INNOVATIVE APPROACHES IN SPORT SCIENCES

GECE AKADEMİ

Kitap Adı	**: Innovative Approaches In Sport Sciences**
İmtiyaz Sahibi/Publisher	**:** Gece Kitaplığı
Genel Yayın Yönetmeni/Editor in Chief	**:** Doç. Dr. Atilla ATİK
Proje Koordinatörü/Project Coordinator	**:** Ethem BİLİCİ
Kapak&İç Tasarım/Cover&Interior Design	**:** Özge ERGENEL
Sosyal Medya/Social Media	**:** Arzu ÇUHACIOĞLU
Yayına Hazırlama	**:** Gece Akademi Dizgi Birimi
Sertifika/Certificate No	**:** 34559
ISBN	: 978-605-288-806-3

Editör/Editors

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Gece Publishing
ABD Adres/ USA Address: 387 Park Avenue South, 5th Floor, New York, 10016, USA
Telefon/Phone: +1 347 355 10 70

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Türkiye Adres/Turkey Address: Kızılay Mah. Fevzi Çakmak 1. Sokak Ümit Apt. No: 22/A Çankaya/Ankara/TR
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İÇİNDEKİLER

CHAPTER 1

Manuscript title:Effects of 6-Week Roller-Ski Interval Uphill Training on Selected Physiological Characteristics in Cross-Country Skiers

Authors: Bahar ATEŞ[1], Ebru ÇETİN[2]

INTRODUCTION

Cross-country skiing is a physiologically demanding endurance sport (Carlsson et al. 2014; Sandbakk and Holmberg 2014; Stoggl et al. 2011; Nesser et al. 2004) in which both the legs and arms contribute to generate propulsive power at varying degrees during skiing (Holmberg et al. 2005; Osteras et al. 2002).As all athletes, for cross-country skiers training aims to improve psychological and physical improvements. Components regarding performance in cross-country skiing are complex. Studies have indicated that elite cross-country skiers have highest values in endurance athletes (Holmberg et al. 2007; Saltin and Astrand 1967). The relevance of maximal oxygen consumption (VO_{2max}), time to exhaustion, lactate thresholds, upper body power output, and peak upper body oxygen consumption for cross-country skiers has been also confirmed by some studies showing a relationship between these test variables and competitive performance capacity of cross-country skiing (Alsobrook and Heil 2009; Carlsson et al. 2012).Since the ski-racing format has changed in the last decades (Stoggl et al. 2009), physiological factors, such as muscular strength and power, including upper and lower body, have became important, as well (Lindinger et al. 2009; Losnegard et al. 2011; Stoggl et al. 2007; Stoggl et al. 2011). Along with the all changes, training methods have changed considerably.

Previous studies on cross-country skiing have investigated a potential association between both aerobic and anaerobic power and cross-country skiing performance (Carlsson et al. 2013; Losnegard 2013; Sandbakk et al. 2011; Losnegard et al. 2013; Carlsson et al. 2012). Osteras et al. (2002) investigated association between upper-body endurance and the achieved 10-min ski ergometer in 19 cross-country skiers. Sandbakk et al. (2013) demonstrated that the effectiveness of aerobic high-intensity training, on endurance performance and oxygen uptake at ventilator threshold in national level junior cross-country skiers. Though cross-country skiing is characterized highly by aerobic power and endurance capacity (Stöggl et al. 2007), skiers also need to produce power in a rapid way (Mikkola et al. 2007). Hoff et al. (1999) investigated the association between maximal strength training and work economy in trained female cross-country skiers. Stoggl et al. (2011) determined the relationships between general strength, maximal skiing speeds, pole and leg kinetic and kinematics of a group of elite male skiers. Losnegard et al. (2011) have been studied heavy strength training

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with normal endurance training in elite cross country skiers. In addition to these studies, Larsson et al. (2002) stated in their study that quadriceps strength is correlated to performance in cross-country skiing.

