COMPARISON OF COORDINATIVE ABILITIES ON TAEKWONDO PLAYERS MIXED MARTIAL ARTS FIGHTERS AND JUDOKAS

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Abstract

The aim of the study was to compare the coordinative abilities of taekwondo players, mixed martial arts fighters and judokas. Totally 75 athletes were chosen for the study 25 taekwondo players, 25 MMA fighters and 25 judokas whose age between18-22. All risks and benefits pertaining to the study were explained to the athletes. Ball reaction exercise test, Numbered Medicine ball run test, Long nose test, Sprint at given rhythm and Backward Medicine ball run test were used for the purpose for determining Reaction ability, orientation ability, Balance ability, Rhythm ability and Differentiation ability of the athletes participating into the study. The collected data were statistically analyzed by using one way Analysis of variance (ANOVA) statistics. To find out the paired mean difference, the Scheffe's post hoc test was used. The level of confidence was fixed at 0.05. According to the findings, it is concluded that MMA fighters has higher differentiation abilities than taekwondo players and judokas. And, judokas has higher orientation abilities, reaction abilities, balance abilities and rhythm abilities follows by taekwondo players and MMA fighters. It is also concluded that athletes practicing judo has more coordinative abilities as compare to mixed martial arts and taekwondo.

Keywords: coordinative abilities, Taekwondo, MMA, judokas, differentiation, orientation, rhythm, balance, orientation.

Introduction

Coordinative abilities are known as skill, competence and mastery defined by the body motion control and orientation process. The skill Word used by many authors in the literature has a more restrictive meaning compared with wealth (complexity) which defines the distinctive indications of these abilities. The same authors define the coordinative abilities as follows. It is a psychometric qualities' mixture that is unique to the activities in various types by restructuring the physical basis that principally exists, orients itself to the different situations in a fast and efficient way implies the ability of learning new motions quickly (Smidu, 2014). Motor coordination is defined as the ability of displaying the motions containing skill in a fast, fluent and successful way (Connick et al. 2015).

Judo is a sport that entails the complex motions to be performed and high-level planning to be used. It is seen that there are differences in the regional brain morphology of judoka and athletes of other defense arts compared with sedentary individuals (Jacini et al., 2008). In other words, judo is a dynamic sport which contains high-density intervals requiring complex skills and tactical excellence for the success. Judoka must perform many actions during the match (Degoutte et al., 2003).

Mixed martial arts(MMA), sometimes referred to as cage fighting, no holds barred and ultimate fighting, is a full contact combat sport based on striking, grappling and ground fighting, incorporating techniques from various combat sports from around the world. Mixed martial arts (MMA), a combat sport consisting of wrestling, boxing, and martial arts, is a popular activity associated with danger and violence. The popularity of combat sports and especially Mixed Martial Arts (MMA), through the Ultimate Fighting Championship (UFC) fights, has been growing fast, with a large number of athletes being involved in MMA training and fights, while the number of spectators and fans has also increased rapidly (La Bounty et al., 2011).

Taekwondo has been a part of the Olympic demonstration program since Seoul 1988 and Barcelona 1992, before becoming an Olympic discipline from the Sydney 2000 Olympic Games. In this paper we

focus on the anthropometric, physical, and coordinative profiles of taekwondo athletes of different levels. Taekwondo is a full contact free-sparring sport, which consists of punches and kicks that have to produce a displacement of the body segment of the opponent. The words 'Taekwondo' translates as tae to hit using the foot (kick), kwon to hit using the fist (punch) and do referring to the art (Kazemi et al., 2010)

Being successful in many modern sports is associated with the abilities of running, jumping, pushing, pulling and throwing. Mobility is a biological need for every individual, however, performance-based motions in terms of quality are necessary for the success and high-level performance in the sports. Sports are the activities containing complex motions in it and it is based on performance of various motions. Therefore, different sports branches need different coordinative abilities (Singh, 2004).

Once the literature is examined, it is seen that there are studies carried out for the examination of the relation between the agility performance and some coordinative abilities of judoka, searching of the relation between the match ability and some coordinative abilities of wrestlers and judoka (Rana and Rajpoot 2015) However, it was seen that there was no study conducted for the purpose of determining the coordinative abilities of these three sports branches for comparing the coordinative abilities of taekwondo, judo and MMA. Hence, the aim of this research is to compare the coordinative abilities of taekwondo, judo and MMA.

