

Techniques and tactics from medal-winning men's and women's national teams in the 16th World Kendo Championships

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

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Abstract

Background and Study Aim:

Although kendo is increasingly being practised worldwide, few studies have compared methods and techniques used by practitioners in different countries, except for some studies that focused on Japan and Korea. The current research is highlighting prevailing techniques by athletes from different countries. Application aim is to support the expansion of the kendo.

Material and Methods:

DVDs containing video of 240 matches among competitors from five countries that represent the podium winners in both the men's and women's categories of the 16th World Kendo Championship Tournament were used in this study. The researchers classified all of the effective strikes into the following categories: (1) major technique classifications (2) *datotsu-bui* (3) technique sub-categories. Chi-square tests were used to compare the usage frequencies of the different techniques analysed in the study between men and women and the respective countries included in the study.

Results:

No significant differences in technical manoeuvres used by men and women competitors were found. There were also no significant differences between the ratios of effective strikes or thrusts between men's competitors from the four countries studied. The effective strike ratios of Korea and Brazil differed from those of Japan and the USA in women.

Conclusions:

There are differences in how men and women practice kendo due to differences in physical characteristics, but none was found. Among women kendo practitioners, some differences in skills among different countries were identified. The findings of the current research will aid in the dissemination of kendo globally.

Keywords:

competition analysis • kendo matches • skill • striking zones

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Ashi-sabaki – footwork to attack smoothly or avoid a swiftly striking opponent.

Dan – rank is indicating the level of skill.

Datotsu-bui – zones where a point is scored when an accurate strike or thrust is made.

Debana-kote – the act of striking the opponent's *kote* used at the moment when an opponent moves forward to apply pressure or is about to attack.

Debana-men – the act of striking the opponent's *men* used at the moment when an opponent moves forward to apply pressure or is about to attack.

Dou – the piece of kendo equipment which covers the chest and stomach areas. One of the striking zones.

Hiki-men – the act of striking the opponent's *men* while retreating in situations where one is very close to the opponent.

Hiki-waza – techniques where the player strikes while retreating in situations, such as *tsubazeriai*, where one is very close to the opponent.

Iaido – from a seated or standing position, the swordsman draws the sword from its scabbard and engages the enemy.

Ippon-uchi kote – the act of striking the opponent's *kote* with making the first strike with all one's strength.

Ippon-uchi men – the act of striking the opponent's *men* with making the first strike with all one's strength.

Jyoudo – A martial art that controls an enemy with a cane.

Kote – the piece of kendo equipment; the gloves which cover the hands and forearms. One of the striking zones.

Kote-nuki-men – the act of striking the opponent's *men* after warding off an opponent's striking *kote*.

Men – the piece of kendo equipment which covers the head, face, throat, and shoulders. One of the striking zones.

INTRODUCTION

The International Kendo Federation (FIK), founded in 1970, aims to promote kendo internationally (including *iaido* and *jyoudo*) and cultivate mutual trust and fellowship among its member organisations [1]. To this end, FIK sends Japanese kendo specialists to the Asian and European continents as well as the Americas yearly. Furthermore, in cooperation with the Ministry of Foreign Affairs and *Nippon Budokan*, FIK also dispatches instructors globally through coordination with the Japan Overseas Cooperation Volunteers. Importantly, FIK also hosts the World Kendo Championship (WKC). The first WKC was a men's only competition held in 1970. Eleven countries participated in this event, and it has been held once every three years since then. Beginning in 1997 with the commencement of the 11th WKC, women's competitions were added.

Kendo is an athletic event that is rooted in Japanese culture through its categorisation as a martial art. Martial arts and *budo*, in general, seek to develop both the mind and the spirit of those who practice them. As such, kendo has the dual-objective of not only skill improvement and competition but also spiritual and personal development [2]. Judo, also a martial art, has been adopted as an Olympic event and gained worldwide acceptance. As a result, many studies have been conducted to identify those qualities which enhance competitiveness and the effects of competition rules on the sport [3, 4].

Kendo has begun to spread internationally, but there is a lack of research with regards to differences in how the sport is practised in different countries, compared to the extensive research that has been conducted in Japan and Korea [5-8]. Kendo's worldwide proliferation warrants more research in how it is practised internationally. The current research is highlighting prevailing techniques by athletes from different countries.

Application aim is to support the expansion of the kendo.

