

BIOMECHANICAL PROPERTIES OF JUDO THROWING TECHNIQUE, UCHIMATA, ESPECIALLY FOR NEWLY DEVELOPED FLAMINGO TECHNIQUE

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The Kododan Judo, organized in 1882 in Japan by the late President Jigoro Kano, is a refined version of the ancient martial art of jujitsu. Typically when one envisions martial arts, the mental image includes kicks, punches, and other striking techniques. The sport of Judo involves none of these, but does permit the use of throwing techniques, mat work similar to wrestling, strangle holds and joint locks at the elbow. Despite its original role as a martial art, Judo as practiced today is essentially the highest form of wrestling practiced anywhere in the world (Harter & Bates, 1985).

In the daily practice of Judo, Deshi (Judo student's name in Japanese language), always has to follow the example of Sensei, (Judo instructor's name in Japanese language), in order to develop his own effective excellent throwing technique. Generally, Sensei can throw an opponent (Uke) effectively using his own special throwing technique, which is the newly developed Flamingo Technique. As for a right-side grip, the throwing technique of Uchimata is defined by the fact that Uke is unbalanced forward, then the right leg (back of the thigh) is inserted

between Uke's legs to sweep against the inner side of Uke's left thigh. The conventional technique of Uchimata in Judo is that Uke is in the basic natural standing position with his feet spaced wide apart and his body bent slightly forward; to begin Tori steps in with his right foot, and then immediately steps in with his left, when stepping in with the left leg the knee is bent, he proceeds to straighten it, contacting Uke's left inner thigh with the right leg (back of thigh) and sweeping (Uchida, 1970). This study biomechanically focuses upon the Flamingo Technique. The special part of this technique uses one step with the left leg only, without stepping with the right leg.

Therefore, the purpose of this study was to determine the effectiveness of the Flamingo Technique which was developed by Japanese elite Judoists to compliment the conventional technique of Uchimata.

Method

The Uchimata technique selected for analysis has been recognized as being used commonly and extensively in world-class competition (the report of All Japan Judo Federation, 1988). All throwing movements of Uchimata were taken by NAC High Speed Video Camera, filmed at 200 frames per second, and the kinematic data including Center of Gravity (C.G.) calculated by Matsui et al. (1958) were obtained. In this study, a Uchimata exercise was performed by two male Japanese Judoist of Juntendo University Judo Team, Japan: N.H. An elite varsity Judoist, Sensei, won third prize in the 95 kg class of the 1983 All Japan Intercollegiate Championships. The other subject, Deshi, won third prize in the 86 kg class of the 1987 All Japan Intercollegiate Championship (Table 1). One of the best performances among five Uchimata trials was analyzed by using both conventional and Flamingo techniques. The displacement of the C.G. and the time of throw were measured as parameters in three phases: Kuzushi, the unbalancing of the opponent; Tsukiri, the mechanical aspects of the technique; and Kake, the sweeping leg following a path between the legs of the Uke and striking high inside the defender's upper thigh and/or groin.

TABLE 1 PHYSICAL CHARACTERISTIC
OF SUBJECTS

Subject	Height (cm)	Weight (kg)	Age	Career (Years)	Judo Rank	Grip Form
N.H. (Tori)	179.0	88.0	26	18	Yondan	Left-Side Grip
N.M. (Tori)	178.0	86.0	22	10	Sandan	Right-Side Grip
S.D. (Uke)	178.0	86.0	22	10	Sandan	Right-Side Grip

Results and Discussion

As for the time of throwing movements, N.H. (Sensei) threw for 0.27 sec, 0.22 sec, and 0.35 sec: in Kuzushi, Tsukiri, and Kake, the total time of the activity was 0.87 sec, by the conventional technique. N.H. (Sensei) also threw from 0.31 sec, 0.21 sec, and 0.37 sec: in Kuzushi, Tsukiri, and Kake, the total time of the activity was 0.89 sec, by the Flamingo technique. On the other hand, N.M. (Deshi) threw in 0.22 sec, 0.18 sec, and 0.40 sec: in Kuzushi, Tsukiri, and Kake, the total time of the activity was 0.80 sec, by the conventional technique. N.M. also (Deshi) threw for 0.25 sec, 0.20 sec, and 0.27 sec: In Kuzushi, Tsukiri, and Kake, the total time of activity was 0.72 sec by Flamingo technique. (Table 2)

TABLE 2 TIME OF THROWING MOVEMENT
IN UCHIMATA

Subject	Throwing Technique	Kuzushi (sec)	Tsukuri (sec)	Kake (sec)	Total (sec)
N.H. (Sensei)	FLAMINGO	0.31	0.21	0.37	0.89
	Conventional	0.27	0.22	0.35	0.87
N.M. (Deshi)	FLAMINGO	0.25	0.20	0.27	0.72
	Conventional	0.22	0.18	0.40	0.80

The displacement of the C.G. of the subject N.H. (Sensei) ranged from -17.5 cm to +12.5 cm in the Ksukiri and Kake phases of the conventional technique (Figure 1). The displacement of the C.G. of the subject N.H. (Sensei) ranged from -35.0 cm to +8.5 cm during Kake of the Flamingo technique (Figure 2). The displacement of the C.G. of the subject N.M. (Deshi) ranged from -25.0 cm to +6.5 cm in Kake of conventional technique. The displacement of C.G. in subject N.M. (Deshi) ranged -42.5 cm to +13. cm in Kake of Flamingo technique.

