

Standing right: laterality of combat stance in Brazilian jiu-jitsu

Authors' Contribution:

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

Matia Okubo 

Department of Psychology, Senshu University, Kawasaki, Japan

Received: 06 February 2021; **Accepted:** 21 February 2021; **Published online:** 09 March 2022

AoBID: 15073

Abstract

Background and Study Aim:

Fighters in grappling sports usually have a preferred combat stance. In general, judokas and wrestlers prefer the right combat stance, which involves the placement of the right foot in front while grabbing the opponent's collar or neck with their right hand. The aim of present study is knowledge about the laterality of the combat stance in Brazilian jiu-jitsu fighters and its role in competition outcomes and skill levels.

Material and Methods:

We surveyed video recordings of 313 matches in the Brazilian jiu-jitsu competitions, and coded the laterality of the combat stance (left or right), match outcome (win or lose), and belt rank (blue, purple, brown, or black).

Results:

Among a total of 610 fighters, 391 fighters adopted the right combat stance, while the remaining 291 took the left combat stance. A significant rightward preference was found for the combat stance (%right = 64.10%, $p < 0.001$, 95% confidence intervals (CI): 60.15, 67.91). The association between the combat stance and match outcome was not significant; $\chi^2(1) = 0.40$, $p = 0.39$. The main effect of the combat stance was significant, endorsing the rightward preference in the combat stance, $LR\chi^2(1) = 49.16$, $p < 0.001$. There was a main effect of belt rank; $LR\chi^2(3) = 157.13$, $p < 0.001$; reflecting the difference in the number of matches between the belt ranks. However, no interaction was significant; $LR\chi^2 s(1) < 1.00$, $p s > 0.35$; including the interactions involving belt rank; $LR\chi^2 s(3) < 4.54$, $p s > 0.21$.

Conclusions:

The modest lateral preference in combat stance may reflect strategies or tactics rather than biological factors such as handedness. As Brazilian jiu-jitsu focuses more on the ground than on standing techniques, the laterality of combat stance may have little effect on competition outcomes and skill levels.

Key words:

belt rank • combat sports • grappling sports • martial arts • neo-gladiator

Copyright:

© 2022, the Authors. Published by Archives of Budo

Conflict of interest:

Authors have declared that no competing interest exists

Ethical approval:

The research has been approved by the local Ethics Committee

Provenance & peer review:

Not commissioned; externally peer-reviewed

Source of support:

This research was supported by the JSPS KAKENHI under the grant No. 19K03384

Author's address:

Matia Okubo, Department of Psychology, Senshu University, Kawasaki, Japan; e-mail: mokubo@psy.senshu-u.ac.jp

Brazilian jiu jitsu – is a type of fight in which a uniform or gi is used; its main purpose is to project or take your opponent down. Once on the ground, you must seek to control your adversary with different techniques (immobilizations, chokes, joints locks). In the absence of submission at the end of the fight, the winner is declared by the number of points won [16].

Combat stance – *noun* is the distribution, foot orientation and body positions (particularly the legs and torso) adopted when attacking, defending, advancing, or retreating.

Laterality – *noun* is preference in use of homologous parts on one lateral half of the body, such as hand or foot, over those on the other.

Judoka – *noun* is person who practises or is an expert in judo.

Neo-gladiator – a person who trains mix martial arts (MMA) and similar forms of hand-to-hand fighting that do not meet the definition of sport according to the Olympic Charter [24].

Częstochowa Declaration 2015: HMA against MMA – "continuous improvement of health through martial arts as one of the most attractive form of physical activity for a human, accessible during entire life should constantly exist in public space, especially in electronic media, to balance permanent degradation of mental and social health by enhancing the promotion of mixed martial arts – contemporary, bloody gladiatorship, significant tool of education to aggression in a macro scale".

Gdansk 2nd HMA World Congress Resolution – **Article 1** The white flag with five interlocking "Olympic rings" is the most recognizable symbol in the global public space. Neither did the resurrected idea of Olympia, "Citius, Altius, Fortius" save humanity from the horrors of two world wars, nor did the declared mission of the International Olympic Committee (IOC): "1. (...) the promotion of ethics and (...) ensuring that, in sport, the spirit of fair play prevails and violence is banned" (Olympic Charter, p. 18) stop the pathology of permanently educating contemporary man in aggression. **Article 2** Likewise,

INTRODUCTION

People may show reliable lateral preferences in sports because lateral preferences exist for the upper and lower limbs, namely handedness and footedness [1]. Although fighters in grappling sports use both hands (and other body parts) in almost all techniques, they show distinct lateral preferences. Sterkowicz et al. [2] found that the laterality of combat stance predicted the attacking direction in judo as follows: right-handers who tend to have the right combat stance prefer to attack in the opponents' forward-left direction, whereas left-handers who tend to have the left combat stance prefer to attack in the opponents' forward-right direction.