MATERIAL AND METHODS

Analysed competition

Fifty-six countries were represented in the 16th WKC tournament, which was held in Japan from 29th to 31st May 2015 (Table 1). Four competition categories that originated in the 11th WKC tournament were used: men's team, women's team, men's individual and women's individual. Of the fifty-six countries represented, a select few were consistently podium winners. In the men's categories, these countries are Hungary (which took third place in the 15th and 16th WKC competitions), Japan, Korea, and the USA. Japan, Korea, the USA, and Brazil represent the medal-winning countries in women's competitions (Table 2).

The current research uses data from competitions in which these teams competed due to their relatively high kendo performance. Specifically, 240 team competitions (130 men's and 110 women's competitions) were analysed in the current study. Data from 130 individual men's matches were analysed in this study: 35 matches from Japan and Korea, 30 from the USA and Hungary. For women's individual matches, 110 data were analysed: 30 matches from Japan and Korea, 25 from the USA and Brazil. Data were taken from video recorded from a second-floor seat in the venues hosting the matches. All matches were recorded in full.

Analysed items

Data from effective strikes or thrusts as defined by the kendo guidelines [9, 10] during competitions were classified according to gender and competitors' nationality. Details will be provided below.

Table 1. A number of countries that participated in World Kendo Championships (WKC) by continent.

WKC	Continent					Total
	Asia	Europe	America	Oceania	Africa	
11	8	18	7	2	1	36
12	8	23	7	2	1	41
13	8	24	8	2	1	43
14	7	19	9	2	1	38
15	9	27	9	2	1	48
16	11	32	10	2	1	56

Table 2. Results of the World Kendo Championships.

WKC	Place			
	1st	2nd	3rd	
		men		
11	Japan	Korea	Canada	Brazil
12	Japan	Korea	USA	Italy
13	Korea	USA	Japan	Taiwan
14	Japan	USA	Korea	Brazil
15	Japan	Korea	USA	Hungary
16	Japan	Korea	USA	Hungary
		women		
11	Japan	Brazil	USA	Canada
12	Japan	Korea	Canada	Taiwan
13	Japan	Korea	Germany	Canada
14	Japan	Korea	USA	Brazil
15	Japan	Korea	Germany	Brazil
16	Japan	Korea	USA	Brazil

Nippon Budokan – the general purpose hall for *budo* which was constructed in kitanomaru-koen in Chiyoda-ku, Tokyo, in 1964.

Oji-waza – the act of parrying the opponent's strike by moving the *shinai* and the body, and then counterattacking the emerging opening immediately.

Shikake-waza – a general name of techniques for initiating an aggressive attack.

Tsuki – one of the striking or thrusting zones in kendo.

A broad classification of techniques is as follows: *shikake-waza* are offensive manoeuvres carried out prior to an opponent's attack and a counterattack during an opponent's advance is called *oji-waza*. *Hiki-waza*, which is often used when competitors are in close proximity to one another [11], is classified as its categorisation in this study.

Datotsu-bui: *men*, *kote*, *dou*, *tsuki* were categorised as striking positions. The directions of the attacks were not documented in this research.

The techniques subcategories were done according to the kendo guidelines [9].

Statistical analysis

The video was imported into a personal computer and viewed to perform the analyses. Information was collected using Excel spreadsheet software (Microsoft). Two kendo practitioners have fifth *dan* and over fifth *dan* classified the manoeuvres as being effective strikes and thrusts. Statistics analysis of each item was performed using χ^2 tests in IBM SPSS Statistics version 21, and residual analysis was further conducted on those variables in which significant differences were discovered to confirm rate differences of scored strikes or thrusts between different countries' and men's and women's competitors. Statistical significance was set at less than 5%.

RESULTS

The overall effective rate of strikes was 178 for men and 161 for women, which does not represent a significant difference. Categories of performed effective strikes are as follows: 71.3% *shikake-waza*, 15.2% *hiki-waza*, and 13.5% for *oji-waza*. Data from women's competitions revealed the following information: 63.4% *shikake-waza*, 18.0% *hiki-waza* and 18.6% *oji-waza* (Table 3).

No significant differences between men and women were found with respect to striking targets. Combined, *men* accounted for about 60%, followed by *kote*, *dou* and *tsuki*. Notably, women did not utilise *tsuki*. Five techniques make up the majority of those used, and no significant differences exist between men and women. In descending order of use, skills used are as follows: *ippon-uchi men*, *ippon-uchi kote*, *dehana-kote*, *hiki-men* and *dehana-men* for men and *ippon-uchi men*, *dehana-kote*, *hiki-men*, *dehana-men* and *ippon-uchi kote* for women. Differences in usage frequency can be seen in the current data.