Nowadays, high-intensity training on performance has been popular research topic again in endurance sports. Several studies have also reported that high-intensity training has superior central adaptations compared with continuous exercises at lower intensity (Daussin et al. 2007; Helgerud et al. 2007; Sandbakk et al. 2013). Traditionally, endurance athletes have trained according to approach of high volumes of low-intensity and moderate volume of high-intensity endurance training. Cross-country skiers normally use this training approach (called polarized model) in their training (Sandbakk et al. 2013; Sandbakk et al. 2011). Also the off-season is a vital training period to improve skiers' performance. Skiers commonly use running and roller-ski trainings in these months (Carlsson 2014). Rolling skiing is one of the training methods used by cross-country skiers during summer season and similar to cross-country skiing in that performing the same ski techniques (Jorgensen 2003). Due to roller-ski exercises provide important changes in skeletal muscle activity (Van Hall et al. 2003) roller-ski training programs are commonly used to enhance performance by cross-country skiers in summer months. Stoggl et al. (2005) stated that roller-board training serves a simple, inexpensive and useful device for specific training and testing for cross-country skiing. Therefore, the purpose of the present study was to determine the effects of roller-ski aerobic high-intensity interval training on isokinetic strength of the quadriceps and hamstring, aerobic and anaerobic power and a time-trial performance task, 500-m roller-ski test, after 6-week of intervention period in cross-country skiers.

MATERIAL AND METHODS

Subjects and Experimental Design

The 18 cross-country skiers who participated in the study included 10 male (age, 19,45±2,3 years; height, 173,30±4,88 cm; weight, 62,66±7,28 kg, BMI, 21,52±1,49 kg.m and training age, 7,5±1,4 years) and 8 female (age, 17,05±0,4 years; height, 158,63±4,88 cm; weight, 50,44±5,07 kg, BMI,19,06±0,79 kg.m and training age, 4,4±1,2 years) cross-country skiers. All participants were fully acquainted with the nature of the study before they gave their written, informed consent to participate.

The intervention 6-week training period conducted after the winter season from the beginning of September to the end of October during the second preparation of the new winter season. All skiers performed a 5 repeats x500 m all-out uphill intervals (with poles) andtwo sets of 2 repeats x500 m all-out uphill intervals (without poles) with roller-skis at 85-92% of HR_{max} with total work periods, threetimes a week in addition to their traditional training program. The ratio of work to rest was determined as 1:1. 5-minute was given between sets.

The skiers were instructed to perform the intervals with their maximal sustainable intensity. Training intervention started with a 20-min warm-up on roll-

er-ski of 60% HR_{max}. All training sessions were performed on roller-ski at height differences 144 m on asphalt. All intervals were carried out with a 15-minute active rest (jogging) periods in between. Training was standardized on the days before pre and post-testing.

Before and after the intervention training period the skiers tested for VO_{2max}, anaerobic power, leg strengthat 60˚/sec, and also for 500-m time trial performance. All tests were carried out with >24-hour intervals in between. All subjects used to same type of roller-ski (Pro-Ski C2, Sterners, Nyhammar, Sweden with 80 mm wheel diameter), and each skiers used their own skating poles, boots and helmets. Free skating technique (V1) was used during the study. Descriptive measurements (height, weight, age, BMI and training age) were obtained before the study.

VO_{2max} measurement

VO_{2max} was measured by maximum stepwise exercise protocol using the Cosmed Quark CPET System (Rome, Italy), in a breath-by-breath mode while running on a treadmill (HP COSMOS, Germany). Consuming of oxygen (VO_2) and hearth rate (HR) were recorded every 2 minutes. Before the test a 15-min warm-up was performed at 60% maximal HR (HR_{max}) on treadmill. The protocol started with an inclination of 00 at 8 $km.h^{-1}$ for female and 10 $km.h^{-1}$ for male skiers. The speed was increased 1 $km.h^{-1}$ every minute. When the speed reached 15 $km.h^{-1}$ the inclination was increased 1.5% every minute. The test was maintained until the athletes are exhausted. The highest heart rate value during the test was measured and used as HR_{max}. For assessing heart rate (HR), Polar Accurex heart rate monitors were used (Polar Electro, Finland).

Anaerobic power measurement

To evaluate the level of anaerobic capacity a 30 s Wingate test was conducted using a modified cycle ergometer (model 834E, Monark, Sweden). The test was preceded by a 2-minute warm-up with a load of $1Wxkg^{-1}$, and several 5 s accelerations. Subjects performed Wingate test against a resistance equivalent to 0.075 $kg.kg^{-1}$ body mass. Also skiers were instructed to begin pedaling as fast as possible against the ergometer's inertial resistance and verbally encouraged to continue to pedal as fast as they could for the entire 30 seconds. Results of test were calculated and recorded in watts (W) and watts per kilogram body weight (W/kg^{-1}).