Method

Participants

Totally 75 athletes were chosen for the study 25 Taekwondo players, 25 MMA fighters and 25 judokas whose age between18-22. All risks and benefits pertaining to the study were explained to the athletes.

Measurements

Ball reaction exercise test, Numbered Medicine ball run test, Long nose test, Sprint at given rhythm and Backward Medicine ball run test were used for the purpose for determining Reaction ability, orientation ability, Balance ability, Rhythm ability and Differentiation ability of the athletes participating into the study.

Numbered medicine ball running test

This test is to determine orientation ability of the subjects. All the medicine balls weighing 3 kg were arranged Figure-1 on an even ground in a semi-circle with a distance of 1.5 m between the balls. The medicine balls weighing 4 kg were kept 3 m away from these medicine balls. Behind all the medicine balls of 3 kg weight, metallic number plates of 1 sq foot size were kept from 1 to 5. Before the start of the test, the subjects were said to stand behind the start finish photocell gate which is behind the sixth medicine ball facing toward the opposite direction. On signal ''ready-go'', the subjects turn, crossing start-finish gate and run the number called by tester, touch the medicine ball and run back to touch the sixth medicine ball, immediately another number is called. Similarly, a total of three times the number was called by the tester. After the subjects performed accordingly for three times, they completed the test by crossing start-finish gate again. Using a photocell, the tester measures the time between the ''Go'' signal and crossing the finish gate in units of 0.1 s. Before the actual test was administered, one practical trial was given to all the subjects, (Chib 2000; Minz, 2003; Singh, 2004).

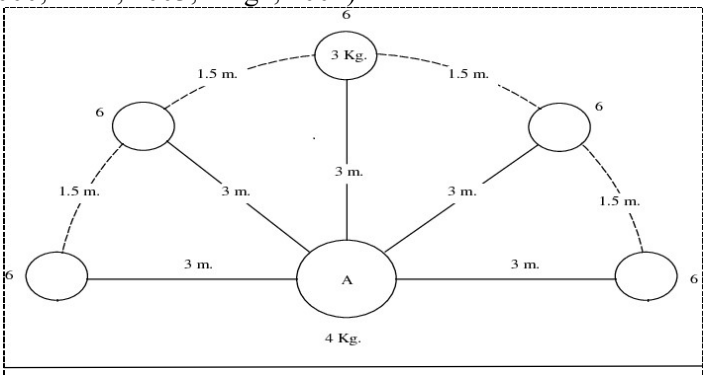

Fig 1

Backward medicine ball throw test

This test is used for measuring the differentiation ability. A gymnastic matte in length of three meters and in width of 6 meters was positioned 1,5 meters away from the starting line, as seen in Figure-2. A circle in diameter of 40cm was drawn in the middle of matte and 2 kg of medicine ball was placed into this circle. It was said to the subjects to wait behind the starting line in such a way which will face to the opposite direction. It was asked from the subjects to try to strike the medicine ball within the circle by launching a 1kg medicine ball with two hands over the head without looking back. The subjects repeated the test for 2 times after 1 trial and the best rating was accepted as the score.

The scoring was performed as follows;

1 score when the medicine ball launched by the subjects touches the matte

2 scores when the medicine ball launched by the subjects touches the line of circle

3 scores when the medicine ball launched by the subjects falls into the circle

4 scores when the medicine ball launched by the subjects strikes another medicine ball within the circle. Total of all scores obtained by launching 5 balls created the individual score (Chib 2000; Minz 2003; Singh 2004)

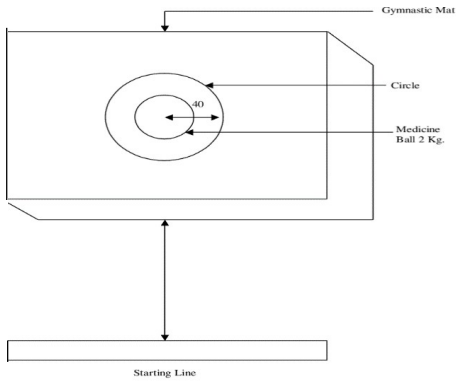

Fig 2

Ball reaction exercise test

This test was administered to measure the reaction ability of the subjects. Two wooden planks of four meters each kept inclined by a supporting stand as seen in Figure-3 having a height of one meter and twenty centimeters so that it could enable a volleyball to roll freely from a height of 1.20m the lower end of wooden planks were kept at a distance of 1.5m away from the starting line outer side of one of the plank was graduated in centimeters. Volleyball was held by the tester at the top of the plank. The subjects were asked to stand behind the starting line facing opposite top the plank. On clapping the subjects took a turn and ran towards the plank and stopped the ball with both hands which was dropped on the signals the ball should not pushed upward while stopping. The score was the distance measured in cms. From the top of the planks to a points where the subjects stopped the ball (Chib 2000; Minz 2003; Singh 2004).