Fighters in grappling sports usually have a preferred combat stance. In general, judokas and wrestlers prefer the right combat stance, which involves the placement of the right foot in front while grabbing the opponent's collar or neck with their right hand [3]. Trip et al. [4] showed that 60% of elite judokas who won international tournaments had the right combat stance, while approximately 80% of non-elite judokas who lost early in the local tournaments had the same stance. Dopico et al. [5] surveyed Olympic Games and world championships and reported a higher percentage of elite judokas with a left combat stance than non-elite (56% of participants at gold and bronze medal-level matches and 34% of those in playoffs). As observed in judo [4, 5], left-handed judokas who tended to have a left combat stance were more successful than right-handed judokas. A similar relationship has been found in boxing [6, 7] and mixed martial arts (MMA – see glossary: neo-gladiator; CZĘSTOCHOWA DECLARATION 2015: HMA against MMA; Gdansk 2nd HMA World Congress Resolution and MMA comment) [8, 9], although most athletes in these striking sports prefer the left combat stance, which involves placement of the left foot forward. In sum, both grappling and striking combat sports showed lateral preferences in combat stance, and the less frequent combat stance had a better chance of winning [5, 3].

The advantages of uncommon combat stances (the left and right stances for grappling and striking sports, respectively) can be explained in terms of strategic or tactic advantage [10, 11]. Most fighters become accustomed to the common combat stance but not to the less frequent one. For example, fighters who *frequently* use

the right-combat stance demonstrate a lack of experience when confronted with an opponent who uses a *rare* left-combat stance; however, fighters with a *rare* left-combat stance can confront those with a common right-combat stance. Fighters are usually unprepared for attacks from the less experienced side since these are difficult to predict [12]. Therefore, the rarity of fighters with a left-combat stance has a selective advantage.

This study focuses on the laterality of combat stance in Brazilian jiu-jitsu, a grappling sport originally developed from judo. Although Brazilian jiu-jitsu and judo share the same origin, Brazilian jiu-jitsu focuses more on the ground than standing techniques (chokes, submissions, and immobilization), while judo focuses more on standing techniques (throws and take-downs) [13]. However, matches start from the standing position in both Brazilian jiu-jitsu and judo. Thus, combat stance and grip fighting may play a crucial role in Brazilian jiu-jitsu too, similar to other combat sports [5, 3]. To examine the role of combat stance in Brazilian jiu-jitsu, we surveyed 626 fighters in Brazilian jiu-jitsu competitions. Based on previous results in judo [4, 5] we expected that jiu-jitsu fighters will have the right combat stance, which is more prevalent in grappling sports than the left one. If the advantage of the less frequent combat stance is taken into consideration [10-12], the left stance should predict a better chance of winning than the right stance. In addition, we used belt ranks (blue, purple, brown, and black) to examine the effects of skill level. Anecdotally speaking, it is extremely difficult to earn a black belt in Brazilian jiu-jitsu [14]. The practitioners usually spend more than 10 years in training to earn a black belt. It is expected that the frequency of the right stance would decrease with the increase in the belt rank (from blue to black).

The aim of present study is knowledge about the laterality of the combat stance in Brazilian jiu-jitsu fighters and its role in competition outcomes and skill levels.

MATERIAL AND METHODS

Materials

We surveyed video recordings of the Japanese Brazilian jiu-jitsu Federation (JBJJF) for the years 2019 and 2020 available on the JBJJF's YouTube

channel (<https://www.youtube.com/channel/UCcK8V-RQUvPCMzDQajugOmw>). There were 313 matches in the championships, including 22 for blue belts, 120 for purple belts, 75 for brown belts, and 96 for black belts. Eight matches (four black and four brown belt matches) were excluded from the analysis because the competitors did not compete and shared their prizes. The remaining 305 matches comprised 30 and 275 matches with female and male fighters, respectively.

