Technical and tactical characteristic of Japanese high level women kendo players: comparative analysis

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Abstract

Background & Study Aim: Female kendo practitioners’ technical and tactical abilities have steadily improved since the 10th World Kendo Championship held in 1997, when a dedicated women’s competition class was created. However, exercise methodologies and injury prevention techniques have not evolved in tandem. The current study is meant to provide kendo practitioners, coaches, and managers with information essential to tailoring their exercise and injury prevention programs to female kendo practitioners. The aim of the study is to assess whether women differ from men in terms of technical and tactical aspects of competition outcomes.

Material & Methods: Sixty matches from the 50th All Japan Women’s Kendo Championship and 60 men’s matches from the 45th All Japan Men’s Kendo Championship were analyzed using DVDs. Specifically, the following aspects were analyzed: technique categories, spatial distance, counter attack, datotsu-bui (target points), body and shinai (bamboo sword) movement, and ratio of points awarded based on the total number of attacks. These data were analyzed by three kendo experts who hold 7th, 5th, 4th dan.

Results: Point scoring attacks were comparatively fewer in women’s competitions than in men’s. Female competitors also attacked in closer spatial distance relative to their male counterparts. Finally, women attacked primarily by stepping forward in a defensive stance while waving the shinai side to side in close proximity to the opponent’s body.

Conclusions: Women’s tactics differed markedly from that of men’s. It is recommended that female kendo practitioners employ an exercise regimen that accounts for the fundamental differences between the male and female physique.

Key words: combat sport, tactical actions, physiological characteristics, sexual distinction, spatial distance

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INTRODUCTION

Japanese elementary school aged children undergo tests which measure both their physical strength and athletic ability. These test results indicate negligible differences between males and females in terms of physical traits during primary school years. However, after adolescence, differences in both physical strength and athletic ability become apparent. These differences have been studied and documented numerous times by researchers in various sports [3,4]. These kinds of studies provide valuable data upon which to build female-focused programs aimed at not only improving competitive ability, but also creating preventative injury strategies tailored to women [5].

Kendo is a sport in which two opponents attempt to strike each other with the shinai (bamboo sword) in four target areas: men (head), kote (hands), dou (trunk), and tsuki (throat). Body contact during both offensive and defensive play is permitted. Generally, the competitors maintain two meters of distance between each other. Agility and stamina are required traits of kendo practitioners, as high speed maneuvering and the element of surprise are fundamental to successful employment of the techniques that are required to win matches.

Kendo is a member of budo, and has its roots in ancient Japan. It has gained worldwide acceptance, and is played by people ranging from infant to elderly in age. The first kendo world Championship was held in 1970. However, a women's category did not exist at this time. Due to the increased popularity of the sport amongst females, a women's category was created in the 10th World Kendo Championship held in 1997, twenty seven years after the first world kendo championship was held.

The technical and tactical skill level of female kendo practitioners has been rapidly improving since the addition of the women's category to the world kendo championship. However, since kendo's inception, its competitors have been primarily males. Therefore, studies have focused on technical characteristics of male competitions, with relatively few manuals or research papers written addressing the female dimension of the sport.

This lack of material extends to both social aspects of kendo and analysis of female kendo competitions [6, 7]. Furthermore, information concerning competitive techniques and exercise methodology that acknowledge the physiological differences between males and females cannot be confirmed. Because differences between the sexes are apparent in both physical strength and athletic abilities, consideration should be afforded to strength improvement exercises and competitive strategies as they relate specifically to the female competitors. Introduction of methods that take into account the physiological differences between males and females could lead to advancement of women's kendo as a sport. The aim of the study is to assess whether women differ from men in terms of technical and tactical aspects of competition outcomes.

MATERIAL AND METHODS

1. Subjects

Matches from 50th All Japan Women's Kendo Championship were analyzed. All participants qualified in regional competitions. Among these 64 participants, 12 members had previously participated in any of the 12th, 13th, 14th, or 15th World Women's Kendo Championships. This high participation rate by the competitors in the world championships ensured a skill level comparable to that of competitors in the World Kendo Championships.