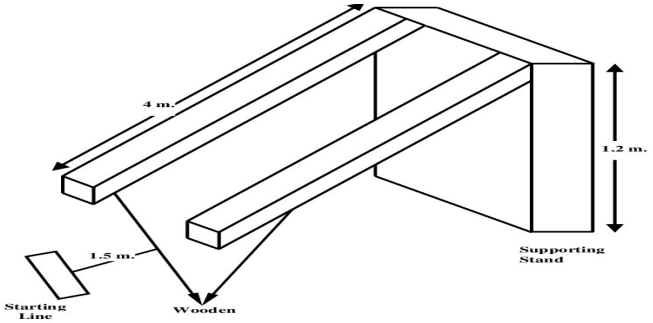

Fig 3

Long nose test

The test was administered to measure the balance ability of the subjects. A balance beam of standard size was kept on the floor one and half meter away from the starting line se seen in Figure-4. The subjects was asked to stand behind the starting line with one kg medicine ball on his hand fully stretched forward and the other hand holding the opposite ear lobe on clapping the subject moved the balance beam towards the 2 kg ball which kept at the other end and push down without loosing the balance the time taken in seconds to complete the course was taken as the score (Chib 2000; Minz 2003; Singh 2004).

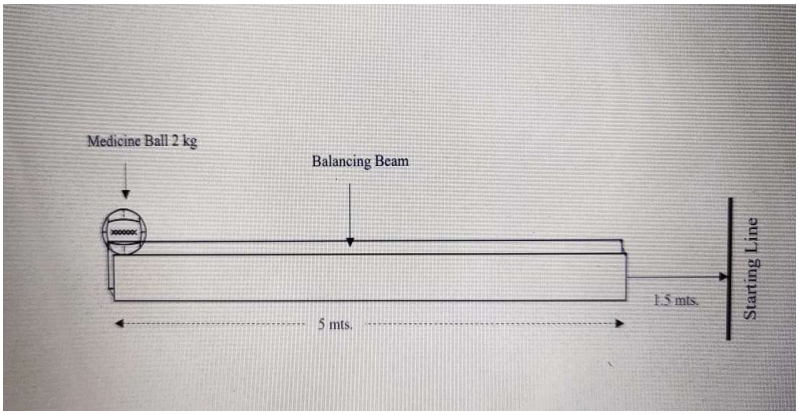

Fig 4

Sprint of given rhythm

This test is used for measuring the rhythm ability. 11 gymnastic hoops were positioned systematically, as is seen in Figure-5. The first 3 hoops were aligned in a consecutive order in an adjacent way with each other 5 meters away from the starting line. Similarly, the other 3 hoops were positioned 5 meters away from the finishing line. The remaining 5 hoops were positioned in an adjacent line with each other in the middle of the running distance. The distance between the starting line and finishing line is 30 meters. Also, two photocells were placed in starting and finishing points of the 30 meters of line for determining the running time. Test was shown and explained to the subjects before implementing the test. Then, the subjects run the 30 meters of distance in a straight way being independent from the gymnastic hoops as swift as possible. Afterwards, the subjects run by making stepping between each hoop by adjusting the rhythm throughout the 11 gymnastic hoops aligned systematically in a regular rhythm and at maximum speed. Each subject firstly made a trial. Then, the subjects run for 30 meters in a normal way for two times and for 30 meters in a rhythmic way for 2 times. The best rating was obtained for each running. Difference between the first and second running was recorded as rhythm score (Chib 2000; Minz 2003; Singh 2004).