Data processing

For each fighter, we coded the laterality of the combat stance (left or right), match outcome (win or lose), and belt rank (blue, purple, brown, or black). The laterality of the combat stance was determined by the fighter’s leading foot (left or right) in the standing position at the beginning of the match. χ^2 analysis was used to examine the

association of 2×2 tables, while log-linear modelling with analysis of variance coding [15] was used to examine the higher-order multiple frequency tables.

RESULTS

Among a total of 610 fighters, 391 fighters adopted the right combat stance, while the remaining 291 took the left combat stance. A significant rightward preference was found for the combat stance (% right = 64.10%, $p < 0.001$, 95% confidence intervals (CI): 60.15, 67.91 (Table 1).

The percentage of winning was close to 50% (i.e., the chance level); 95% CIs included the chance level (50.00%), irrespective of the combat stance (left: %win = 52.51%, 95% CI: 45.67, 59.28; right: % win = 48.59%, 95% CI: 43.54, 53.67).

Table 1. The number of jiu-jitsu fighters as a function of combat stance (left vs. right), match outcome (win vs. lose), and belt rank (blue, purple, brown, and black).

Outcome of the fight	Belt rank								Total	
	blue		purple		brown		black			
	left	right	left	right	left	right	left	right	left	right
Win	13	9	44	76	21	50	37	55	115	190
Lose	9	13	43	77	25	46	27	65	104	201

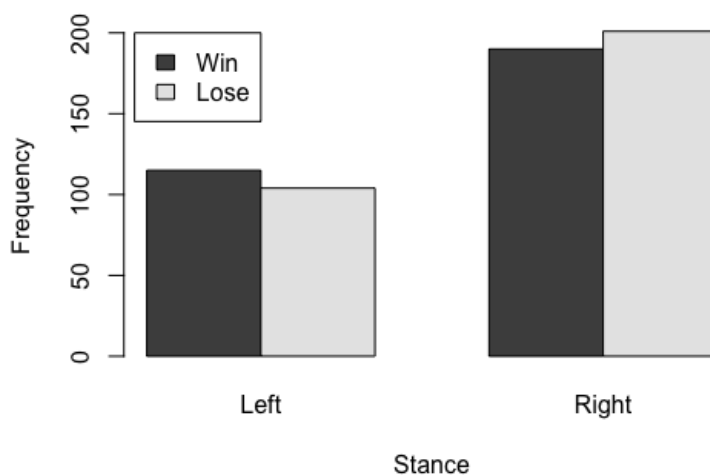


Figure 1. The number of jiu-jitsu fighters as a function of combat stance and match outcome. Belt ranks were collapsed in the presentation.

symbols (a sword pointed downwards surrounded by five rings) and motto (“Friendship through Sport”) of Conseil International du Sport Militaire (CISM) did not stop soldiers from killing each other and murdering people after 1948 (the year of establishing CISM, the second largest multi-sport discipline organization after the IOC, and also the year of the Universal Declaration of Human Rights). **Article 3** Although there are five identical combat sports in the Olympic Games and the Military World Games, their potential is still not used to meet the second of the Fundamental Principles of Olympism: “(...) to place sport at the service of the harmonious development of humankind, with a view to promoting a peaceful society concerned with the preservation of human dignity” (Olympic Charter, p. 13). **Article 4** Boxing and wrestling cultivate the traditions of ancient Olympism. Judo and taekwondo have given martial arts humanistic and health attractiveness. Fencing combines this tradition with modernity in the spirit of chivalry. Aiming dynamic offensive and defensive actions directly at the opponent’s body (irrespective of the protectors used) in such a way as not to hurt is a measure of respecting those knightly rules. This rule harmonizes with the principle of respect for the opponent’s as well as one’s own corporeality and dignity over the vain victory at all costs. **Article 5** For the civilized individual and the society for whom human health and dignity are the common good, participation, in any role, in brutal shows of people massacring each other cannot be a standard of the quality of life. Neo gladiatorship camouflaged under the banner of martial arts or combat sports is a slight to the Fundamental Principles of Olympism, but also to the Universal Declaration of Human Rights. Therefore, this Resolution should inspire as many actors of Knowledge Society as possible jointly to oppose any deformations of the mission of Olympism and sport. The expansion of the pathology of unauthorized naming neo gladiators as combat sports athletes will soon turn the Fundamental Principles of Olympism into their own caricature – objective indicators are a testament to the devastation of all dimensions of health by the practice of legal bloody pageants [25].

