Original Article

Comparıson Of Lower And Upper Extremity Y Balance Test Scores Of Some Team And Indıvıdual Adolescent Athletes

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Abstract

The aim of this study is to determine the relationships between the Y Balance Test (YBT) upper and lower extremity balance scores of judo, taekwondo, basketball and volleyball players. A total of 46 athletes, including judo (12), taekwondo (10), basketball (10) and volleyball (12), participated in the study. Participants were evaluated with lower extremity Y balance test (LE YBT) and upper extremity Y balance test (UE YBT). The collected data were analyzed with the SPSS 22 program using an independent t test. As a result of the analyzes, it was seen that all of the upper extremity Y Balance Test and Arm length data of taekwondo, judo, basketball and volleyball players were statistically significant according to the branches, and all the lower extremity Y Balance Test and Chimney length data were statistically significant according to the branches P<0,01. As a result, It can be said that lower extremity Y Balance Test and upper extremity Y Balance Test values of basketball and volleyball players, where limb length is at the forefront, are better than judo and taekwondo branches, which are individual double combat sports. This result can be attributed to the limitation of physical structure due to the fact that judo and taekwondo branches are welterweight sports and limitation of the physical activity, and the physical capacity of basketball and volleyball sports to create an advantage in the competition.

Keywords: Y balance test, Taekwondo, Judo, Basketball, Volleyball.

INTRODUCTION

Basketball and volleyball, which are indoor sports, are team sports that push the limits of physical capacity that require high level of condition. While basketball is characterized by the ball-holding, throwing and bouncing movements of the athletes in addition to double struggles, short-distance running and jumping movements, volleyball is observed as the whole of the movements in which the hitting movements other than holding or carrying the ball are exhibited in addition to the stepping and jumping of the athletes. While there is a balance situation in which external factors are effective in basketball, it can be said that external factors are minimized in volleyball. Taekwondo and judo, which are dual combat sports, are individual combat sports in which the limits of physical capacity are challenged that require high level of conditioning. There are some distinctive features of these two branches. In judo, it is aimed to score points by aiming to disrupt the balance of the opponent in general, in which some foot games stand out with pulling and pushing by holding hands, while in taekwondo, the balance of the opponent is disturbed by foot and hand blows targeting certain areas of the opponent. Balance is defined as the ability of the whole or a part of the body to stay in a certain state or to maintain its position by resisting gravity.[1] The human body receives feedback to maintain balance during static and dynamic movement and directional activities.[2] These feedbacks can be encountered in daily activities such as walking, in which one foot moves one after the other [3], as well as in the display of sportive skills. One of the most important elements of being able to perform at a high level as well as in daily routine activities is balance control.[4] Providing balance control and an optimal posture can be achieved in movements against the center of gravity.[5] While maintaining the posture allows the movement to be performed correctly, it also provides a biomechanical advantage in cases where sportive performance is expressed in milliseconds. The ability to maintain the balance of the body in a certain position is expressed as static balance.[6,7]

Researchers often use the Y Balance Test (YBT), which is among the most important tools in the literature, to measure dynamic balance to assess dynamic balance, monitor changes in performance after initiation of an injury prevention, rehabilitation program, or identify athletes who may be at high risk of injury.[7,9] The lower extremity Y balance test (LE YBT) is a field test that can be safely applied both in the evaluation of balance and in the prediction of lower extremity injuries.[8,10] While LE YBT is included in injury prevention programs, it will also evaluate the presence of asymmetry and provide risk estimation about injury.[11] The upper extremity Y balance test (UE YBT) aims to examine the balance of the athlete while maintaining the stability of the athlete and reaching the end point where the upper extremity can reach and return. UE YBT is used to predict upper extremity injuries and to reduce injuries with early awareness.[12,13] This test, which is used to predict and prevent shoulder injuries,[14] is a reliable field test that provides information about injury risk by evaluating asymmetries.[11]

Although there are limited studies on the Y balance test performance of taekwondo, judo, basketball and volleyball athletes in the literature, no study was found to compare both the upper and lower extremity balance performances of these branches at the same time. In this study, it was aimed to compare Y balance test (YBT) scores of taekwondo, judo, basketball and volleyball players and to determine the relationships between upper and lower extremity balance scores according to branches.

