COORDINATIVE ABILITIES OF TAEKWONDO IN DIFFERENT WEIGHT CATEGORIES: A COMPARATIVE STUDY

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ABSTRACT

The study was conducted on selected coordinative abilities on 80 school level girls from Gujarat state those participated in state as well as national level competition of taekwondo, 10 from each weight category with the purpose to compare the coordinative abilities of taekwondo players among different weight categories. The selected coordinative abilities were Reaction ability, Orientation ability, Differentiation ability, Balance ability and Rhythm ability. To compare coordinative abilities of taekwondo players among different weight categories, Analysis of variance (ANOVA) was employed at 0.5 level of significance. On the basis of results, the following conclusions were drawn: No significance difference was found in different weight categories in relation to orientation ability (1.874). Significant difference was found in different weight categories in relation to differentiation ability (6.659), Reaction ability (7.279), Balance ability (8.445) and Rhythm ability (2.160).

Key Words: Coordination, Taekwondo, Balance, Rhythm and Weight Category.

INTRODUCTION:

Taekwondo is a full contact free-sparring sport which awards points for head contact. Weight cycling is a term used to describe rapid weight loss following self-induced food limitation and/or dehydration. Both gradual (seasonal) and rapid (weekly) weight reduction cycles are used by athletes, and have been investigated for potential effects on nutrition and performance (Mohsen Heather,& Young ,2005). These cycles are used in various sports such as judo, rowing, wrestling, and boxing in order to make a weight category. Like many of these sports, Taekwondo consists of repeated-effort, high intensity physical demands. Although the World Taekwondo Federation has eight distinct weight classes per gender for all competitions and championships except for the Olympic Games, no rulings have been implemented to address weight cycling in the sport (Mohsen, Heather, & Young , 2005).Overtraining syndrome is a neuroendocrine disorder characterized by

poor performance in competition, inability to maintain training loads, persistent fatigue, reduced catecholamine excretion, frequent illness, disturbed sleep and alterations in mood state(MacKinnon, 2000).Sport training is important even for excellent athletes. Only when their cardio respiratory function, energy expenditure and blood lactate system are well controlled can they show potential and maintain high performance. This is very important to both coaches and athletes (Hiroyuki et al., 1999). Peaking, or the ability of an athlete to perform at peak performance during the main competition or games of the year, is also related to strength training.

Tae-kwon-do became recognized as an official sport at the Sydney and Athens Olympics in 2000 and 2004. It is a full contact free-sparring sport which awards point for head contact and tae-kwon-Do competition with 3 rounds (3 min per round), and a 1-min break between every round, the score determines who is the winner.

The improvement of aerobic and anaerobic capacity, speed, muscle strength, recovery and neuromuscular coordination are the main targets of sport science training. However, it is well known that physical conditioning and aerobic capacity in particular, depend upon 4 important elements: maximal oxygen consumption, anaerobic threshold, work economy and recovery.

To maintain good performance throughout the competitive phase this physiological base must be maintained. The determination of physiological variables such as the anaerobic threshold (AT) and maximal oxygen uptake (VO2max) through incremental exercise testing, and the relevance of these variables to endurance performance, is a major requirement for coaches and athletes. Therefore, prolonged bouts of strenuous exercise cause a temporary depression of various aspects of immune function (e.g., neutrophil respiratory burst, lymphocyte proliferation, monocyte antigen presentation) that usually lasts approximately 3-24 h after exercise, depending on the intensity and duration of the exercise bout. Post-exercise immune function depression is most pronounced when exercise is continuous, prolonged, of moderate to high intensity and performed without food intake.

OBJECTIVE OF STUDY:

The purpose of the study was to compare the coordinative abilities of taekwondo players among different weight categories.

METHODOLOGY:

For the purpose of this study eighty female taekwondo players of school level girls from Gujarat state those participated in state as well as national level competition of taekwondo competition (ten from each weight category) were selected as subjects for the study. Age of the subjects was range from 14 to 19 years. Keeping the feasibility criterion in mind, especially in the case of availability of instruments, the following co-ordinative abilities were selected: Orientation Ability,Differentiation Ability, Reaction Ability, Balance Ability and Rhythm Ability.