MMA (comment) – According to Wikipedia, the first documented use of the

name mixed martial arts was in a review of Ultimate Fighting Championship (UFC 1) by television critic Howard Rosenberg, in 1993. Proponents of MMA list ancient pankration as its ancient archetype. Thus, they prove that they consciously distance themselves from humanistic and healthy values of martial arts" [26, p. 7].

The association between the combat stance and match outcome was not significant; $\chi^2(1) = 0.40$, $p = 0.39$ (Figure 1).

To examine the effect of skill level, we conducted a log-linear model analysis with the interaction between combat stance (left or right), belt rank (blue, purple, brown, or black), and match outcome (win or lose). The main effect of the combat stance was significant, endorsing the rightward preference in the combat stance, $LR\chi^2(1) = 49.16$, $p < 0.001$. There was a main effect of belt rank; $LR\chi^2(3) = 157.13$, $p < 0.001$; reflecting the difference in the number of matches between the belt ranks. However, no interaction was significant; $LR\chi^2(1) < 1.00$, $ps > 0.35$; including the interactions involving belt rank; $LR\chi^2(3) < 4.54$, $ps > 0.21$.

DISCUSSION

Jiu-jitsu fighters tend to prefer the right combat stance to the left. The percentage of the right combat stance in jiu-jitsu fighters was similar to that seen in elite judokas (ca. 60%) but lower than that seen in non-elite judokas (ca. 80%) [4]. While this rightward preference supports our predictions, the laterality of combat stance was not found to be associated with skill level (belt ranks) and competition outcome. These results do not agree with our hypotheses or previous reports stating that the left stance is associated with skill levels and competition success in judo [4, 5].

The discrepancy between the results can be attributed to the game structures of the Brazilian jiu-jitsu and judo. Coswig et al. [13] found that ground game accounted for approximately 80% of the total combat time in Brazilian jiu-jitsu (the remaining 20% for standing game), whereas it accounted for only 30% in judo. Del Vecchio et al. [16] found a similar time structure in the International Brazilian Jiu-Jitsu Federation (IBJJF) 2005 Brazilian jiu-jitsu world championship. Since Brazilian jiu-jitsu focuses primarily on the ground techniques [16, 13], a combat stance in the standing position may have little impact on competition outcomes as well as skill level.

Rules and regulations may also have contributed to this discrepancy. Takedowns from standing positions are highly important in judo because instant wins are awarded for throwing

their opponents and making them land on their backs [17]. On the other hand, takedowns in Brazilian jiu-jitsu are worth only two points, the lowest score awarded in a match (cf. three points for side control and four points for mount or back control) [18]. In addition, pulling the opponent to the ground game is allowed in Brazilian jiu-jitsu but not in judo. Therefore, instead of fighting for a takedown or throw, jiu-jitsu fighters tend to go immediately to the ground game by pulling guards in competition [16, 13]. In both jiu-jitsu and judo, instant wins are awarded when the opponent submits to chokes or joint locks, which are mainly used on the ground. However, judo matches are often stopped, particularly on the ground, because the progress of the game stops or stalls on the ground, and referees restart the match from the standing position. Brazilian jiu-jitsu does not have such rules of stop-and-restart from standing, leading to a higher effort-to-pose ratio (effort: pose = 6:1) [19] than in judo (effort: pose = 2:1) [20]. These rules of Brazilian jiu-jitsu, which are designed to fight on the ground, may also be responsible for the null association with the combat stance found in the present study.

The laterality of the combat stance has often been interpreted in terms of the survival value of left-handers. Raymond et al. [6] examined the relationship between handedness and performance in sports and found that elite athletes included many left-handers. Based on these results, they proposed the hypothesis that left-handers have an advantage owing to unfamiliarity in a fight, increasing their fitness for survival. Left-handers have been seen in overwhelming numbers in elite combat sports athletes, such as boxing [6, 7], judo [4, 5], wrestling [21], and MMA [8, 9]. In contrast to these previous results, we did not find any association between combat stance and competition outcome. The advantage of infrequency, proposed by the fighting hypothesis, may be negligible in the standing game of Brazilian jiu-jitsu because the difference in frequency was significant but not large enough to produce a substantial effect on the match outcome as found in the present study.