No significant differences were found in ratios representing any of the categories of major technique classifications, striking targets, or technique classifications (Table 4). In terms of major skill classifications, *shikake-waza* had the highest overall usage ratio. Japanese and Hungarian competitors used *hiki-waza* and *oji-waza* equally,

while Korean competitors used *hiki-waza* more than *oji-waza*. *Oji-waza* was used more frequently than *hiki-waza* by American competitors. Striking targets were ranked in the following order based on frequency: *men*, *kote*, *dou* and *tsuki*. *Dou* and *tsuki* were not used in the USA, and *tsuki* was not used in Hungary. In terms of skills classifications, Japanese competitors utilised *ippon-uchi kote* the most while *ippon-uchi men* were used most by competitors in the other three countries studied.

Japanese and Brazilian women competitors performed the effective strikes or thrusts in the following order: *shikake-waza*, *hiki-waza*, *oji-waza*. This is in contrast to Korean and American competitors which employed the effective strikes or thrusts in this order: *shikake-waza*, *oji-waza* and *hiki-waza*. Notably, *hiki-waza* was used by Korean women competitors significantly less than women of other nationalities ($p < 0.01$) but they used *shikake-waza* significantly more ($p < 0.05$). The use of *hiki-waza* was significantly higher among Japanese competitors ($p < 0.05$). No significant differences in the striking target ratios were found, and the striking target ranked in the following order in all of the countries studied: *men*, *kote*, *dou*. *Tsuki* was not used. A significant

difference in the usage ratios of techniques was found. From greatest to least use, Japanese competitors used *ippon-uchi men*, *hiki-men*, *debanakote*. Korean competitors used *ippon-uchi men*, *debanamen*, *debanakote*. Americans used *ippon-uchi men*, *kote-nuki-men*, *debanakote* and *hiki-men*. Brazilians used *debanakote*, *hiki-men*, *debanamen* (Table 5).

DISCUSSION

Analyses of the competitions from the All Japan Kendo Championships show that both men and women are required to attack quickly. As such, competitors focus on being the first to initiate the attack as opposed to waiting for the opponent to attack and then being forced to counter-attack [5, 7]. More than 80% of the effective strikes or thrusts performed in both men and women competitions were either *shikake-waza* and *hiki-waza*. Regarding skills, among the five types of techniques with high ratios only *oji-waza* was used solely by women competitors; the other four types were regularly used by both men and women. Based on these observations it is probable that in the context of international

Table 3. Comparison of effective points between men and women by classification of techniques.

Variable	Men		Women	
	n	%	n	%
Total	178		161	
Major technique classification				
<i>Shikake-waza</i> (offensive attack)	127	71.3	102	63.4
<i>Hiki-waza</i> (retreating attack)	27	15.2	29	18.0
<i>Oji-waza</i> (counterattack)	24	13.5	30	18.6
Datotsu-bui (striking targets)				
<i>Men</i> (head)	105	59.0	103	64.0
<i>Kote</i> (hands)	59	33.1	43	26.7
<i>Dou</i> (body trunk)	11	6.2	15	9.3
<i>Tsuki</i> (throat)	3	1.7	0	0.0
Technique sub-categories				
Ippon-uchi men	43	24.2	37	23.0
Ippon-uchi kote	26	14.6	9	5.6
Debana-men	14	7.9	15	9.3
Debana-kote	19	10.7	26	16.1
Hiki-men	19	10.7	22	13.7
Other	57	32.0	52	32.3

Table 4. Comparison of effective points by country categorised by technique classification (men).

Variable	Japan		Korea		USA		Hungary	
	n	%	n	%	n	%	n	%
Total	60		46		33		39	
Major technique classification								
<i>Shikake-waza</i> (offensive attack)	44	73.3	38	82.6	22	66.7	23	59.0
<i>Hiki-waza</i> (retreating attack)	8	13.3	6	13.0	5	15.2	8	20.5
<i>Oji-waza</i> (counterattack)	8	13.3	2	4.3	6	18.2	8	20.5
<i>Datotsu-bui</i> (striking targets)								
<i>Men</i> (head)	36	60.0	26	56.5	22	66.7	21	53.8
<i>Kote</i> (hands)	20	33.3	14	30.4	11	33.3	14	35.9
<i>Dou</i> (trunk)	2	3.3	5	10.9	0	0.0	4	10.3
<i>Tsuki</i> (throat)	2	3.3	1	2.2	0	0.0	0	0.0
Technique sub-categories								
<i>Ipponuchi-men</i>	12	20.0	19	41.3	5	15.2	7	17.9
<i>Ipponuchi-kote</i>	13	21.7	4	8.7	5	15.2	4	10.3
<i>Debana-men</i>	6	10.0	2	4.3	4	12.1	2	5.1
<i>Debana-kote</i>	2	3.3	8	17.4	5	15.2	4	10.3
<i>Hiki-men</i>	6	10.0	2	4.3	4	12.1	7	17.9
<i>Hiki-dou</i>	1	1.7	4	8.7	0	0.0	0	0.0
Other	20	33.3	7	15.2	10	30.3	15	38.5