The following weight categories were selected

(a)Above 44 - 46(b)Above 46 - 49(c)Above 49 – 52(d)Above 52 – 54(e)Above 55 – 59(f)Above 59 – 63(g)Above 63 – 68 and (h)Above 68.

ADMINISTRATION OF TESTS:

The necessary data was collected by administering co-ordinative abilities tests as suggested by Peter Hirtz (1985).To compare the coordinative abilities of taekwondo among different weight categories, analysis of Variance (ANOVA) was employed at .05 level of significance.

FINDINGS AND CONCLUSIONS:

To observe the difference between taekwondo Players of all weight categories on their selected coordinative abilities, the analysis of variance was adopted and data pertaining to these has been presented in table 1 to 9.

TABLE – 1

ANALYSIS OF VARIANCE OF ORIENTATION ABILITY AMONG ALL WEIGHT CATEGORIES OF TAEKWONDO

Source of variation	Df	SS	MSS	F-Ratio
Between Groups	7	1.929	0.276	1.847*
With in Groups	72	10.746	0.149	

* Insignificant at 0.05 Level of Confidence F 0.05 (7,72) = 2.15

Table – 1 revealed that there was not any significant difference in different weight categories in relation to orientation ability, as obtained F ratio was 1.84, which was lower value than the value 2.15 required for F-ratio to be significant at 0.05 level with (7, 72) degree of freedom.

TABLE – 2
ANALYSIS OF VARIANCE OF DIFFERENTIATION ABILITY AMONG ALL WEIGHT CATEGORIES OF TAEKWONDO

Source of variation	Df	SS	MSS	F-Ratio
Between Groups	7	214.5	30.65	6.659*
With in Groups	72	331.4	4.603	

* Significant at 0.05 Level of Confidence F 0.05 (7,72) = 2.15

Table – 2 revealed that there was significant difference in different weight categories in relation to differentiation ability, as obtained F ratio was 6.659, which was higher value than the tabulated value 2.15 required for F-ratio to be significant at 0.05 level with (7, 72) degree of freedom.

Since the one way analysis of variance was found significant in relation to Differentiation Ability, the least significant difference (LSD) test was applied to find out which of the differences of the means amongst the different weight categories were statistically significant.

TABLE – 3
LEAST SIGNIFICANT DIFFERENCE POST-HOC TEST FOR MEANS OF ALL WEIGHT CATEGORIES IN RELATION TO DIFFERENTIATION ABILITY

Weight Categories								**M.D.**	**C.D.**
Above 44 –46	Above 46 - 49	Above 49 – 52	Above 52 – 54	Above 55 – 59	Above 59 – 63	Above 63 – 68	Above 68		
7.10	7.10							0.00	
7.10		7.60						0.500	

7.10			9.20					2.10*	
7.10				8.80				1.70	
7.10					9.60			2.50*	
7.10						11.0		3.90*	
7.10							11.8	4.70*	
	7.10	7.60						0.50	
	7.10		9.20					2.10*	
	7.10			8.80				1.70	
	7.10				9.60			2.50*	
	7.10					11.0		3.90*	
	7.10						11.8	4.70*	1.918
		7.60	9.20					1.60	
		7.60		8.80				1.20	
		7.60			9.60			2.00*	
		7.60				11.0		3.40*	
		7.60					11.8	4.20*	
			9.20	8.80				0.40	
			9.20		9.60			0.40	
			9.20			11.0		1.80	
			9.20				11.8	2.60*	
				8.80	9.60			.800	
				8.80		11.0		2.20*	
				8.80			11.8	3.00*	

					9.60	11.0		1.40	
					9.60		11.8	2.20*	
						11.0	11.8	0.80	

* Significant at .05 level.

It is evident from table – 3 that mean differences of all weight categories in relation to differentiation ability was found to be significant between Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68.

Mean difference between (table – 3) Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, 55 – 59, Above 59 – 63, Above 63 – 68., Above 68 did not prove to be significant at .05 level of confidence.