Two DVDs recorded at each competition were used. Match selection criteria were as follows. Both competitors stood in chudan-no-kamae (an upright posture and held the shinai at midlevel to their body cavity, with their right foot slightly forward in lateral relation to the left foot). Of the sixty three total matches in the 50th All Japan Women's Competition, three did not qualify based on the criteria, so a total of 60 matches were analyzed. For comparative analysis, 60 matches from the 45th All Japan Kendo Championship were analyzed [8]. Seventeen of 64 competitors who took part in this Championship had previously taken part in the World Kendo Championship. This high participation rate by the competitors in the world championships ensured a skill level comparable to that of competitors in the World Kendo Championships and provides equivalent data in terms of competition skill level of the participants.

2. Procedure

Comparisons between male and female kendo players were made based on observation of technical and tactical dimensions. Categories outlining technical and tactical types and the development of attacking are shown in Figure 1. All techniques explained in Figure 1 are defined by kendo teaching guidelines and technical manuals, and are specified below [9-11].
Technique classifications:
Offensive techniques: Striking an opponent with the shinai before the opponent initiates an attack.
Counter techniques: Striking an opponent with the shinai after rendering the opponent’s attacks ineffective.

Maai (Spatial distance between the opponents):
Offensive technique: Distance between the opponents when one of them initiates an attack.
Counter technique: Distance between opponents when one of them initiates a counter attack.

Tsuki-ito-no-maai (Fundamental spatial distance): Distance at which a player can strike the opponent by taking one step forward and evade attack by taking one step backwards.

Toi-maai (Further spatial distance): Distance at which both players are out of striking range of each other’s shinai.

Chikai-maai (Closer Spatial Distance): Distance at which both players are within striking range of each other’s shinai.

Sesshoku-no-maai (Contact Distance): When the players’ bodies are in contact and the top of one of the player’s shinai is within striking range of the opponent’s body.

Shinai movement: Movement based on the movement of the shinai in general and the top of the shinai in particular.

Up: The top of the shinai is raised over the opponent’s head.
Down: The top of the shinai is below the opponent’s navel.
Left: The top of the shinai is over the right half of the opponent’s body.
Right: The top of the shinai is over the left half of the opponent’s body.
Front: The top of the shinai is pointed at the opponent’s face with both arms outstretched.
No movement: The shinai is held still.

Body movement: A player’s body movements in relation to the opponent: Front, back, left, right, and no movement.

Counter attacks: Movements of the shinai: Nuki (Drawing out), Kaeshi (Striking back), Suriage (Deflecting up), and Uchiotoshi (Dropping down).

Scoring: Strikes by the players were classified according to whether they were awarded points from the judges.

3. Statistical Analysis
Data gathered from the video analysis were entered into an Excel (Microsoft Corporation, Redmond, WA, USA) spreadsheet. Chi-square tests were used to compare the frequency of the analysis variables between the two contests. P<0.05 was considered statistically significant. Three analysts participated in the study. They hold 7th dan, 5th dan, and 4th dan.

RESULTS
Both 60 men’s and 60 women’s matches were analyzed. Of these, 20 women’s matches (30%) ended within regulation time and 29 men’s matches (48%) ended within regulation time. Total contest time for...
the women's matches was 655 minutes and 39 seconds (10 minutes and 56 seconds per contest) and 453 minutes and 8 seconds (7 minutes and 33 seconds per contest) for men.

Table 1 contains the technical and tactical variables analyzed for both men and women: 2,639 attacks, 69 of which were scored, occurred in women's matches, while 1,823 attacks, 75 of which were scored, occurred in men's matches. There were significant differences between females and males in the following categories: technique classifications, target points, and spatial distances both in offensive and counter attacks. (P<0.001, respectively).

In technique classifications, use of offensive techniques was significantly higher for females in comparison to males. Attempts to strike the men were higher in women's competitions than men's, while frequency of kote and tsuki strikes was lower than in men's competitions. Regarding spatial distance, use of close distance attacks, both offensive and counter, were highest in women's competitions, measured at 49% and 67% respectively. On the other hand, fundamental spatial distance attacks in both offensive and counter techniques were highest in men's competitions, measured at 53% and 63%, respectively.

Figure 2 contains data analysis regarding the shinai and body movements of player's attack initiation. There were significant differences between men and women with regards to the shinai and body movements variables analyzed (P<0.001, respectively). Specifically, right direction shinai movements were higher for women in comparison to men, while the frequency of no movement of the shinai was lower for women than that of men. Women's forward and backward body movement was higher than that of men.

