

ANALYSIS OF STRATEGY USED IN TAEKWONDO COMPETITION

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The purpose of this study was to investigate the strategy used in the Taekwondo competition. A total of 21 matches, consisting of 1598 offensive and defensive events, were video taped. Competition strategy, based on frame-by-frame video analysis, was employed to classify the athlete's motion. Offensive and defensive kicking technique, in order of priority, was roundhouse kick (72.7%), double roundhouse kick (11.0%), back kick (8.0%), cut down kick (3.3%), pushing kick (2.2%), spinning hook kick (1.9%), side kick (0.8%), and hook kick (0.2%). The methodology employed in this study and the data reported may be useful to coaches and athletes interested in gaining insight on the strategy of patterns used in Taekwondo competition.

KEY WORDS: kicking, strategy, Taekwondo, game analysis

INTRODUCTION: Taekwondo was originally developed in Korea as a martial art and was based on a defensive strategy. It is now a highly regarded contemporary sport practised by people all over the world. For the purposes of competition, Taekwondo can be described as a combat sport consisting of sharp, strong angular moves and free-flowing circular movements in which an athlete uses bare hands and feet to repel an opponent. Since the successful use of kicking, both offensively and defensively, will score the athlete points, it is the most important objective in a Taekwondo competition.

At the 1988 and 1992 Olympic Games, Taekwondo appeared only as a demonstration sport. However, at the 2000 Olympic Games in Sydney, it finally gained recognition as an official sport.

Taekwondo competition took place in an 8m × 8m area. It was officiated by one referee and three judges. There were eight different weight divisions, Fin (male not exceeding 54kg, female not exceeding 47kg), Fly (male 54kg – 58kg, female 47kg – 51kg), Bantam (male 58kg – 62kg, female 51kg – 55kg), Feather (male 62kg – 67 kg, female 55kg – 59kg), Light (male 67kg – 72kg, female 59kg – 63kg), Welter (male 72kg – 78kg, female 63kg – 67kg), Middle (male 78kg – 84kg, female 67kg – 72kg) and Heavy (male over 84 kg, female over 72 kg). The duration of the contests were three rounds of three minutes with one minute of rest between rounds. The legal scoring areas were mid-section of the trunk and face and valid points were given for attacks to the legal scoring areas if the competitors using the parts of the foot below the ankle bone and the front parts of the fist.

Game strategy analysis has been used extensively on tactics used in squash (Hong, Robinson, & Chan, 1998; Hughes, 1993; Hughes, & Franks, 1993), football (Hughes, 1993), basketball (Miller & Bartlett, 1994), rugby (Hughes & Clarke, 1994), netball (Palmer, Hughes & Borrie, 1994) and badminton (Hong & Tong, 2000). However, to the authors knowledge, a systematic analysis of the strategy involved in Taekwondo is still lacking.

Information on game strategy in Taekwondo can broaden the knowledge of coaches on patterns used in this sport. It is anticipated that this will also help the Taekwondo coaches to train their athletes more effectively in the use of pertinent tactics in competitive situations.

METHODS: In the (1999) Asian level Taekwondo competition 24 male athletes (9 Fly, 8 Feather and 7 Bantam) participated in 21 matches from which 1598 offensive and defensive motions were selected for analysis. The competitions were recorded on a video camera (CCD-TRV46E PAL, SONY, Japan) placed at the stage at a relatively high position in order to view the whole activity area. Notational analysis, which is based on frame-by-frame video analysis, was employed to categorize the athlete's motion.

The athlete's movements and strategy employed in the competition were divided into several of components in the notational analysis. Each movement was decomposed and classified into

pre-defined parameters to document the frequency or their occurrence. The pre-defined parameters included action, kicking technique, section of attacking, and effectiveness of the action.

Action: Action was defined as the athlete's movement and subdivided into categories of offensive, defensive, or no reaction. The movement of the athlete who started the sequence was defined as offensive action. The opponent was defined as defensive action if he starts to defend the opponent's attack. Otherwise, the movement was defined as no reaction (i.e., no defensive reaction of movement in response to the attack).

Kicking technique: Offensive kicking was defined as a continuous movement in which the leg was used to attack an opponent. On the other hand, continuous movement of the leg in response to an opponent's attack was defined as defensive kicking. Kicking technique was analysed into two variables: preferred leg (front or back), and type of kicking technique. Eight different types of kicks were employed: roundhouse, double roundhouse, back, cut down, pushing, spinning hook, side, and hook.

Section of attack: The section of attack was classified into trunk and head. These are the only areas that can be legally attacked in Taekwondo.

Effectiveness of the action: The effectiveness of the action was classified into effective, ineffective and missing. The effective action was defined as the attack to the legal scoring areas in which parts with using the parts of the foot below the ankle bone or front parts of the fist was used. Otherwise, kicking was designated as ineffective action (i.e., unable to attack to the legal area or attacking the legal area without using the proper parts of the foot or fist). Missing was assigned when the kicking did not touch the opponent. The percentage distribution of action, kicking technique, section of attacking, and effectiveness of the action were calculated.