TABLE – 4

ANALYSIS OF VARIANCE OF REACTION ABILITY AMONG ALL WEIGHT CATEGORIES OF TAEKWONDO

Source of variation	Df	SS	MSS	F-Ratio
Between Groups	7	1.775	.254	7.279*
With in Groups	72	2.507	0.35	

* Significant at 0.05 Level of Confidence F 0.05 (7,72) = 2.15

Table – 4 revealed that there was significant difference in different weight categories in relation to reaction ability, as obtained F ratio was 7.279, which was higher value than the tabulated value 2.15 required for F-ratio to be significant at 0.05 level with (7, 72) degree of freedom.

Since the one way analysis of variance was found significant in relation to Reaction Ability, the least significant difference (LSD) test was applied to find out which of the differences of the means amongst the different weight categories were statistically significant.

TABLE – 5

LEAST SIGNIFICANT DIFFERENCE POST-HOC TEST FOR MEANS OF ALL WEIGHT CATEGORIES IN RELATION TO REACTION ABILITY

Weight Categories								M.D.	C.D.
Above 44 – 46	Above 46 – 49	Above 49 – 52	Above 52 – 54	Above 55 – 59	Above 59 – 63	Above 63 – 68	Above 68		
1.369	1.313							.056	
1.369		1.521						.152	
1.369			1.497					.128	
1.369				1.599				.230*	
1.369					1.555			.186*	
1.369						1.729		.360*	
1.369							1.775	4.60*	
	1.313	1.521						.201*	
	1.313		1.497					.184*	
	1.313			1.599				.286*	
	1.313				1.555			.242*	
	1.313					1.729		.416*	
	1.313						1.775	.462*	
		1.521	1.497					.024	
		1.521		1.599				.078	
		1.521			1.555			.034	
		1.521				1.729		.208*	
		1.521					1.775	.254*	0.167
			1.497	1.599				.102	
			1.497		1.555			.058	
			1.497			1.729		.232*	

			1.497				1.775	.278*	
				1.599	1.555			.044	
				1.599		1.729		.130	
				1.599			1.775	.176*	
					1.555	1.729		.174*	
					1.555		1.775	.220*	
						1.729	1.775	.046	

* Significant at .05 level.

It is evident from table – 4 that mean differences of all weight categories in relation to reaction ability was found to be significant between below Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68

Mean difference between (table – 5), Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68 did not prove to be significant at .05 level of confidence.

TABLE – 6

ANALYSIS OF VARIANCE OF BALANCE ABILITY AMONG ALL WEIGHT CATEGORIES OF TAEKWONDO

Source of variation	Df	SS	MSS	F-Ratio
Between Groups	7	69.754	9.965	8.445*
With in Groups	72	84.962	1.180	

* Significant at 0.05 Level of Confidence F 0.05 (7,72) = 2.15

Table – 6 revealed that there was significant difference in different weight categories in relation to balance ability, as obtained F ratio was 8.445, which was higher value than the tabulated value 2.15 required for F-ratio to be significant at 0.05 level with (7, 72) degree of freedom.

Since the one way analysis of variance was found significant in relation to Balance Ability, the least significant difference (LSD) test was applied to find out which of the differences of the means amongst the different weight categories were statistically significant.

TABLE – 7

LEAST SIGNIFICANT DIFFERENCE POST-HOC TEST FOR MEANS OF ALL WEIGHT CATEGORIES IN RELATION TO BALANCE ABILITY

Weight Categories								M.D.	C.D.
Above 44 – 46	Above 46 - 49	Above 49 – 52	Above 52 – 54	Above 55 – 59	Above 59 – 63	Above 63 – 68	Above 68		
5.894	6.007							.113	
5.894		6.217						.323	
5.894			6.649					.755	
5.894				6.856				.962	
5.894					7.648			1.754*	
5.894						8.625		2.731*	
5.894							7.975	2.081*	
	6.007	6.217						.201	
	6.007		6.649					.642	
	6.007			6.856				.849	
	6.007				7.648			1.64*	
	6.007					8.625		2.61*	
	6.007						7.975	1.96*	
		6.217	6.649					.432	
		6.217		6.856				.639	.971
		6.217			7.648			1.43*	
		6.217				8.625		2.40*	
		6.217					7.975	1.75*	

			6.649	6.856				.207	
			6.649		7.648			.999	
			6.649			8.625		1.97*	
			6.649				7.975	1.32*	
				6.856	7.648			.792	
				6.856		8.625		1.76*	
				6.856			7.975	1.11*	
					7.648	8.625		.977*	
					7.648		7.975	.327	
						8.625	7.975	.650	

* Significant at .05 level.