As for both the conventional technique and the Flamingo technique, it was found that each elite Judoist threw up his opponent vertically from his lowest point of C.G. in the air. However, as for Uchimata by N.M. (Deshi), Deshi made Kake faster by 0.13 sec using the Flamingo technique as compared to using the conventional technique during Uchimata performance by Sensei.

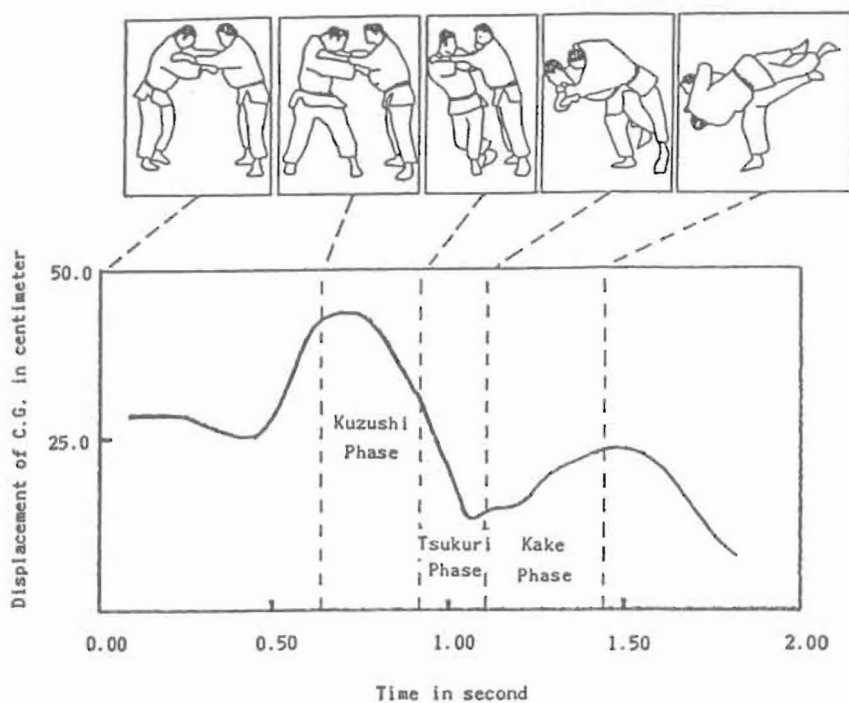


FIGURE 1 CENTER OF GRAVITY-TIME CURVE
IN CONVENTIONAL TECHNIQUE
BY N. H. (SENSEI)

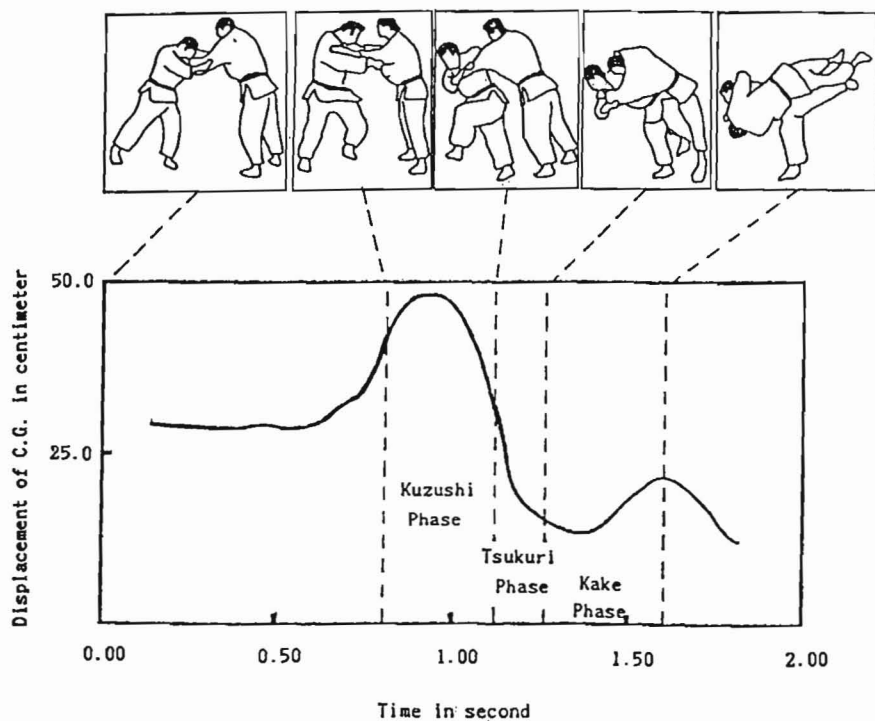


FIGURE 2 CENTER OF GRAVITY-TIME CURVE
IN FLAMINGO TECHNIQUE
BY N. H. (SENSEI)

In contest situations, the faster a throw can be executed, the less time the opponent has to mount a counterattack. As for the time of throwing movements, in subject N.M. (Deshi), the Flamingo technique has been shown to have an advantage over the conventional technique in this respect. My suggestion is that the necessity of the Flamingo technique should be stressed in the daily practice of Judo.

References

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