One might question whether the measure of skill level, namely belt rank, is qualitatively different from that of previous studies [4, 5]. Previous studies have compared elite judokas who competed in Olympic Games or world

championships with trainee judokas [4]. Brazilian jiu-jitsu black belt fighters who are assumed to have the highest skill in the present sample may not be as skilled as Olympians in judo. However, it should be noted that the left-stance rate of elite judokas (ca. 60%) was approximately the same as that of jiu-jitsu fighters across belt ranks in the present sample. As jiu-jitsu fighters, relative to judokas, were more inclined to choose the left stance across the belt ranks, it is better to interpret the discrepancy between the results of different studies in terms of the general characteristics of each combat sport rather than the difference between the high skilled fighters of respective games.

The percentage of the right stance was relatively small in jiu-jitsu fighters (64%) than that in trainee judokas (ca. 80%) [4] and athletes in other combat sports (boxing, wrestling, MMA, and fencing) [3]. This lower rate may reflect strategies or tactics [10, 11] in Brazilian jiu-jitsu rather than biological factors such as handedness, which showed an extremely skewed distribution towards the right [22]. The advantage of the uncommon left stance may be the reason for its strategic choice in the present sample. Although the rate of the right stance was not very high (64%), it was still 1.77 times larger than that of the left stance (36%). Although the rarity of fighters with a left combat stance may have an advantage [10, 11], such an advantage may be very small and may not have a substantial effect on match outcomes in Brazilian jiu-jitsu. Alternatively, some jiu-jitsu fighters may not care much about the combat stance, choosing it randomly as it does not have a substantial effect on performance in the game. In such cases, the correct stance rate may well decrease and become close to the chance level (50%).

The present study had some limitations. First, we did not examine the role of weight class in the present study because no such information was available on the video recordings used in the present study. Match analysis of the IBJJF world championship revealed that takedowns were very rare for lighter weight classes (<70 kg) [23], suggesting that fighters in lighter weight classes, relative to those in heavier class, were less engaged in standing fights and tended to go straight to the ground. If we focused our analyses on heavier classes, the laterality of combat stance might have a different role in match outcomes. Second,

we focused on the standing technique but not on the ground technique, which is mainly used in Brazilian jiu-jitsu. Further research is required to clarify these issues, such as weight class and ground techniques.

In the present study, we found a rightward preference in combat stance in the Brazilian jiu-jitsu. The size of the rightward preference was small and not associated with skill level or competition outcome. These results are compatible with previous results demonstrating that Brazilian jiu-jitsu heavily focuses on the ground game rather than the standing game [16, 13]. From a theoretical point of view, the present results shed new light on Raymond et al. [6] fighting hypothesis and provide some insights into the evolutionary explanation of combat sports and martial arts.

CONCLUSIONS

Certain practical suggestions on training and competition for Brazilian jiu-jitsu emerge from our study. First, jiu-jitsu fighters need not be too concerned about any uncommon combat stance adopted by the opponent in a match, as it does not have any substantial bearing on competition outcome. Second, they should train with opponents with both left and right combat stances to minimize the discomfort of an unfamiliar situation in a match due to an opponent's unusual stance. Although Brazilian jiu-jitsu focuses more on the ground than standing techniques, it is necessary to understand the characteristics of the standing game because matches always start from standing positions. The characterization of standing games, including combat stance and its lack of association with competition outcomes and skill levels, can help in the preparation of appropriate training programs and the development of strategies in competitions.

HIGHLIGHTS

Jiu-jitsu fighters (n = 610) showed a rightward preference in the combat stance. This rightward preference was modest (ca. 60%) and not associated with competition outcomes and skill levels. Since Brazilian jiu-jitsu focuses primarily on the ground techniques, a combat stance in the standing position may have little impact on competition outcomes as well as skill level.

