

Evaluation of Core Stabilization Strength of Team and Individual Athletes and Sedentary

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ABSTRACT

Aim: This study was carried out to examine the core strength of athletes and sedentary people between the ages of 13-18.

Methods: 200 male athletes from Samsun and 51 sedentary men who did not do any sports participated in this study. The Plank Fitness Test was applied to measure core strength and the time they could stand without disturbing the plank position was recorded. IBM SPSS Statistics 21 package program was used in the analysis of the data. Before the analysis of the data, Shapiro-Wilk normality test was applied and it was determined that the data did not show normal distribution ($p < 0.05$). The Kruskal-Wallis H test was used to compare the averages of core duration between the groups.

Results: According to the findings obtained in the study, a significant difference was found when the durations of the groups in the core test were examined [$X^2(2) = 92,158, p < .05$]. This finding shows that the core strength between the groups is different according to the branch. When the averages of the groups are examined, it is determined that the branch with the highest core duration is judo (190.53 sec.), followed by taekwondo (158.18 sec.), football (158.01 sec.), sedentary (107.73 sec.) and basketball (69.55 sec.) groups, respectively. In addition, it is seen that the results obtained in core times and the results of training age and body mass index values are similar.

Conclusion: According to the results of our study, it is noteworthy that those who do individual sports have higher core scores than those who do team sports and sedentary. We think that this difference is due to the fact that the concentration is constantly high in individual sports and the techniques performed accordingly require more core strength. In addition, we can say that the fact that sedentary people get more core points than basketball players is due to the fact that the training age of the participants and the body mass index values of the basketball players are higher than the other participants. In the light of these results, we think that more core training should be included, especially in sports that require high technical skills and strength.

Keywords: Team and Individual Sports, Sedentary, Core Strength

INTRODUCTION

Core; It is an English word meaning core. It is used as the center of gravity, which is accepted as the middle point of the human body in sports science.¹ The core region consists of bones, discs, ligaments and muscles. The core can be defined as the trunk or the region that provides the connection between the lower knees and the sternum.² The muscles in the core region consist of the pelvis and trunk muscles. In some studies in the literature, the core region muscles consist of all the muscles located between the sternum and the knee. Core muscles have an important role on body posture.¹ As advances in science progress, core muscles are divided into small local muscles and large local muscles. Some researchers named these muscles as anterior and posterior muscles.¹

Strength differs according to the exercises performed in age periods. Muscle strength increases with the age of the person. At the same time, the increase in the muscle mass of the body together with factors such as age, height and weight also affects the strength.² Strength training has an important place in terms of preventive, therapeutic, performance enhancing, protecting and developing the body and psychological purposes. Developing the

musculoskeletal system, increasing flexibility, preventing posture disorders are some of its protective features. Shortening the treatment process after surgeries and improving performance in the post-injury period are among its therapeutic properties. It provides an effect on more active use of abilities and motoric features to improve performance. It plays an active role in regulating body fat ratio and providing weight control in order to protect the body. In the psychological field, it has effects on the increase of self-confidence, the development of the sense of perception and the personal confidence of being successful in a field.^{3,4,5}

When the strength is examined in the developmental stage, there is no difference between girls and boys until the age of 10-11. However, from this age on, boys can develop more than girls in terms of strength. The reason for this is that while the muscle mass in girls constitutes 25-35% of body weight, the muscle mass in boys is 40-45% of body weight. Strength differs depending on the type of training performed according to age. Until adolescence, the strength increases regardless of any factor, while after puberty there is a difference according to gender. It is seen that strength develops continuously in men at the age of 9-

14, this development accelerates at the age of 14-17, and the progress in strength slows down at the age of 17-24.⁶

The effects of core strength exercises have been investigated by many people and it has been concluded that the athletes improve their motor skills, contribute to body balance, prevent injuries, and increase the performance and strength of the athlete. Strength exercises for the core region are especially beneficial for athletes.² It is important to develop core strength and power in order to provide better performance in the sports branch. Increasing core stabilization is the basis for increased strength production in the lower and upper extremities. However, it does not mean that the increase in core strength will always positively affect the sportive performance.¹ When we look at the literature, positive and significant results were not found in some studies.⁷ There are many types of exercises that cover the core muscles. In recent years, core exercises have become a fundamental part of the training. The type of exercise that is done according to the body weight, height, age of the person and aims to strengthen the muscles that provide the balance of the spine is called core training. This training affects the strength and stabilization of regional and superficial muscles. With core training exercises, the balance of the body can be improved, and the risk of injury can be reduced with the strengthening of the muscles.⁶ Core training is done for two purposes. The first is done to increase performance and improve strength. Secondly, it is performed for the purpose of preventing injuries or post-injury treatment. There are many different types of core exercises. When the studies on the subject are examined, it is seen that there are varieties of core exercise. Some of those; Bridge exercise, tummy tuck exercise, heel press squat exercise, cobra exercise, bike tummy tuck exercise, tummy tuck exercise with fitness ball, upright tummy tuck exercise, reverse tummy tuck exercise, long arm tummy tuck exercise, side abdominal compression exercise to name a few. There are more varieties.² The aim of this study is to examine the core strength of athletes and sedentary athletes between the ages of 13-18 and to evaluate the core strength according to the branch type.