Isokinetic knee extension and flexion peak torque

Isokinetic strength was assessed with the "ISOMED 2000" (D&R Fersh Gmbh, GERMANY), which recorded isokinetic knee extension and flexion peak torques at various preset constant angular velocities. Before testing, each subject completed a standardized warm-up consisting of 10-minute submaximal (~60%) on treadmill followed by quadriceps and hamstrings stretching with a 20-second pause for each repetition (5-6 static stretches). The subjects were placed in a comfortable upright seated position on the Isomed dynamometer chair and secured using knee, pelvic, and torso straps to minimize extraneous body move-

ments. Movement center of the dynamometer was at the level of lateral condyle and the calibration was made for each subject individually. Lower fixed component of dynamometer was placed on distal tibia above the approximately 3-fingers of ankle. The isokinetic knee extension and flexion was assessed at 60˚/sec. Test started with five submaximal followed by two to three maximal repetitions for warm up purposes. The skiers started with their dominant leg. Once dominant limb has been tested, each subject was given a brief period of volitional recovery (about 3-min) and then asked to perform the non-dominant limb at 60˚/sec. Only the highest peak torque values of the flexors and extensors of the legs were used in the analysis. Torques was gravity-corrected for each subject where the gravity effect was greatest. All subjects were encouraged to avoid pacing and to sustain their supramaximal efforts throughout the test. The peak torque rate to body mass was recorded in (PT/VA) Newton-meter/kilogram (nm/kg).

500-m time trial test

The 500-m time trial was performed on asphalt. Each skier used the same pair of roller-skis at pre-to post-test. These roller-skis were not used between pre-to post-test to avoid changes in rolling resistance. Skiers were allowed to practice with roller-skis for 30-minute during warm-up period. Test started at 30-second intervals, and allowed to use only skate technique (V1). Time was recorded using photocell gates (Power Timer New Test).

Statistical analysis was processed using Microsoft Excel and IBM SPSS (Ver. 20) statistical software. Mean and standard deviation were calculated for each variable. Wilcoxon Test (2-related samples) was used to determine significant changes from pre-to post-test values. Also percentage changes (%) were calculated to detect skiers' improvements from pre-to post-test values. P-value <0.005 was considered statistically significant. All values were listed as pre-to post-test mean (±SD), significant level, and percentage changes (%).

RESULTS

Tables 1 and 2 outline the changes in isokinetic strength and 2-km time trial performance between pre- and post-test for both female and male in all the training groups. Significant increases were observed in the right and left leg quadriceps and hamstrings isokinetic strength parameters in both female and male skiers at 600/sec velocity by the end of the 8-week intervention periods. The female skiers and male skiers improved Right Leg Quadriceps by 10,13 ± 10,32% and 18 ± 9,97%, Right Leg Hamstring by 9,62 ± 20,97% and 12,6 ± 14,3%, Left Leg Quadriceps by 9,34 ± 10,63% and 19 ± 10,8%, Left Leg Hamstring by 9,25 ± 19,47% and 11,3 ± 13,31%, respectively, from pre-to-post-testing (all $p<0.05$) (Table 1 and 2). The strength increased between pre- and post-test in all the training groups but the changes in Hamstring Right and Hamstring Left at 60 ◦ /sec differences were greater than in Quadriceps Right and Quadriceps Left at 60 ◦ / sec from pre to post- testing in both group.

2-km roller-ski performance improved from pre to post-testing in both female skiers (by 4,16%, $p<0,05$), and male skiers (4,98%, $p<0,05$). The female skiers improved roller-ski performance (-0,72 seconds) and the male skiers (-0,87) (Table 1 and 2).