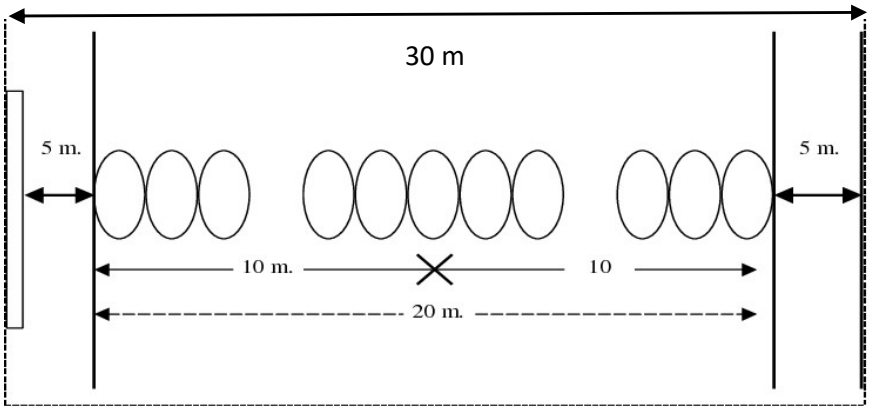

Fig 5

Statistical technique

The collected data from the three games on coordinative abilities were statistically analyzed by using one way ANOVA in the SPSS 22 program. Scheffe's post hoc test was also used to determine the 'F' ratio obtained was significant.

Results

The descriptive analysis shows mean and standard deviation of coordinative abilities among taekwondo, mixed martial arts and judo as presented in Table 1.

Table 1: Mean and Standard Deviation of Coordinative abilities among selected games

Coordinative abilities	Taekwondo (n=25)		MMA (n=25)		JUDO (n=25)	
	Mean	SD	Mean	SD	Mean	SD
Orientation abilities	6.78	0.61	6.46	0.39	7.10	0.53
Differentiation abilities	12.32	2.41	13.16	2.52	11.64	3.37
Reaction abilities	156.60	17.14	136.32	9.44	161.28	16.65
Balance abilities	10.84	1.72	9.40	0.73	11.14	1.85
Rhythm abilities	10.71	2.32	8.78	0.99	11.24	2.66

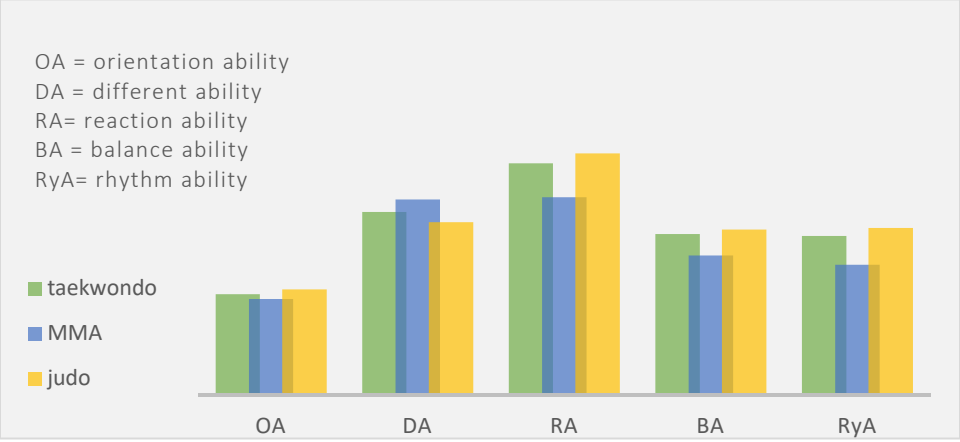

Figure -1 Graphs showing the differences on coordinative abilities among the games

Table 2 Analysis of variances with regard to Coordinative abilities among selected games

Coordinative abilities	Source of variance	Sum of squares	df	MS	F
Orientation abilities	Between the group	5.19	2	2.59	9.43*
	Within the group	19.81	72	0.27	
Differentiation abilities	Between the group	28.98	2	14.49	1.84
	Within the group	566.56	72	7.86	
Reaction abilities	Between the group	8801.52	2	4400.76	19.98*
	Within the group	15858.48	72	220.27	
Balance abilities	Between the group	43.42	2	21.71	9.36*
	Within the group	166.95	72	2.31	
Rhythm abilities	Between the group	83.70	2	41.85	9.30*
	Within the group	323.94	72	4.49	

*Significance at 0.05 level $F_{0.5}(2,72) = 3.12$

The obtained 'F' ratio = 9.43, 19.98, 9.36 & 9.30 of orientation abilities, reaction abilities, balance and rhythm abilities has been found significant at 0.05 level as it is greater than the tabulated 'F' value = 3.12. Whereas, 'F' ratio = 1.84 of differentiation abilities is lesser than tabulated 'F' value = 3.12. Thus, no significant difference for differentiation abilities among the selected games. Further, Scheffe's test was applied to find out the difference among the means of selected games. The results have been presented in table 3.