MATERIAL AND METHODS

Participants of the Study: The study included football (79), basketball (74), taekwondo (14), judo (33), sedentary (51) who train at least 3 times a week in the 13-18 age group in Samsun and have been actively involved in sports for 1 year. There were 251 male participants.

Core Test (The Plank Fitness Test): Core test is a test applied to evaluate core strength. The participant is asked to take the plank position and wait as long as he can without breaking his stance. As soon as the person maintains the correct posture, the time is recorded with the stopwatch. When the participant starts to break the ideal posture or abandons the test, the time is stopped and the current score is recorded. An example of correct plank posture was shown to each of the participants.⁸ Eight participants who performed less than 30 seconds (sec) in the core test were excluded from the study, and the score of 12 participants who achieved a score of 500 seconds or more in the core test was accepted as 500 points. In the study, a total of 251 male participants were included in the

study evaluations, with the lowest score being 30 and the highest score being 500.

Body Mass Index (BMI): The BMI values of the participants were obtained by dividing the body weight (kg) by the square of the height (in m) (BMI=kg/m²).

Statistical Evaluation: The data of the study were evaluated with the IBM SPSS Satatistics 21 package program. Before the analysis of the data, Shapiro-Wilk normality test was applied and it was determined that the data did not show normal distribution (p<0.05). The Kruskal-Wallis H test was used to compare the averages of core duration between the groups.

RESULTS

Table 1: Descriptive data of the participants

Variable	Branch	N	%	Min.	Max.	\bar{X}
Age	Football	79	31,5	13	18	15,67
	Basketball	74	29,5	13	17	14,66
	Taekwondo	14	5,6	13	18	15,21
	Judo	33	20,3	14	18	16,66
	Sedantery	51	13,1	13	17	14,88
Height (cm)	Football	79	31,5	140	190	173,97
	Basketball	74	29,5	148	197	173,55
	Taekwondo	14	5,6	146	186	167,21
	Judo	33	20,3	156	186	171,87
	Sedantery	51	13,1	140	184	169,62
Body Weight (kg)	Football	79	31,5	35	87	63,51
	Basketball	74	29,5	35	113	67,35
	Taekwondo	14	5,6	32	103	57,50
	Judo	33	20,3	49	125	69,60
	Sedantery	51	13,1	31	90	62,07
Body Mass Index	Football	79	31,5	13,90	31,10	20,70
	Basketball	74	29,5	14,00	33,00	22,140
	Taekwondo	14	5,6	15,00	29,80	19,960
	Judo	33	20,3	16,90	36,10	23,330
	Sedantery	51	13,1	13,30	31,10	21,350
Training age (Year)	Football	79	31,5	2	11	6,18
	Basketball	74	29,5	1	9	4,08
	Taekwondo	14	5,6	1	9	6,14
	Judo	33	20,3	3	13	6,72
	Sedantery	51	13,1	-	-	-
Training Frequency(week/day)	Football	79	31,5	3	5	3,70
	Basketball	74	29,5	2	7	3,18
	Taekwondo	14	5,6	2	5	4,50
	Judo	33	20,3	5	6	5,06
	Sedantery	51	13,1	-	-	-
Core Duration(Se cond)	Football	79	31,5	70	500	240,13
	Basketball	74	29,5	30	380	113,01
	Taekwondo	14	5,6	112	500	254,64
	Judo	33	20,3	127	500	297,42
	Sedantery	51	13,1	48	500	166,96

When we look at the lowest and highest values of the descriptive information of the participants in the study in Table 1, the average age is 14.66 years for basketball and 16.66 years for judo. The average height is 167.21 cm in

taekwondo and 173.97 cm in football. The average body weight is 57.50 kg in taekwondo and 69.60 kg in judo. The average BMI is 23.33 judo, 19.96 taekwondo. In core time, it is basketball with 113.01 seconds and judo with 297.42 seconds. When the general averages of all individuals participating in the study are examined; mean age is 15.41 years, average height is 171.24 cm, weight is 64.00 kg, BMI is 21.49 and core duration is 214.43 sec. was obtained.