Table 1: Comparison Between Pre and Post Test in Female Athletes

Parameters	PRE-TEST x±ss	POST-TEST x±ss	p	% Change
MaksVO_2 (ml.kg.dk^{-1})	58.0±3.09	60.2±3.1	0.012*	3.78
$HR_{max.}$ (beats.min^{-1})	190.4±9.56	185.6±10.13	0.011*	-2.56
Max. Anaerobic Power (Watt-kg-1)	8.76±0.92	9.51±0.64	0.012*	8.56
Average Anaerobic Power (Watt-kg-1)	6.74±0.67	7.25±0.79	0.011*	7.57
Min. Anaerobic Power (Watt-kg-1)	4.36±0.64	4.99±0.66	0.012*	14.5
RL/Quadriceps N.m (60^0/sn)	109.3±28.2	119±26.8	0.011*	8.92
RL/Hamstring N.m (60^0/sn)	54.4±12.7	60.8±13.3	0.005*	11.8
LL/Quadriceps N.m (60^0/sn)	102.5±17.2	111.9±18	0.011*	9.13
LL/Hamstring N.m (60^0/sn)	53.4±15.2	59.5±17.8	0.005*	11.5
500-m time trial (sn) (pole)	2.36±0.59	2.28±0.6	0.012*	-3.39
500-m time trial (sn) (no pole)	3.16±0.56	3.04±0.68	0.012*	-3.80

Table 2: Comparison Between Pre and Post Test in Male Athletes

Parameters	PRE-TEST x±ss	POST-TEST x±ss	p	% Change
MaksVO_2(ml.kg.dk^{-1})	67.1±3.35	69.9±3.56	0.005*	4.19
$HR_{max.}$ (beats.min^{-1})	189.1±13.44	182.6±14.28	0.005*	-3.44
Max Anaerobic Power (Watt-kg^{-1})	11.3±0.69	12.2±0.76	0.005*	8.11
Average Anaerobic Power (Watt-kg^{-1})	8.37±0.48	8.89±0.55	0.005*	6.21
Minumum Anaerobic Power (Watt-kg^{-1})	5.35±1.18	6.01±0.84	0.005*	12.3
RL/Quadriceps N.m (60^0/sn)	191.6±19.8	209.2±23.13	0.005*	9.19
RL/Hamstring N.m (60^0/sn)	96.6±15.2	107.5±12.7	0.005*	11.3
LL/Quadriceps N.m (60^0/sn)	187.5±26	208.8±26.2	0.005*	11.4
LL/Hamstring N.m (60^0/sn)	95.4±13.1	102.3±14.2	0.005*	7.23
500-m time trial (sn) (pole)	1.49±0.05	1.45±0.05	0.004*	-2.68
500-m time trial (sn) (no pole)	2.4±0.15	2.29±0.26	0.005*	-4.58

DISCUSSION

It was hypothesized in this study that the in-preseason roller-ski aerobic high-intensity interval training would allow cross-country ski athletes to increase isokinetic leg muscle strength and 2-km time trial performance. This study points out important influences of roller-ski interval training on performance in cross-country skiers. It has been shown that during the endurance exercises, adding two interval seasons per week for 4 to 8 weeks improves performance by 2% to 4% among well-trained endurance athletes (21). Our present study supports this observation, because the sport-specific interval training tends to improve performance in cross-country skiers in both female and male skiers.

Studies in recent years have emphasized the specific maximal strength, explosive strength and strength endurance capacities of cross-country skiers, especially in sprint races (22). However, data regarding testing and training of the lower-body strength and performance are scarce. The skating technique involves pushes with the propulsive legs (25) in different forms of double poling (3). So, the legs have significant effects on ski performance, especially in double poling performance (5, 6, 7, 28). As we have noted before, upper-body strength capacities on skiing performance have examined by several studies. Nesser et al. (14) studied that, in junior cross-country skiers, 4 commonly training program for the development of upper-body power and found that training using a roller-

board with 5-12 RM and explosive speed is effective in developing upper-body power. Similarly, Stöggl et al. (24) tested specific upper-body power and strength and also maximal power, explosive strength, and power-endurance predict double-poling sprint performance over race distance in elite cross-country skiers on a rollerboard. They indicated that the improvement of specific explosive strength and maximal power. Nilsson et al. (15) conducted an investigation, in well-trained cross-country skiers, regarding upper body 20-s or 180-s interval training to test upper body power output. And at the end of the study they stated that 6 weeks of 20-s or 180-s double poling interval training, led to development in upper body power output in both 30-s and 6-min tests. Therefore, further studies also need to investigate leg muscle strength to enhance performance in cross-country skiers. These findings obtained from current study provide important information for coaches and athletes.

