

TIME ANALYSIS OF SONKYO MOTION IN PROFESSIONAL SUMO-WRESTLERS

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The purpose of this study was to investigate the spend time for sonkyo motion in professional sumo-wrestlers. The sumo tournament which held in September 2007 was videotaped. And using this film, the motion time was measured. Moreover 5 motion phases were defined in matches respectively. Results indicated that Yokoduna (the highest ranker) showed the longest motion time in these wrestlers. It is generous that slow speed motion indicates having room to breathe. This may suggest that Yokoduna has the dignity as the highest in rank. Therefore Yokoduna showed this result. However there is no evidence to clarify that thing. It is necessarily to correct more data of motion time in order to clarify the relationship between motion time and rank in further study.

KEY WORDS: etiquette, sumo, time analysis

INTRODUCTION:

It is known that sumo is the national sport in Japan (Photo 1, 2). In the ring (dohyo) 4.55 meters in a diameter, two men fight until which is won. It is simple for understanding the rules of sumo. A sumo-wrestler who touches the ground with any part of his body other than his feet loses the match and the bout ends in defeat the moment any part of the body crosses over the boundary of the ring (R. Ochiai and J. Takeda, 2001). It is as much a ceremony as it is a sport, reflecting its origins as a religious rite. It spends a lot of time for etiquette (ex. ring entering ceremony as the opening ceremony and bow twirling ceremony as the closing ceremony). And they use 3-4 minutes for the etiquette motion before their match started in despite of time length of the match is less than 30 seconds. In etiquette motion, sumo-wrestlers do the sonkyo posture (Photo 3). Sonkyo is the one of the traditional etiquette posture which renders the respective mind to the opposition. There are a lot of studies to analysis the skill of sumo and body compositions. However there are few studies to discuss about and to focus on the motion of etiquette. We hypothecated that there is the relationship between the rank and motion time. Therefore the purpose of this study was to investigate the motion time of sonkyo in professional sumo-wrestlers.



Figure 1: Sumo match



Figure 2: A sumo-wrestler in sonkyo posture



METHODS:

The sumo tournament which held at Tokyo Ryogoku-kokugikan in September 2007 was videotaped and that data was downloaded to PC. Using the movie edit software (Ultra EDIT2, Canopus, Japan), the motion time (from standing posture to sonkyo posture was defined as IN and from sonkyo posture to standing posture was defined as OUT) in all matches was measured respectively. Sumo-wrestler does sonkyo motion 6-7 times in one match. When the given strength water phase is 1 time, the ring entrance ceremony phase is 1 time, the getting start position phase is 3 times, the starting position phase in limit time is 1 time and the given the prices phase is 1 time. The last phase motion does only winner of the match. 5 motion phases which include sonkyo motion were defined in these matches respectively.

1. Given strength water phase.
2. Ring entrance ceremony phase.
3. Getting start position phase.
4. Starting position phase in limit time.
5. Given the prices phase (only winner).

IN was defined from at the instant of bending knee to at the instant of touching heel and hip. And OUT was defined from at the instant of bearing off heel and hip to extending subject's knee.

RESULTS & DISCUSSION:

The motion time of sonkyo in the higher rank sumo wrestlers was shown in Table 1. And motion time in second higher rankers and lower rankers was shown in Table 2 and Table 3. In the table, being smaller Mae's number indicates the higher rank. In this result, Yokoduna (the highest ranker) showed the longest motion time in these wrestlers. It is generous that slow speed motion indicates having room to breathe. This may suggest that Yokoduna has the dignity as the highest in rank. Therefore Yokoduna showed the longest time. However there is no evidence to clarify that thing. It is necessarily to clarify the relationship between time and rank in further study. Another finding is that wrestlers without Yokoduna showed near value. It may relate the weight of individuals. The heavier weight sumo wrestlers in these tables (Ozeki A, Mae3 B, Mae15 A) showed the longer motion time. It is often to say that the motion time relates one's weight. Therefore It is thought that these results occurred.