Figure 3 illustrates the frequency of shinai and body movements during defense. The analysis discovered significant differences between females and males in regards to those variables analyzed (P<0.001, respectively). Comparatively, women initiated statistically

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Table 1. The comparison of the technical characteristics

<table>
<thead>
<tr>
<th></th>
<th>50th Women's</th>
<th>45th Men's</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<tr>
<td>Counter attack</td>
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<td>Kote(Hands)</td>
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<td>Dou(Trunk)</td>
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<tr>
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<tr>
<td>Contact</td>
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<td>25.28</td>
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<tr>
<td>Counterattack</td>
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<tr>
<td>Contact</td>
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*P<0.001
fewer forward movements of the shinai than did men. Right shinai movement was significantly higher for women than for men. No body movement was significantly lower for women while forward frequency movements were higher for women than for men.

Figure 4 illustrates the pattern frequency both the shinai and body movement for men and women when the players initiate an attack. Striking while stepping forward and moving the shinai towards the right was highest amongst women while no body and shinai movement was highest amongst men. Additionally, the number of different strike patterns employed by women was less than that of men.

Figure 5 illustrates pattern frequency of body movements and shinai in defensive situations. Amongst women, the pattern of stepping forward while moving the shinai to the right was highest, while no stepping while moving the shinai to the right was highest amongst men. Additionally, the number of defensive patterns employed by women was less than that of men.

Figure 6 illustrates counter attack pattern frequency. The kote-kaeshi-men pattern was the most used, and two of the five counterattacks were initiated after the opponent attempted a men strike. Conversely, men employed the kote-suriage-kote...
most frequently, and all the top five counterattacks were initiated after the opponent attempted a kote strike.

**DISCUSSION**

Some kendo experts contend that the time required to achieve ippon and average match times are too long in men’s tournaments. [12-14] On average, techniques attempted in women’s matches were the same as in men’s on a per minute basis; however, the frequency of overtime matches and the average contest time was longer than that for men’s matches. In addition, the frequency of point scoring techniques for women was very low (2.61%). Due to lack of data from previous studies, time required in gaining ippon and average contest time could not be confirmed. However, due to the data presented, it is assumed that the time for achieving ippon and the average women’s competition time are longer than in men’s competitions.

In kendo competitions, spatial distance between the two competitors plays a fundamental role in the match’s outcome [10]. Of the distances analyzed, the fundamental spatial difference is the most important in terms of offensive, defensive, and counterattack techniques in exercise [9, 10]. Female competitors engaged each other in close spatial distance and with body contact in 73% of the time, while men maintained either fundamental spatial distance or farther spatial distance 57% of the time.

Traditional kendo manuals prescribe that both women and men strike from the fundamental spatial distance. Females and males have approximately the same muscle power in the cross sectional area, and muscle contraction speed is also approximately the same [15,16]. Physique differences and comparatively more muscle mass in males results in both strength and speed differences. In regards to speed, women, on average, were 10% slower than men in competitions [17]. Because women step forward at a lower speed than men, an attack initiated
in the fundamental spatial distance would result in the opponent easily counterattacking due to the difference in the speed distance ratio. Thus, the close distance at which women kendo practitioners compete is a result of comparatively less speed and muscle mass than of men.

Kendo players attempt to score points through striking one of four datotsu-bui (target points): men, kote, dou, tsuki. The attempt is successful if contact is made with kendou-gu (protectors for kendo) with the shinai while maintaining the posture and mentality as prescribed by zanshin [18]. Simply striking datotsu-bui with the shinai does not guarantee points—players must execute an accurate strike while exhibiting the proper mentality within the fundamental spatial distance and at the correct speed to score ippon. Women players tend to engage each other in the close spatial distance, resulting in the inability to achieve the speed necessary to carry out point scoring attacks.

According to previous studies, men players often use kote and tsuki to thwart the opponent’s defense and set the stage for an effective attack [18]. In women’s contests analyzed, there were few kote and tsuki that would allow them to check their opponents’ attacks. This is due to the close spatial distance fighting because the risk of an opponent initiating a counter attack is high.

Fundamental spatial distance is a primary focus of most instructors teaching the dynamics necessary for a point scoring attack using the shinai. However, it is recommended that instructors incorporate instruction that accounts for the differences between men and women’s physique and muscle mass into their programs and develop new exercise methods in light of these observations.