METHOD

Research Model

Research Model In the research, correlation and comparison tests were performed and the relational screening model was used. The relational survey model, which is one of the general survey model types, is a research model that aims to determine the presence and/or degree of co-variance between two or more variables.[15] A total of 46 athletes in the Research Group, aged between 14 and 16, including judo (12), taekwondo (10), basketball (10) and volleyball (12) were included in the study. Athletes to participate in the study were selected from athletes who have been playing the relevant sport for at least three years, do not have any disease that may affect the normal function of the musculoskeletal system, have no history of surgical operations that may affect the normal function of the musculoskeletal system, and do not have a current active injury.

Data Collection Tools

Y Balance Test Kit was used to determine the dynamic balance of the athletes. The Y-Test kit consisted of a platform to which three duly marked centimeter plastic tubes were attached, forming the anterior, posteromedial, and posterolateral extension directions. The pipes were positioned on the platform such that the angle between the posteromedial and posterolateral pipes was 90° and the angle between the anterior extension pipe and the other pipes was 135°. The athlete reached the access points by pushing boxes that slide on the pipe.[15] In the Lower Extremity Y Balance Test Application Protocol allowed the athletes to perform three trials on the balance platform. Y balance test kit was used for the test.[16] For the Y balance test, the athletes were asked to reach the apparatus in 3 directions (anterior, posterolateral and posteromedial) with the other foot while balancing on the right foot first, without crossing the red-marked place on the balance foot on the platform.

If the athlete got help from the apparatus, touched the floor with his feet or fell from the platform by losing his balance, the test was considered unsuccessful and he was asked to return to the starting position and lie down again. The athletes repeated the test 3 times and the maximum distance reached was recorded. The same test was repeated for the other lower extremity. The lower extremity dimensions of the athletes were found by measuring the distance between the spinailiacaanterior and the medialmalleolus. Y balance scores were found using the reach distance and limb length in each direction.

Upper Extremity Y Balance Test Application Protocol determined upper extremity lengths by measuring the distance between the C7 cervical vertebra processus spinosus and middle finger tips of the athletes. Before the test, attention was paid to ensure that the athlete was not tired.[13] Athletes first stood in push-up position on the platform with their right hands. In this position, the athletes were positioned perpendicular to the middle extension of the Y balance kit (the arm making an angle of 135° with the other ends). In this state, the other arms, which are 90° between them, remained on the lateral of the athlete's fixed hand. It was warned that the athlete's fixed hand should not cross the red line on the kit. The test of the athlete who crossed the red line, whose balance was disturbed, and who was helped by the platform apparatus, was repeated. The athlete was asked to move the platform apparatus to the last point where it could be taken by driving along the extension remaining in the medial of the movable hand and the fixed hand. Afterwards, the athlete was asked to push the platform apparatus along the superior and inferior arms, respectively, and take them to the last point they could take. The end points reached were recorded.

Analysis of Data

The data obtained in the study were evaluated using the SPSS for Windows statistical analysis program. Descriptive statistics of the variables in the study were determined by arithmetic mean and standard deviation. The normality distribution of the data was examined using the Shapiro Wilk's test, and the One Way Anova test was used to compare the data with normal distribution between groups.

FINDINGS

The data obtained in the upper and lower extremity Y Balance Test (YBT) measurements of judo, taekwondo, basketball and volleyball players are as follows.