Table 3 Scheffe's test for the Differences on coordinative abilities among selected games

	Taekwondo	**MMA**	**Judo**	**M.D**	**C.I**
Orientation abilities	6.78	6.46	-	0.32	0.36
	6.78	-	7.10	0.32	
	-	6.46	7.10	0.64*	
Differentiation abilities	12.32	13.16	-	0.84	1.98
	12.32	-	11.64	0.68	
	-	13.16	11.64	1.52	
Reaction abilities	156.60	136.32	-	20.28*	10.48
	156.60	-	161.28	4.68	
	-	136.32	161.28	25.48*	
Balance abilities	10.84	9.40	-	1.44*	1.07
	10.84	-	11.14	0.3	
	-	9.40	11.14	1.74*	
Rhythm abilities	10.71	8.78	-	1.93*	1.49
	10.71	-	11.24	0.53	
	-	8.78	11.24	2.46*	

As shown in table 3 the Scheffe's post hoc analysis shows the significance mean difference of coordinative abilities exists among the games. Since, the mean difference of MMA & judo = 0.64 is higher than the confidence level value 0.36 for orientation abilities, taekwondo & MMA = 20.28 and MMA & judo = 25.48 is higher than the confidence level value = 10.48 for reaction abilities, taekwondo & MMA = 1.44 and MMA & judo = 1.74 is higher than the confidence level value = 1.07 for balance abilities, taekwondo & MMA = 1.93 and MMA & judo = 2.46 is higher than the confidence level value = 1.49 for rhythm abilities.

Discussion

The findings of this study shows that MMA has higher differentiation abilities than taekwondo and judo. And, judo has higher orientation abilities, reaction abilities, balance abilities and rhythm abilities follows by taekwondo and MMA. The rhythm ability enables the athletes to perceive a rhythm coming from the outer world and to reveal it during a motion action. In addition to this, athletes can reveal any rhythm existing in the motor memory again thanks to the rhythm ability (Minz, 2003). Orientation is defined as the ability of designating the changing motion and position of the body at a time and location in regard to the motion to be performed. In other words, the position of the whole body or any part of the body is able to determine the location of the rival and teammates, ball and playing field by the gravitational force (Holmann and Hettinger, 1980).

In a study in which relation between the agility and orientation ability of judoka was examined, means of the orientation ability of 67 child judoka whose age mean was 10.34±1.40 years were determined as 11.09±1.04 seconds, 20 karate player children whose age mean was 14.60±0.82 years were included into a study conducted by (Peker and Vural, 2018). According to the results of the research, orientation ability means were found as 11.69±1.61 seconds, rhythm ability means were found as 1.82±0.64 seconds.

In another research conducted over volleyball players and handball players whose age ranges between 15-22, the orientation ability means of volleyball players were found as 12.84±1.83 seconds, rhythm ability means as 2.46±1.22 seconds and differentiation ability mean as 9.72±3.32 scores. On the other hand, the orientation ability means of handball players were determined as 11.2±1.11 seconds, rhythm ability means as 3.23±1.26 seconds and differentiation ability mean as 9.55±2.77 scores (Lohchab, 2014).

(Peker et al., 2018) conducted a study for the purpose of examining the effect of exercise on the coordinative abilities. In the research conducted, football player children whose age is in range of 11-12 were divided into two groups as test and control group. When the pre-exercise pre-test results are examined; the orientation ability means of the test group were found as 8.47±0.77 seconds, rhythm ability means as 1.46±0.26 seconds and differentiation ability means as 8.75±3.76 scores, respectively. The orientation ability means of the control group were determined as 10.80±0.75 seconds, rhythm ability means as 1.67±0.28 seconds and differentiation ability mean as 8.67±3.33 scores, respectively.

Conclusion

From the results of the study and discussion, the following conclusion are drawn.

1. For Orientation abilities, comparing judo, MMA and taekwondo athletes practicing judo is highest.
2. For Differentiation abilities, comparing judo, MMA and taekwondo athletes practicing MMA is highest.
3. For Reaction abilities, comparing judo, MMA and taekwondo athletes practicing judo is highest.
4. For Balance abilities, comparing judo, MMA and taekwondo athletes practicing judo is highest.
5. For Rhythm abilities, comparing judo, MMA and taekwondo athletes practicing judo is highest.
6. Comparing Coordinative Abilities for judo, MMA and taekwondo athletes practicing judo is highest.

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