Table 1 Sonkyo motion time in higher rank sumo-wrestlers

	Yokoduna	Ozeki A	Ozeki B	Ozeki C	Sekiwake A	Sekiwake B	Komusubi A	Komusubi B
1 in	0.70		0.54					0.64
2 in	1.01	1.62		1.11		1.11		1.12
3-1 in		1.03		0.75	0.96		0.6	0.98
3-2 in	1.4		0.96				1.08	
3-3 in	1.7							
4 in	1.57	0.59				0.8	0.92	
5 in			0.74					
mean	1.28	1.08	0.75	0.93	0.96	0.96	0.87	0.91

	Yokoduna	Ozeki A	Ozeki B	Ozeki C	Sekiwake A	Sekiwake B	Komusubi A	Komusubi B
1 out			0.4					0.68
2 out	1.66		0.69	0.6	1.08	0.64		
3-1 out	1.33	2.04	1.01	0.69	0.95		0.55	0.82
3-2 out	1.81	1.76	0.81		0.41		0.91	0.83
3-3 out	1.74							
4 out	1.65	0.84	0.4				0.66	0.61
5 out			0.42					
mean	1.64	1.55	0.62	0.65	0.81	0.64	0.71	0.74

UNIT:sec

Table 2 Sonkyo motion time in second higher rank sumo-wrestlers

	Mae1 A	Mae1 B	Mae2 A	Mae2 B	Mae3 A	Mae3 B	Mae4 A	Mae4 B
1 in		0.55						
2 in					0.6			
3-1 in		0.57		0.54	0.44		0.93	0.72
3-2 in				0.76				1.21
3-3 in								
4 in	0.82	0.73	0.87			0.84		
5 in	0.92							0.68
mean	0.87	0.62	0.87	0.65	0.52	0.84	0.93	0.87

	Mae1A	Mae1B	Mae2A	Mae2B	Mae3A	Mae3B	Mae4A	Mae4B
1 out								
2 out		0.47			0.58	1.04		
3-1 out	0.43	0.7	0.56	0.55		0.98	1.14	1.01
3-2 out				0.63			0.82	1.17
3-3 out								
4 out	0.64	0.47	0.37	0.76		1.33		
5 out	0.49							0.48
mean	0.52	0.55	0.47	0.65	0.58	1.12	0.98	0.89

UNIT:sec

Table 3 Sonkyo motion time in lower rank sumo-wrestlers

	Mae13 A	Mae13 B	Mae14 A	Mae14 B	Mae15 A	Mae15 B	Mae16 A	Mae16 B
1 in	0.51	0.72		0.63				
2 in	0.9	0.73		0.74				
3-1 in	1.07	0.78	0.66	0.62	1.81	0.56	0.95	0.52
3-2 in		0.73			0.91		0.89	
3-3 in								
4 in			1.23	0.5	0.98	0.76	1.18	0.72
5 in	0.73			0.62	1.04	0.61		
mean	0.80	0.74	0.95	0.62	1.19	0.64	1.01	0.62

	Mae13A	Mae13B	Mae14A	Mae14B	Mae15A	Mae15B	Mae16A	Mae16B
1 out		0.53		0.48				
2 out	0.73			0.74				
3-1 out	0.65	0.5	0.72	1.22	1.21	0.53	0.93	0.32
3-2 out	0.89	0.47			1.18		1	
3-3 out								
4 out			0.88		0.84	0.58	0.46	0.4
5 out	0.52			0.48	1	0.41		
mean	0.70	0.50	0.80	0.73	1.06	0.51	0.80	0.36

UNIT:sec

CONCLUSION:

The purpose of this study was to investigate the motion time of sonkyo in professional sumo-wrestlers. The highest ranker showed the longest motion time in higher rank wrestlers. It may indicate that there is the relationship between raw powers and etiquette motion time in professional sumo-wrestler. It is necessary to collect more data to clarify the specific and statistical relationship in further study.

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