirteen male athletes (28.5±3.7yrs.), participants in the “up to 65 Kg 1st KYU” category, holders of either brown or black belts and graduated with 1st KYU participated in this study. The tournament lasted three days, however all black belt fights happened on its third day and were disputed in a 8x8 m tatami. Each fight lasted 3 minutes through knockout stages. Were included in this study athletes who: a) aged 18 to 39 years; b) competed in the “up to 65 Kg 1st KYU” category. Were excluded of this study athletes who: a) refused to sign the consent form; b) belonged in another category. All athletes were approached and invited to take part in this study during the official weighing. This study had the local ethical committee approval (Register number 2.303.067) with all athletes having signed the consent form prior to data collection.

Assessment of techniques employed during fights

In order to assess the most commonly applied strikes in combat, an observational and noting methodology was employed by six field specialists, either researchers or coaches with experience in Karate, during the 11 fights and 22 records obtained in the “up to 65 Kg 1st KYU” category.

Intra-assessor reliability was measured through Test-retest method. Intra-assessor reliability level was individually measured by six assessors, who observed technical/tactical actions during the “up to 65 Kg 1st KYU” category fights in real time at the Brazilian Shotokan Karate Championship. After two weeks the same professionals then observed the recordings made from the same combats and then produced the scout. Spearman’s Correlation indexes were classified as weak correlation (0.20 to 0.40), moderate (0.40 to 0.60) and strong (values above 0.60), with all technical/tactical coefficients being considered strong²⁴. Technical/tactical intra-assessors reliability was strong ($r_s=0.9909$ to $p<0.0001$). Technical/tactical inter-assessors reliability was strong ($r_s=1.00$ to $p<0.0001$). The weight category selection was intentional due to its accessibility and thanks to the consent from the Brazilian Karate Confederation chairman. All data was recorded through Scout Karate, a spreadsheet developed within Microsoft ExcelTM 2010 to register points acquired by the athletes based on tactical skills considering attack, anticipation, defence and counter-attack. As for the points based on technical skills, punches assessed were Oi zuki, Gyaku zuki and Kizami zuki; kicks assessed were Mae geri, Mawashi geri and Ura-Mawashi (Figure 1). Such observational indicators were determined from specialized literature check^{5,6,22}.

Technique (punch)	Detailed Description
Oi zuki	Executed with the same leg used to move forward.
Gyaku zuki	Reverse punch; arm opposite to the front foot.
Kizami zuki	Executed with the hand ahead of guard position.
Technique (kick)	
Mae geri	Frontal kick with the leg positioned behind.
Mawashi geri	Semicircular kick with the leg positioned behind.
Ura mawashi	Reverse circular kick.

Figure 1. Description of punch and kick techniques used in Scout Karate

Source: Adapted from Laird and McLeod⁵

Statistical analysis

Data was stored using a Microsoft Excel[®] (2010) spreadsheet and transferred to the Bioestat 5.0 (2007) software for statistical analysis. The Shapiro-Wilk test was employed to verify normal distribution so the findings could be presented in median and standard deviation with minimal, maximal and percentual values. The Anova test compared the most used techniques and actions and the Chi-Square test for independent samples verified whether there were significant differences between techniques performed by winners and losers. Spearman’s correlation was applied to check intra and inter-assessors reliability ($p<0.05$).

Results

Table 1 shows the most employed techniques by 13 black belt karate athletes during the Brazilian Shotokan Karate Championship of 2017. The strike mostly used ($p<0.01$) during fights was the Mawashi geri (26.3 ± 1.5) followed by the Gyaku zuki (19.5 ± 2.0). The Mae geri (1.1 ± 0.7) and the Oi zuki (1.3 ± 0.5) were the least employed strikes, with non-significant differences being presented between both ($p\geq 0.05$).

Table 1. Mostly used techniques at the Brazilian Shotokan Karate Championship “up to 65 Kg 1st KYU” category

Technique (n=13)	Mean	SD	Minimum - Maximal
Oi zuki	1.3	0.5	1 - 2
Gyaku zuki	19.5	2.0	17 - 22
Kizami zuki	2.5	1.2	1 - 4
Mae geri	1.1	0.7	0 - 2
Mawashi geri	26.3*	1.5	24 - 28
Ura mawashi	2.1	0.7	1 - 3
Others	6.0	0.8	5 - 7

Note: *Anova significant differences ($p < 0.01$); SD = standard deviation

Source: Authors

Tactical actions observed during the 11 fights of the “up to 65 Kg 1st KYU” category are described in Table 2. The most frequently viewed action was attack (47.5 ± 5.5), followed by anticipation (10.3 ± 1.3) and counter-attack (1.1 ± 0.7).

Table 2. Most frequent tactical actions during Kumite at the Brazilian Shotokan Karate Championship “up to 65 Kg 1st KYU” category

Actions (n=13)	Mean	SD	%	Minimum – Maximal
Attack	47.5*	5.5	80.6	40 - 54
Anticipation	10.3	1.3	17.5	9 - 12
Counter-Attack	1.1	0.7	1.9	0 - 2

Note: * Anova significant differences ($p < 0.01$); SD = standard deviation; % = percentages

Source: Authors

The more frequently employed techniques by the winners in the “up to 65 Kg 1st KYU” category are presented in Table 3. The Gyaku zuki was the most commonly applied attack technique by losers (68.2%). The Mawashi geri was the mostly executed kick (71.4%) by the athletes who reached the finals, whereas the losers employed it less often (28.6%).