Table 2: Comparison of core times between groups

Variable	Groups	N	Rank Average	Sd.	X ²	P
Core Duration (Second)	Football	79	158,01	4	92, 158	<0.001 5>3>1> 4>2
	Basketball	74	69,55			
	Taekwondo	14	158,18			
	Judo	51	107,73			
	Sedantery	33	190,53			
Training age	Football	79	118,85	3	41, 903	<0.001 5>3>1> 2>4
	Basketball	74	66,32			
	Taekwondo	14	120,25			
	Judo	51	-			
	Sedantery	33	124,82			

According to Table 2, a significant difference was found between the recorded times of the groups in the core test [$X^2(2) = 92,158, p < .05$]. This finding shows that the core strength between the groups is different according to the branch. Looking at the mean rows of the groups, it was determined that the branch with the highest core success was judo, followed by taekwondo, football, sedentary, and basketball, respectively ($p < 0.001$). It was determined that the training age also showed parallelism except for the ranking of the basketball and sedentary groups, and this parallelism was significant ($p < 0.001$).

DISCUSSION

The aim of our study is to examine and compare the core strengths of individual, team athletes and sedentary groups between the ages of 13-18. The lowest average age in basketball is 14.66 years, basketball is judo with the highest 16.66 years. The lowest average height group is 167.21 cm, taekwondo and football with the highest 173.97 cm. The lowest average body weight is 57.50 kg in taekwondo, and the highest in judo with 69.60 kg. The lowest average BMI is 19.96 in taekwondo and the highest in judo with 23.33. The group with the lowest core duration is 113.01 seconds, basketball, and the highest is judo with 297.42 seconds (Table 1).

A significant difference was found between the recorded times of the groups in the core test according to the branches [$X^2(2) = 92,158, (p < 0.001)$]. Considering the mean rank of the groups, it was determined that the branch with the highest core success was judo, followed by taekwondo, football, sedentary, and basketball, respectively ($p < 0.001$) (Table 2). According to Kibler, Press, and Sciascia (2006) that the core test measurement of the athletes who do Judo is higher than other branches, trunk stabilization facilitates the transmission of the strength produced by the lower body to the upper body and contributes to the performance of the athletes throughout the judo techniques.⁹ Judo athletes have to constantly defend and attack throughout the match, except for very short momentary movements.^{10,11} The muscles that will

come into play both during the attack and during the defense are the trunk muscles. The trunk first moves to create a stable base, and then the chain reaction of muscle contractions spreads to move the extremities. This sequence of muscle contractions is necessary to safely perform any explosive or heavy body movement.^{12,17,18} We can say that the results of this study are similar to the results in the literature. The training age of the athletes in the Judo branch is 6.14 years and the intense use of core muscles in this branch shows that they have better times compared to other branches. Looking at other studies, Ceylan and Cebi (2021) in their study on football, volleyball, athletics, handball, wrestling and rugby sports branches concluded that football players had a better time than other branches with 163.2 seconds in plank data.¹³ In the study of Atan (2020), it was determined that the participants who do individual sports have longer stopping times in the plank than the team athletes.¹⁴ Ezechieli et al. (2013) examined core strength profiles in their study on volleyball, football and triathlon athletes. Good and normal values were found in the extensor and lateral flexor strength of the left side of the body of the athletes. When the three branches were examined, football had the best core strength, the football branch was followed by volleyball, and the triathlon branch came after football and volleyball. When the core strength values of the three groups were compared with each other, no significant finding was found.¹⁵ Williams et al. (1997) in their study on American Football, middle-distance, long-distance runners and Football found that the core strength was significantly better in American football players and soccer players than in middle and long distance runners.¹⁶ According to Kibler, Press, and Sciascia (2006), they stated that trunk strength is better in team sports than endurance athletes. They explained this situation with the frequent use of basic stability and practices during the competition by team athletes during activities related to holding the ball. This stability is an important requirement when performing techniques with the lower extremities, to successfully engage the opponent for the ball, as well as to allow the necessary safe landings of the player's weight and the necessary support.⁹

There is a significant difference when looking at the mean rank of the training age of the participants ($p < 0.001$). We see that the branch with the highest training age is judo, followed by taekwondo, football, basketball and the sedentary group, respectively. This result shows us that there is a parallelism between core duration and training age (Table 2).

CONCLUSION

In this study, it was carried out to determine the core strength of individual, team athletes and sedentary groups between the ages of 13-18. The unbalanced and low muscle strength of the core region of the group participating in the study was determined and the core muscle strength of the individuals was evaluated. When an evaluation is made by looking at the age of the participants to do sports, we can evaluate that the core strength of the branches with a high time to do sports is also good. It is one of the results of our study that the groups doing individual sports are better than the individuals doing team sports. We think that this result is due to the fact that the

concentration is constantly high in individual sports and the techniques performed accordingly require more core strength. In addition, we can say that the fact that sedentary people get more core points than basketball players is due to the training age of the participants and the body mass index values of the basketball players than the other participants. In the light of these results, we think that more core training should be included, especially in sports that require high technical skills and strength. In addition, with this study, we suggest the development of individualized training plans by determining core strength, preventing injuries and ensuring that athletes at all sports levels reach maximum performance.

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