RESULTS: From the 21 matches and 63 rounds 1598 movements were analyzed. The distribution of offensive and defensive movements are shown in Figure 1. The predominance in the use of back kicking is presented in Figure 2. From Figure 3 it is evident that the trunk was the area that received that greatest percentage of attacks. Figure 4 includes a distribution of types of kicks. It is evident that the roundhouse kick was used in nearly three of four kicks.

DISCUSSION: The results indicated that the relatively high percentage of back leg kicking (75.9%) was employed in both offensive and defensive action. Kong, Luk and Hong (2000) found that the movement time for front leg roundhouse kick was shorter than the back leg roundhouse kick. However, the back leg roundhouse could produce the larger linear velocity. In other words, larger momentum could be produced by the back leg roundhouse kick than by the front leg roundhouse kick. In Taekwondo competition, the large kicking momentum may be useful in repelling an opponent or attacking the legal striking area in order to score points.

It was found that athlete prefer to kick the opponents' trunk section rather than the head section. Luk & Hong (2000) found that significantly higher muscle activity in gastrocnemius, sartorius, tensor fascias latae and vastus lateralis was required to perform the roundhouse kick to the level of the eye. Therefore, greater employment of kicking to the trunk section may reduce the degree of fatigue throughout the competition in order to maintain relatively high exercise performance levels over a long period.

Roundhouse kick was the major kicking technique (72.7%) in the Taekwondo competition. In comparison to the side kick and spinning back kick, competitors were able to generate the greater final velocity in roundhouse kick (Pieter & Pieter, 1995). The frequent selection of the roundhouse kick in Taekwondo competition may be explained by the relatively high momentum that could be produced with this kick.

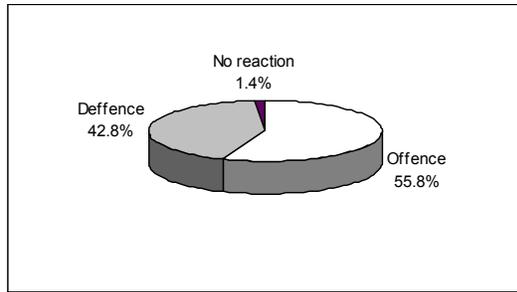


Figure 1 – The distribution of “action” in the 21 matches involving 1598 events.

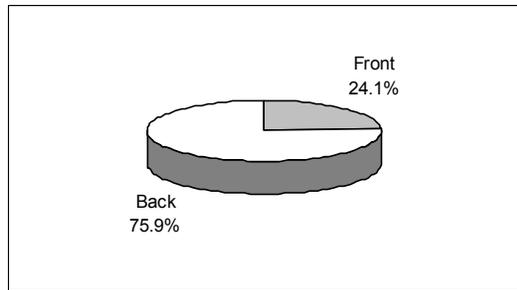


Figure 2 – The distribution of use of preferred led in both offensive and defensive kicking.

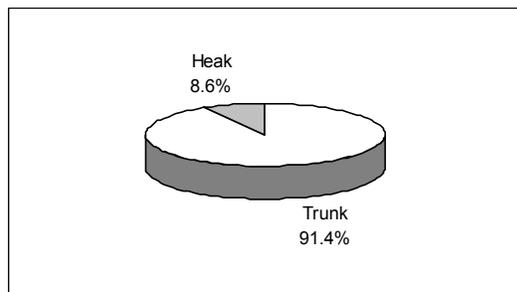


Figure 3 – Targeting of the trunk and head in kicking in both offensive and defensive kicking.

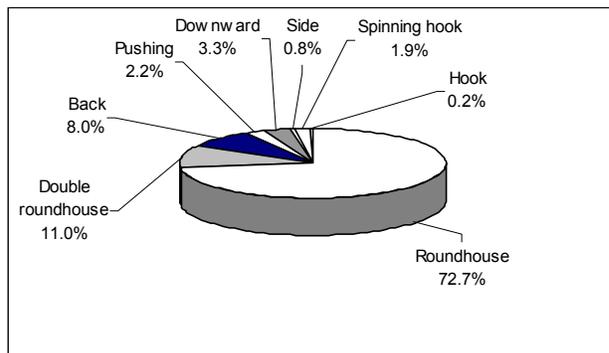


Figure 4 – The percentage distribution of “kicking technique” employed in both offensive and defensive kicking action.

CONCLUSION: In Taekwondo competition, a high percentage of back leg and roundhouse kicking was found. These kicks produced a relatively high velocity of the kicking foot. Kicking to the trunk was the dominant target. It is conjectured that this was the frequent target because less leg muscle activity was required in comparison to targeting the head. The information derived from this study may be helpful to coaches and athletes in planning a training program and strategy for Taekwondo competition.

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