REFERENCES

1. Sacco C, Di Michele R, Semprini G et al. Joint assessment of handedness and footedness through latent class factor analysis. *Laterality* 2018; 23(6): 643-663
2. Sterkowicz S, Lech G, Blecharz J. Effects of laterality on the technical/tactical behavior in view of the results of judo fights. *Arch Budo* 2010; 6(4): 173-177
3. Loffing F, Hagemann N. Performance differences between left- and right-sided athletes in one-on-one interactive sports. In Loffing F, Hagemann N, Strauss B, MacMahon C, editors. *Laterality in Sports*. London: Academic Press; 2016: 249-277
4. Tirp J, Baker J, Weigelt M et al. Combat stance in judo - Laterality differences between and within competition levels. *Int J Perform Anal Sport* 2014; 14(1): 217-224
5. Dopico-Calvo X, Iglesias-Soler E, Morenilla L et al. Laterality and performance in combat sports. *Arch Budo* 2016; 12: 167-177
6. Raymond M, Pontier D, Dufour AB et al. Frequency-dependent maintenance of left handedness in humans. *Proc Biol Sci* 1996; 263(1377): 1627-1633
7. Loffing F, Hagemann N. Pushing through evolution? Incidence and fight records of left-oriented fighters in professional boxing history. *Laterality* 2015; 20(3): 270-286
8. Baker J, Schorer J. The southpaw advantage? Lateral preference in mixed martial arts. *PLoS One* 2013; 8(11): e79793
9. Pollet TV, Stulp G, Groothuis TG. Born to win? Testing the fighting hypothesis in realistic fights: left-handedness in the Ultimate Fighting Championship. *Anim Behav* 2013; 86(4): 839-843
10. Grouios G, Tsormpatzoudis C, Alexandris K et al. Handedness in sport. *J Hum Mov Stud* 2002; 43: 347-361
11. Grouios G. Motoric dominance and sporting excellence: training versus heredity. *Percept Mot Skills* 2004; 98(1): 53-66
12. Hagemann N. The advantage of being left-handed in interactive sports. *Atten Percept Psychophys* 2009; 71(7): 1641-1648
13. Coswig VS, Gentil P, Bueno JCA et al. Physical fitness predicts technical-tactical and time-motion profile in simulated Judo and Brazilian Jiu-Jitsu matches. *Peer J* 2018; 6: e4851
14. Straub C. What Is the Hardest Black Belt to Gain? [accessed 2022 Jan 21]. Available from: URL:<https://www.sportsrec.com/9865677/what-is-the-hardest-black-belt-to-gain>
15. Vokey JR. Multiway frequency analysis for experimental psychologists. *Can J Exp Psychol* 2003; 57(3): 257-264
16. Del Vecchio FB, Bianchi S, Hirata SM et al. Morphofunctional analysis of Brazilian jiu-jitsu practitioners and study of the temporality and quantification of motor actions in the modality. *Movimento Percepção* 2007; 7(10): 263-281
17. International Judo Federation. International Judo Federation Sports Organization Rule. March 2022 [accessed 2022 Mar 09]. Available from: URL:<https://www.ijf.org/documents/>
18. International Brazilian jiu-jitsu federation. Rule Book: General Competition Guidelines Competition Format Manual. Jan 2022 [accessed 2022 Jan 21]. Available from URL: <https://ibjjf.com/books-videos>
19. Andreato LV, Franchini E, de Moraes SM et al. Physiological and Technical-tactical Analysis in Brazilian Jiu-jitsu Competition. *Asian J Sports Med* 2013; 4(2): 137-143
20. Castanerlas JL, Planas A. Estudi de l'estructura temporal del combat de judo. *Apunts Educ Fís Esports* 1997; 47: 32-39
21. Ziyagil MA, Gursoy R, Dane S et al. Left-handed wrestlers are more successful. *Percept Mot Skills* 2010; 111(1): 65-70
22. McManus C. Half a century of handedness research: Myths, truths; fictions, facts; backwards, but mostly forwards. *Brain Neurosci Adv* 2019; 3: 1-10
23. BJJ Heroes. By the numbers: Most successful takedowns in jiu-jitsu. Aug 2019 [accessed 2022 Jan 21]. Available from URL:<https://www.bjjheroes.com/editorial/bjj-stats-takedowns-in-jiu-jitsu>
24. Piepiora P, Witkowski K. Personality profile of combat sports champions against neo-gladiators. *Arch Budo* 2020; 16: 281-293
25. Kalina RM, Krzemieniecki LA, Moska W. Resolution addressed to: United Nations, Norwegian Nobel Committee, World Health Organization, International Olympic Committee, Conseil International du Sport Militaire. 2nd HMA World Congress; 2018 Jun 14-17; Gdansk, Poland. Gdansk: Gdansk University of Physical Education and Sports; 2018
26. Kalina RM, Barczyński BJ. Long way to the Czestochowa Declarations 2015: HMA against MMA. In: Kalina RM, editor. *Proceedings of the 1st World Congress on Health and Martial Arts in Interdisciplinary Approach*. HMA 2015; 2015 Sep 17-19; Czestochowa, Poland. Warsaw: Archives of Budo; 2015: 1-11

Cite this article as: Okubo M. Standing right: laterality of combat stance in Brazilian jiu-jitsu. *Arch Budo* 2022; 18: 71-76