competitions being first to attack facilitates subsequent striking or thrusting effectively. Kendo is classified as a technical sport in that physical strength is relatively unimportant compared to other competitor attributes [12]. Insight, *ashi-sabaki*, spiritual strength and physical strength are the four areas that kendo competitors focus on to improve their kendo skill, in that order [9]. However, it is recognised that top athletes must possess great speed in combination with the skills mentioned before. Males and females are physiologically similar in terms of neurology, cross-sectional muscle strength, and contraction speed rates [13, 14]. However, the larger physique and muscle mass of males lead to differences in exercise intensity and speed. As such, men tend to initiate attacks further from their opponents than women, leading to a higher usage ratio of *ippon-uchi kote* compared to women. Conversely, women utilise *debana-kote* more often than men. This is thought to be attributable to the aforementioned physical attributes.

When comparing different countries for men, no significant difference was found in the usage

of different technique classifications, striking positions or technique classifications. In Japan, however, the proportion of *ippon-uchi men* and *ippon-uchi kote* skills was relatively high, and the ratio of *debana-men* and *debana-kote* skills was relatively low. The *ippon-uchi* skill is a technique used when the opponent retreats backwards or when the opponent cannot turn around and only can move their bamboo sword [9]. Data analysis from the All Japan Kendo Championship revealed that *ippon-uchi kote* was extensively used in attacking opponents and disrupting their defence manoeuvres [5]. Because the *debana* is a technique meant to detect the opponent's movement and attack before they do [9], it is necessary for the competitor to make a sudden movement relatively close to the opponent. In other words, we hypothesised that male Japanese competitors generally followed the pattern of manoeuvring far away from their opponents, checking their opponents' reaction, and then proceeding with an attack. Also, Korean competitors had the lowest proportion of *oji-waza* among the four countries, and the highest ratio of *ippon-uchi men*, followed by *debana-kote*.

Table 5. Comparison of effective points by country categorised by technique classification (women).

Variable	Japan		Korea		USA		Brazil			
	n	%	n	%	n	%	n	%		
Total	49		41		29		42			
Major technique classification										
<i>Shikake-waza</i> (offensive attack)	28	57.1	32	78.0	*	16	55.2	26	61.9	
<i>Hiki-waza</i> (retreating attack)	14	28.6	*	1	2.4	**	4	13.8	10	23.8
<i>Oji-waza</i> (counterattack)	7	14.3	8	19.5		9	31.0	6	14.3	
<i>Datotsu-bui</i> (striking targets)										
<i>Men</i> (head)	33	67.3	26	63.4		22	75.9	22	52.4	
<i>Kote</i> (hands)	10	20.4	11	26.8		6	20.7	16	38.1	
<i>Dou</i> (trunk)	6	12.2	4	9.8		1	3.4	4	9.5	
<i>Tsuki</i> (throat)	0	0.0	0	0.0		0	0.0	0	0.0	
Technique sub-categories										
<i>Ippon-uchi men</i>	12	24.5	16	39.0	**	6	20.7	3	7.1	**
<i>Ippon-uchi kote</i>	1	2.0	4	9.8		2	6.9	2	4.8	
<i>Debana-men</i>	4	8.2	5	12.2		1	3.4	5	11.9	
<i>Debana-kote</i>	7	14.3	5	2.2		3	10.3	11	26.2	*
<i>Hiki-men</i>	10	20.4	1	2.4	*	3	10.3	8	19.0	
<i>Men-kaesi-dou</i>	0	0.0	4	9.8		0	0.0	2	5.1	
<i>Kote-nuki-men</i>	1	2.0	1	2.4		4	13.8	1	2.4	
Other	4	28.6	5	12.2		10	34.5	10	23.8	

*p<0.05 **p<0.01

Conversely, male Korean competitors engaged in less sparring with their opponents. They were more apt to approach their opponent and quickly strike the *men* after detecting an opportunity to do so. Hungarian competitors appeared to utilise roughly the same skills as their Japanese counterparts, albeit their usage ratio of *hiki-waza* was somewhat higher. This is thought to be because Japanese kendo instructors have been going to Hungary and training practitioners [15]. As a result, Hungarian and Japanese practitioners appear to employ skills in similar ratios. American competitors appeared to use the five classified techniques in similar frequencies. Drawing conclusions about American competitors' tactical style from the data with the current research methods is not feasible; more research is needed.