Table 1: Comparison of Participants' Height, Weight, BMI, Sports History, and One Way Anova by Branch

		N	Mean	Std. Deviation	sig
Height	taekwondo	10	159,60	3,86	0,00
	judo	12	156,66	5,43	
	basketball	13	176,76	7,03	
	voleyball	13	175,46	3,09	
	Total	48	167,81	10,45	
Weight	taekwondo	10	51,00	5,61	0,00
	judo	12	48,83	6,32	
	basketball	13	65,07	12,13	
	voleyball	13	62,30	5,34	
	Total	48	57,33	10,52	
BMI	taekwondo	10	20,02	1,89	0,86
	judo	12	19,96	2,69	
	basketball	13	20,79	3,51	
	voleyball	13	20,19	2,01	
	Total	48	20,26	2,58	
Sports History	taekwondo	10	3,30	0,48	0,67
	judo	12	3,50	0,52	
	basketball	13	3,38	0,50	
	voleyball	13	3,53	0,51	
	Total	48	3,43	0,50	

When Table 1 is examined, it is seen that there is a statistically significant relationship in height and weight variables according to branches, but no statistically significant relationship was found between BMI and Sports History P<0.01.

Table 2: Comparison of Participants' Upper Extremity Balance and Arm Length Data by Branch with One Way Anova

		N	Mean	Std. Deviation	sig
Arm Length	Taekwondo	10	79,40	2,27	0,00
	Judo	12	78,16	3,12	
	Basketball	13	88,07	4,32	
	Voleyball	13	86,23	2,45	
	Total	48	83,29	5,31	
Right medial	Taekwondo	10	77,40	5,56	0,00
	Judo	12	74,50	5,12	
	Basketball	13	88,69	9,26	
	Voleyball	13	86,15	7,75	
	Total	48	82,10	9,23	
Right Inferolateral	Taekwondo	10	61,40	9,25	0,00
	Judo	12	61,08	7,87	
	Basketball	13	69,84	8,53	
	Voleyball	13	74,38	8,51	
	Total	48	67,12	10,04	
Right Superoletheral	Taekwondo	10	55,20	8,72	0,00
	Judo	12	51,33	7,74	
	Basketball	13	60,07	7,94	
	Voleyball	13	66,38	8,88	
	Total	48	58,58	9,90	
Left medial	Taekwondo	10	77,60	5,71	0,00
	Judo	12	75,75	3,51	
	Basketball	13	89,30	6,78	
	Voleyball	13	86,46	6,47	
	Total	48	82,70	8,09	
Left inferolateral	Taekwondo	10	67,60	7,19	0,00
	Judo	12	62,00	7,41	
	Basketball	13	73,69	10,37	
	Voleyball	13	76,07	4,38	
	Total	48	70,14	9,31	
Left Superoletheral	Taekwondo	10	60,20	4,58	0,00
	Judo	12	53,25	3,69	
	Basketball	13	63,23	6,97	
	Voleyball	13	67,15	10,89	
	Total	48	61,16	8,79	

When Table 2 is examined, it has been seen that the Upper Extremity Y balance test and Arm length data of the participants according to the branches are all statistically significant. P<0.01 Correlation was determined to be positive and linear.

Table 3: Comparison of Participants' Lower Extremity Balance and Chimney Length Data by Branch with One Way Anova

		N	Mean	Std. Deviation	sig
Leg Length	Taekwondo	10	90,00	2,21	0,00
	Judo	12	84,83	6,39	
	Basketball	13	103,61	6,66	
	Voleyball	13	96,23	1,53	
	Total	48	94,08	8,61	
Left Posteromedial	Taekwondo	10	74,80	5,05	0,00
	Judo	12	66,00	10,41	
	Basketball	13	82,00	9,38	
	Voleyball	13	88,38	9,69	