Male kendo practitioners were observed using the techniques of stepping forward or no stepping while moving the shinai within their opponent’s bodily area pre-attack. According to a previous study, this is effective in thwarting the opponent’s chances of counterattacks [8]. Moving the top of the shinai

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**Figure 5.** The comparison of shinai and body movement patterns during defensive maneuvers.
forward is effective in controlling the opponent’s bodily or shinai movement. However, women usually struck repeatedly while stepping forward and moving the top of the shinai to the right or the left of the opponent’s body, moving the shinai over the body cavity area. This technique is generally considered defensive in nature, and is a result of women striking after fending off an attack and protecting the datotsu-bui. The high frequency of close spatial distance fighting accounts for this.

According to a previous study, male kendo practitioners primarily used the techniques of stepping backwards or no body movement while moving the shinai to their right as a defensive gesture. Raising the top of the shinai forward to control the opponents was used frequently [6]. Female kendo practitioners, however, utilized stepping forward or backward while moving the shinai right or left to hide datotsu-bui as a defense. Due to women engaging one another at close spatial distance, they were unable to control their opponent’s movements with their shinai. Furthermore, they often employ defensive movements in their attacks during competition. These points illustrate the marked difference between man and women’s attacking patterns.

<table>
<thead>
<tr>
<th>50th Women’s</th>
<th>45th Men’s</th>
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<tbody>
<tr>
<td>Kote-kaeshi-men</td>
<td>Kote-suriage-kote</td>
</tr>
<tr>
<td>Men-kaeshi-do</td>
<td>Kote-nuki-kote</td>
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<td>Kote-nuki-men</td>
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<td>Men-nuki-do</td>
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<tr>
<td>Men-suriage-men</td>
<td>Men-kaeshi-kote</td>
</tr>
<tr>
<td>Other</td>
<td>Other</td>
</tr>
</tbody>
</table>

![Figure 6. The comparison of technical styles in counterattacks](image)

According to a previous study, male kendo practitioners primarily used the techniques of stepping backwards or no body movement while moving the shinai to their right as a defensive gesture. Raising the top of the shinai forward to control the opponents was used frequently [6]. Female kendo practitioners, however, utilized stepping forward or backward while moving the shinai right or left to hide datotsu-bui as a defense. Due to women engaging one another at close spatial distance, they were unable to control their opponent’s movements with their shinai. Furthermore, they often employ defensive movements in their attacks during competition. These points illustrate the marked difference between man and women’s attacking patterns.
In women's competitions, counter attacks were most frequently initiated by the opponent after being lured into a kote strike. Men strike accounted for the second most frequent counter attack technique. Striking at the opponent's kote soon after luring the opponent to draw out their shinai with the intention of attacking to their own kote, defined as kote-nuki-kote, was used. This necessitates a certain amount of distance to be successfully performed, and was rarely used in women's contests but used often in men's contests.

The applied analysis of technical and tactical aspects of men and women's kendo is similar to, but not exactly like, the methods used in the analysis of judo [19-21]. It enables profiling the development of individual tactical and technical masters of kendo in the same manner as is done of world's leading judokas [22]. In kendo, unlike judo, there are no weight categories. This does not mean that anthropological methods used to develop profiles of morphological judo men and women [23,24] cannot be used in kendo. Such comprehensive profiling of kendo practitioners based on tactical-technical and morphological criteria may be useful both in terms of cognitive and application (selection for training and prophylaxis of health).

**CONCLUSION**

Contests times were longer for women competitions than that of men due to less number of point scoring attacks.

Close spatial distance techniques were used more frequently than fundamental spatial distance techniques. It is hypothesized that this is a result of the female physique and muscle mass.

Female kendo practitioners stepped forward in a defensive posture while moving the shinai to the left and right. The female physique and muscle mass affects the technical and tactical strategy of female competitors. Female kendo practitioners tend to compete in closer spatial distance than men. In general, women's competitive strategy is different than that of men. Instructors need to reconsider training and coaching methods that account for the physiological differences between males and females.

**CONFLICT OF INTEREST**

The authors declare that they have no financial or personal relationships with any people or organizations that could influence this paper's content in any form.

**REFERENCES**


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