It is evident from table – 7 that mean differences of all weight categories in relation to balance ability was found to be significant Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68..

Mean difference between (table – 7 Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68 did not prove to be significant at .05 level of confidence.

TABLE – 8

ANALYSIS OF VARIANCE OF RHYTHM ABILITY AMONG ALL WEIGHT CATEGORIES OF TAEKWONDO

Source of variation	Df	SS	MSS	F-Ratio
Between Groups	7	2653.5	379.0	2.160*
With in Groups	72	12636.9	175.5	

* Significant at 0.05 Level of Confidence F 0.05 (7, 72) = 2.15

Table – 8 revealed that there was significant difference in different weight categories in relation to Rhythm ability, as obtained F ratio was 2.160, which was higher value than the tabulated value 2.15 required for F-ratio to be significant at 0.05 level with (7, 72) degree of freedom.

Since the one way analysis of variance was found significant in relation to Rhythm Ability, the least significant difference (LSD) test was applied to find out which of the differences of the means amongst the different weight categories were statistically significant.

TABLE – 9

LEAST SIGNIFICANT DIFFERENCE POST-HOC TEST FOR MEANS OF ALL WEIGHT CATEGORIES IN RELATION TO RHYTHM ABILITY

Weight Categories								M.D.	C.D.
Above 44 – 46	Above 46 - 49	Above 49 – 52	Above 52 – 54	Above 55 – 59	Above 59 – 63	Above 63 – 68	Above 68		
.865	.898							.033	
.865		.906						.041	
.865			.991					.126	
.865				.966				.101	
.865					1.065			.200	
.865						1.281		.416*	
.865							1.464	.599*	
	.898	.906						.008	
	.898		.991					.093	
	.898			.966				.068	
	.898				1.065			.167	
	.898					1.281		.383*	
	.898						1.464	.566*	
		.906	.991					.085	
		.906		.966				.060	.274
		.906			1.065			.159	

		.906				1.281		.375*	
		.906					1.464	.558*	
			.991	.966				.025	
			.991		1.065			.074	
			.991			1.281		.290*	
			.991				1.464	.473*	
				.966	1.065			.099	
				.966		1.281		.315*	
				.966			1.464	.498*	
					1.065	1.281		.216	
					1.065		1.464	.399*	
						1.281	1.464	.183	

* Significant at .05 level.

It is evident from table – 9 that mean differences of all weight categories in relation to rhythm ability was found to be significant between Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68

Mean difference between (table – 9) Above 44 – 46, Above 46 – 49, Above 49 – 52, Above 52 – 54, Above 55 – 59, Above 59 – 63, Above 63 – 68., Above 68 did not prove to be significant at 0.05 level of confidence.

DISCUSSIONS:

No significant difference was found among all weight categories in relation to orientation ability and on the other hand significant difference was found in all weight categories in differentiation ability, reaction ability, balance ability and rhythm ability.

Orientation ability is the ability to determine and change the position and movement of the body in time and space in relation to definite field of action. No significant difference in different weight categories might be due to the reason that kinaesthetic sense organs assume more importance for orientation, and the Taekwondo of all weight categories require and use same level of kinaesthetic sense.

Differentiation ability is the ability to achieve a high level of fine tuning or harmony of individual movement phases and body part movements. Significant difference between different weight categories in relation to differentiation ability might be due to the reason that the Taekwondo of different weight categories have different level of tuning and harmony of individual movement phase and body part movements. Taekwondo of low weight category might have high level of tuning and harmony due to less weight.

Significant difference in Balance ability, Reaction ability, Rhythm ability in all weight categories might also be due to the same reasons i.e. difference in adiposity.

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