The results indicate that the manipulation of roller-ski aerobic high-intensity uphill interval training had a significant effect on isokinetic strength with respect to hamstring and quadriceps peak torque at 600/sec. Maximal isokinetic force of right leg extensors and flexors increased in both female and male skiers (by 10,32%, 20,97%; 9,97%, 14,3%, respectively) at 600/sec velocity. Similarly left leg extensors and flexors increased in both female and male skiers (by 10,63%, 19,47% ; 10,8%, 13,31%, respectively) at 600/sec velocity. Martin et al. (12) found that high-intensity aerobic interval cycling can promote gains in quadriceps strength in male collegiate cyclists. Pincivero et al. (17) compared the effects of short rest interval training and long rest interval training on quadriceps and hamstring isokinetic strength at 600/sec in healthy colleges. They showed that significant main effects between the two groups for quadriceps average power at 600/sec and quadriceps peak torque, improvements were greater in long rest interval group than short interval group, at 1800/sec. Also, Mikola et al. (13) showed that, in male cross-country skiers, concurrent explosive strength and endurance training led to improvements in explosive force associated with increased rapid activation of trained leg muscles. And they also observed an increase in 30-m double poling test performance.

These improvements observed in our study may be due to both the roller-ski materials and wheels, which may have the effect of increase in pushing performance during uphill training and also technique dependent.

In the present study, all training groups significantly decreased 2-km roller-ski skating time for female and male skiers by 4,16% and 6,47%, respectively. Sandbakk et al. (18) reported in their study that the higher training speeds might have positive effects on sprint performance during the training sessions performed as roller skiing. This approach is parallel with our results that aerobic high-intensity interval training resulted in a significant improvement in roller-ski time trial performance in cross-country skiers. The findings of Losnegard et al. (11) who showed that the gender-related increase in roller-ski performance (time trial) was greater in female skiers than in males after supplemental heavy strength training to endurance training. A study performed by Nilsson et al. (15) indicated that significant improvements in power output in cross-country

skiers after upper body double poling interval training. A few studies have examined the effects of aerobic high-intensity training on roller-ski performance. One of these studies, Sandbakk et al. (19) including junior cross-country skiers, after the 8-weeks intervention long-term high-intensity period, the long-interval group improved 12-km roller-ski skating time by 6,8 ± 4.0%. Similarly, Sandbakk et al. (18) found significant improvement in sprint performance (1.5-km) in ten male and five female elite junior cross-country skiers divided in to two groups, with one group following a high-intensity endurance training performed in level terrain, and the other group following their baseline training. At the end of the study, they reported that intervention group improved sprint performance (13 ± 3 seconds) after 8-week high-intensity intervention period.

The current study showed that roller-ski aerobic high-intensity uphill interval training is closely related to 2-km time trial performance in cross-country skiing. These decreases may be associated with applied intervention training program and consequently increased leg muscle strength.

CONCLUSION

This study has shown that aerobic power, anaerobic power and leg strength were increased during the pre-season by a specific training program based on roller-ski uphill intervals at high intensity. Besides, this study shows that improvements in time-trial performance. The applications from this study apply both for coaches and scientists by showing that VO_{2max} and anaerobic power and leg strength can be improved both by adding roller-ski aerobic high-intensity interval sessions with a long duration at a higher intensity.

RECOMMENDATIONS

With reference to the training effects found in our study, we suggest that the skiers should integrate the roller-ski aerobic high-intensity interval models in their training programs. The fact that the longer duration intervals additionally enhanced endurance performance and the anaerobic capacity is an important finding for practice. This investigation was only performed over 6-week, and the effects of high-intensity. More studies are needed to evaluate the roller-ski interval trainings in cross-country skiers. Additionally, future studies are needed to carry on with a control group in order to detect differences between all groups.

ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the participating athletes for their cooperation during the study, which was supported by the Ankara Büyükşehir Belediyesi.

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THE ANALYSIS OF RELATIONSHIP BETWEEN UNIVERSITY STUDENTS' BREAKOFF PHENOMENON AND DIFFERENT VARIABLES

Mucahit DURSUN, Erdogan TOZOGLU, A. Vahit DOGAR

Öner GULBAHCE

Introduction

In literature, loneliness is defined by several authors in various ways. Loneliness is assessed as a situation with objective, fully subjective or existential conditions. However, all these views have one fixing in common that they all see loneliness as a painful experience. Peplau and Perlman (1982) perceive loneliness in the sense of human relations and claim that this is a feeling caused by one's disappointment from his or her expectationsand real relations. According to this view, a person, without an objective cause, can feel lonely even if she or he is with another person (11).On the other hand, Mijuskovic (1987) stating that every person is existentially alone, claims that avoiding loneliness is the primary force that influences human behavior (7). Loneliness is also commonly observed among university students (2).Many youngsters who study in the university. away from their families struggle to become a member of a group, to have a profession, to guide their future and to adapt to a new school, a new city and a foreign environment, bring out different problems and as a result, students may be alienated from the traditional environment and themselves (17).