Table 3. Most frequent techniques at the Brazilian Shotokan Karate Championship of 2017

Technique (n=13)	Winners	Losers	Total	(p-value)
Gyaku zuki	7(31.8)	15(68.2)*	22(100%)	0.01
Kizami zuki	2(50)	2(50)	4(100%)	1.00
Mawashi geri	20(71.4)*	8(28.6)	28(100%)	0.001
Ura mawashi	1(25)	3(75)	4(100%)	0.157
Others	3(42.9)	4(57.1)	7(100%)	0.593

Nota: *Proportionally uneven distributions

Source: Authors

Discussion

The present study aimed to identify the most commonly applied tactics and techniques by the winners and losers athletes in the “up to 65 Kg 1st KYU” male category of the Brazilian Shotokan Karate Championship of 2017 (Table 1). Laird and McLeod⁵ observed 17 fights between 34 athletes (22.5 ± 5.3 yrs., 81.7 ± 6.76 kg) where the Gyaku zuki technique was the most frequent, being used 29 times followed by the Mawashi geri in nine occasions. Similar findings were found at the Pan-American Games in 2007, where approximately 80% of the points obtained by the Brazilian Karate Team during the came from punching techniques²⁴. Both studies show disagreeing results when compared to the present research.

Koropanovski e Jovanovic⁶ also observed that the Gyaku zuki strike was most frequently used in European championships with maximum frequency of 66.9%.

International level Karate athletes are bound to perform upper body techniques more often than lower body techniques, regardless of gender, fight outcome and weight category¹⁹. Such preference to the punch technique is related to energy-saving during its execution, since it is a faster and simpler movement which results in a less likely counter-attack²⁵. However, according to the findings here presented the Mawashi geri was the preferred technique employed by the athletes observed, perhaps due to the possibility to keep a safe distance from the opponent hindering their capacity to both counter-attack or anticipate^{26,27}. The Mawashi geri is executed in high speed, being a very precise kick resulting in multiple points during fight²⁸. One trait in this technique is the fact that it starts even before the opponent could detect the attack²⁹. The Mawashi geri merits higher attention from coaches in their periodization programmes, being an efficient technique used by Karate athletes¹⁹. This is supported by Chaabène et al.¹⁸ who analyzed 14 fights from 14 elite athletes of national and international level in different weight categories and verified that the most frequently used technique was the Mawashi geri (43.9%).

The tactical actions more frequently used for defending during the Kumite (Table 2) are anticipation and attack since blows are quick and, as such, require ATP-PC energy supply, which in turn does not allow an offensive task⁴. Therefore, Karate players perform anticipation with punches or kicks Mori et al.³⁰, as demonstrated in this study. Koropanovski et al.³¹ showed that attack represented 35% and 44.2% of tactics employed by Karate players in European and World championships respectively, while Tabben et al.¹⁹ observed its frequency in 34.1 ± 12.2 times in 60 athletes at the World championships. Both studies establish the attack as a tactical weapon to be considered within the importance of tactics during fights.

Table 3 shows the most frequently employed techniques by winners and losers. Chaabène et al.¹⁸ analysed the same features in 14 karate athletes of national and international level and found no significant statistical differences between winners and defeated. The same study also showed 76.2% of the techniques being applied with upper limbs and 23.8% with lower limbs, results that differ from the present study. Laird and McLeod⁵ observed that 43.2% of winners used the Gyaku zuki technique in a similar study. Although there is ease to perform it, such move requires less time to be executed, being precise and powerful therefore providing protection while the athlete seeks points¹⁸.

Perhaps a reason as to why the winning athletes in the present study used the Gyaku zuki technique less often in comparison to the losers is due to the speed and power required to perform it, resulting in excessive contact which in turn provide penalty points given to the opponent⁵. Tabben et al.¹⁹ identified the Mawashi geri as the most frequently used technique to lower limbs (24.1%), however in the same study the prevailing strike was performed with the upper limbs. The same authors also found significant differences between combat actions of attack, anticipation and counter attack where attack showed lower values. These findings are also in divergence to the present study, where the mostly applied action was the attack.

This research built a relationship based on the literature from a sample of Karate athletes in the “up to 65 Kg 1st KYU” male black belt category of national level. However, our findings cannot be used in other weight categories nor to the female population. On the other hand, the tactics and techniques employed during fights at the Brazilian Shotokan Karate Championship contribute to athletes and coaches to establish their strategies during fights as well as to structure their training microcycles in competitions. Therefore, it is recommended that new studies are designed with other weight categories and the female population.

Conclusion

The most frequently technique used in combat was the Mawashi geri followed by the Gyaku zuki. Attack and anticipation were the tactical actions more employed. Winners performed the Mawashi geri more frequently and losers the Gyaku zuki technique. These findings suggest that the attack action and the Mawashi geri technique were assertive tools to achieve victory in the “up to 65 Kg 1st KYU” category. We suggest that training programmes and both technical and tactical strategies should prime for specificity accordingly to the weight category.

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Author's ORCID:

Marcelo Romanovitch Ribas: <https://orcid.org/0000-0002-8761-7171>
Meire Ane Schimitka Pereira: <https://orcid.org/0000-0001-8349-2546>
Thiago Alexandre Barbosa: <https://orcid.org/0000-0003-0915-2310>
André Domingos Lass: <https://orcid.org/0000-0002-2111-9401>
Julio Cesar Bassan: <https://orcid.org/0000-0002-6910-9077>

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Author address: Marcelo Romanovitch Ribas. Av. Presidente Wenceslau Braz, 1172 – Guaira – 81.010-000 – e-mail: mromanovitch@yahoo.com.br