	Total	48	78,22	12,24	
Left Posterolateral	Taekwondo	10	75,80	2,85	0,00
	Judo	12	57,41	7,77	
	Basketball	13	75,07	6,90	
	Voleyball	13	75,92	7,20	
	Total	48	71,04	10,22	
Left Anterior	Taekwondo	10	80,60	4,45	0,00
	Judo	12	57,25	6,29	
	Basketball	13	85,53	9,42	
	Voleyball	13	77,61	12,99	
	Total	48	75,29	14,08	
Right Posteromedial	Taekwondo	10	76,60	3,23	0,00
	Judo	12	64,75	7,77	
	Basketball	13	84,61	8,42	
	Voleyball	13	84,61	7,94	
	Total	48	77,97	10,94	
Right Posterolateral	Taekwondo	10	77,60	7,61	0,00
	Judo	12	53,50	7,10	
	Basketball	13	76,76	8,88	
	Voleyball	13	73,15	5,14	
	Total	48	70,14	12,12	
Right Anterior	Taekwondo	10	78,80	3,48	0,00
	Judo	12	60,33	4,67	
	Basketball	13	83,00	10,98	
	Voleyball	13	85,07	8,41	
	Total	48	77,02	12,48	

When Table 3 was examined, it was seen that all of the Lower Extremity Balance and Chimney Length Data were statistically significant according to the branches. P<0.01 Correlation was determined to be positive and linear.

DISCUSSION AND CONCLUSION

In the study in which the performance of lower extremity and upper extremity Y balance tests of judo, taekwondo, basketball and volleyball players, which are combat sports, were evaluated, the possible effects of the specific training programs of these sports branches and the different performance demands of the branch on the Y balance upper and lower extremity test data were investigated.

When the literature is examined, it is seen that almost all of the studies on Y balance tests are done for clinical purposes. Some of the studies that are excluded from these studies are reliability and validity studies, and the rest are the comparison of athletes with sedentary individuals or the comparison of Y balance test data before and after an exercise program. In addition, the results obtained in the studies in which the few values we can reach are compared;

As a result of 8 weeks of neuromuscular training applied to 29 basketball players with an average age of 20, consisting of the study group (14) and control group (15), there was an improvement compared to the initial scores in the study group.[17]

According to the results of the lower extremity Y balance test applied to two hundred and ninety-five active athletes (117 males, 178 females, average age, 15.6 ± 1.2 years) continuing their education in high school, men achieved more elongation distance results than women. In addition, in the same study, it was shown that sports history positively affects the results of elongation.[18]

Koçak & Ünver, applied YBT to 24 female football players between the ages of 17-30 and took the mean values of the right foot and left foot angles in the study. Right side YBT results were 96.4±4.9%; left side YBT results were determined as 96.3±4.1% mean values.[19]

The study group consisting of 50 students between the ages of 12-14 applied competitive judo training for 3 days and 90 minutes for 8 weeks, while the control group applied basic judo training for 3 days and 90 minutes for 8 weeks. When the mean values of Y balance tests were compared, statistically significant differences were found in the study group (P<0.05).[20]

In another study, in which the Y balance test was used to evaluate the dynamic balance of the upper extremities of 60 women (30 healthy individuals, 30 volleyball players) with a average age of 19.23±2.11 years, findings are: When the groups were compared in terms of upper extremity lengths, medial, inferolateral and superolateral aspects of the Y balance test, and total score, a statistically significant difference (P<0.05) was found in favor of the athlete group.[21]

In the study in which 33 volunteer wrestlers participated (Greco-Roman style = 12, free style = 21), lower extremity Y balance test (AE YBT) and upper extremity Y balance test (UE YBT) were evaluated. No statistically correlation was found between the AE and UE balance scores of Greco-Roman style and freestyle wrestlers (P<0.05).[22]

As a result of the statistical evaluation of the data at the end of the measurements we made, it was seen that there was a statistically significant (0.00) P<0.01 relationship according to the branches in the height and weight variables in Table 1. It was seen that the upper extremity Y balance test and arm length data of the participants according to the branches were statistically significant (0,00) P <0.01. All of the participants' upper extremity Y balance test and arm length data according to the branches were found to be statistically significant (0.00) P<0.01. It is known that in addition to being individual sports, judo and taekwondo athletes, which are among the weight sports, are subject to a physical limitation due to the demands of the sports branch, but the physical structures of volleyball and basketball athletes, which are among team sports, cause success in the sports branch. It is thought that the statistical significance of the results is due to the physical structure demands of the athletes for the branch.

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