Significant differences in skill ratios, including sub-classifications, were identified between women of the different nationalities studied. Korean competitors used *ippon-uchi men* significantly more, and when combined with *ippon-uchi kote* the two skills make up nearly 50% of the

those used, while the ratio of *hiki-men* was significantly low. This tendency by Korean competitors, both men and women, to strike opponents from relatively far distances led the current researchers to generalise that Koreans select techniques that don't require quick movements in close proximity of the opponent. Effective techniques of Brazilian competitors were much different from their Korean counterparts. Specifically, the usage ratio of *ippon-uchi men* was significantly lower, and that of *debana-kote* was significantly higher. Previous research into the tactical behaviour of Japanese middle-aged women kendo competitors [16] shows that general deceleration in female competitors' speed results in their using *debana-kote* when they detect their opponents' motion. This prior research and observations from the current research indicate that perhaps Brazilian competitors utilise close-range striking tactics when they detect their opponents' movement as opposed to using those tactics that rely on speed to be successful. Japanese competitors used *ippon-uchi men* the most. This manoeuvre is carried out from a distance that is relatively

far from the competitor. Close range techniques such as *hiki-men* and *dehana-kote* made up about 30% of the Japanese competitors' techniques each. Previous research into tactical manoeuvres at the All Japan Women's Kendo Championship reported that Japanese competitors tend to initiate offensive manoeuvres when approaching their opponents in defensive stances [7]. The current research supported this finding in that competitors attacked their opponents from close range and using the *ippon-uchi men*. No significant differences were noted in the skills ratios of American competitors. Notably, *kote-nuki-men* in the *oji-waza* category was the second-most used technique. The methods used in the current research were not designed for uncovering the reasons behind the tactical behaviour of American competitors. The more detailed analysis will be required in the future to address these.

When the WKC tournament was first held fifty years ago, there was a considerable difference in techniques used by each countries' contestants. This difference has dissipated, and the techniques used are largely uniform regardless of nationality. Conversely, the first women's competitions were held starting from the 11th WKC fifteen years ago. While the differences in techniques between competitors of different nationalities have somewhat lessened, they are still markedly different when compared to men. All six world continents are represented in the WKC, with the most being from the European Commonwealth. The European Kendo Championship has been held 28 times, showing that Kendo is popular among Europeans. Despite this, no country except for Hungary has placed in WKC's top three. Hungary has won third place in the men's division of the 15th and 16th WKC. The current researchers concluded that lack of sustained motivation is a factor in this; few domestic competitions exist in Europe and so it is difficult for skill levels to advance to world champion status [17, 18]. Past research has also shown that the motivation for Europeans to practice kendo is their interest in the bushido spirit, and human and health development rather than for competitive purposes [19-21]. It is also thought that Europeans compete to meet competitors from countries that are stronger in kendo, such as Japan [22]. The results from the current research support the idea that European kendo competitors prioritise cultural

characteristics and spiritual and social development over competition performance. Japan and Korea both focus on the competitive aspects of the sport. Kendo is incorporated into such occupations as law enforcement in Japan, and in Korea national policies have been set regarding developing top competitors in kendo [8]. Through the incorporation of kendo into aspects of everyday life in Japan, success in competitions is thought to be important to those practising the sport [23] and also a major factor in the relatively long time that people practice the sport [24]. Korean kendo practitioners also emphasise the competitiveness of the sport. Previous research has reported that young female kendo practitioners view kendo as relatively competitive with a little emphasis on pleasure when they are practising [25]. In summary, Japanese and Korean competitors focus on winning because this may have a positive influence on other parts of their lives. This focus on winning is magnified when competitors compete at the international level and are seen as representatives of their countries.

CONCLUSIONS

No major difference in technical manoeuvres was found between men and women competitors. Furthermore, no significant differences were in major technical categories between men competitors from different nationalities. Competitors from Korea and Brazil used approximately the same proportion of different effective strikes or thrusts in the women's competitions; likewise, Japanese and American competitors were similar. Review of the countries participating in the WKC shows that kendo is popular among Europeans. Japan and Korea performed better than Europeans in terms of winning medals. This research also suggests that although differences in skill due to physical strength exists, no technical differences were found between males and females. While skills differ between females from different countries, the analyses measures in this study were not designed to identify such differences. The results from this study may be used to promote and develop kendo as an international sport in the future.

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