According to the surveys, there are two different types of loneliness, which are social and emotional loneliness. Social loneliness, coming to existence with one's disconnection or lack of connection with the social network of peers with whom he or she share views and information; is defined as having no social connections or as the rejection of the individual from a community. It has been stated that individuals who are in this type of loneliness may think that they are in frustration or be rejected by friends (15). Emotional loneliness on the other hand corresponds to absence of sincere and close emotional relations between people. Emotional loneliness in a way, shows up with the disappearance of very important relations such as death and divorce. Removal of such loneliness can be accomplished by establishing important relationships similar to those once existed (13,14).

Humans who have always struggled to survive has provided education for future generations with the past's cultural experiences. Thorough this time, humanity has also contributed to the whole education of individuals by creating a sport culture (16). Sport is a very important communication tool to create close relationship between people. Sport is considered as a soci-

al behavior that appeals to human body and psychology. Sport, securing the mental and physical health of the individual is effective in ensuring the social harmony (9).Sport and physical activity not only creates positive and effective social results, but also provides positive effects on physical and mentalhealth. It is stated that, through sports activities; individuals learn to share and to help in a society,find out to accept victory and losing, to respect other people's opinions and thoughts, to develop feelings such as social responsibility as a result of working together and to provide the socialization period in the society with a conclusion of the development of a sense of social responsibility (12).

Material And Method

The object of this study is to analyze the relationship between university students' breakoff phenomenon and different variables. The study is applied to 368 sample individuals between the ages of 19 and 35 of which, 135 are female and 233 are male, in 2016-2017 academic year of Ataturk University, Faculty of Education.

The independent variables that were used in the study has been prepared by the researcher. The Ucla Loneliness Scale (ULS), which was developed by Russel, Peplau and Ferguson and was translated to Turkish by Demir, in 1989, has been used in order to determine the levels of breakoff phenomenon of individualsin the study. The UCLA loneliness scale consists of 20 items, 10 of which are plain and the other 10 are coded in the opposite direction. Individuals are asked to specify how often they come across the situations in the materials on a four point Likert scale. Inthe scale, positive expressions are scored as "I never experience" 4, "I rarely experience" 3, " I sometimes experience" 2, "I frequently experience" 1 point; whereas materials containing negative expressions are scored as "I never experience" 1, "I rarely experience" 2, "I sometimes experience" 3, "I frequently experience" 4 points. The highest score that can be earned from the scale is 80 and the lowest score is 20. Cronbach's alpha factor is 0.96. As the score on the scale increases, the breakoff phenomenon also increases (1).

Frequency distribution while determining the demographics for the analysis of the data and T test in order to investigate the relationship between two independent variables and breakoff phenomenon are also made use of in the study. On the other hand, analysis of Anova tests are carried out to investigate the relationship between more than two independent variables and breakoff phenomenon. The LSD test has been used to determine the group from which the differences originated. All these tests have been analyzed with SPSS 21 program and the significance level is taken as $p<0,05$.

Findings

In this part, the following results are given: Frequency distributionsconcerning the demographic characteristics of participant students, while determining the demographics for the analysis of the data, Independent - Samples

T Test results in order to investigate the relationship between two independent variables and breakoff phenomenon and One – Way Anova Test results to investigate the relationship between more than two independent variables and breakoff phenomenon.

Table 1: Demographic Characteristics of Students Attending the Survey

Variable		Number (N)	Percent (%)
Cinsiyet	Female	135	36,7
	Male	233	63,3
	Total	368	100,0
Yaş	19 years and under	23	6,3
	Between 20-22 years	136	37,0
	23 years and over	209	56,8
Aile Yapısı	Nuclear family	204	55,4
	Extended family	142	38,6
	Broken family	22	6,0
Spor Yapıyormusun?	Yes	239	64,9
	No	129	35,1
	Total	368	100,0
Haftalık Spor Yapma Süresi	3 hours and under	134	36,4
	Between 4-5 hours	58	15,8
	6 hours and over	47	12,8
	I don't play sports	129	35,1
Spor Türü	Team sport	46	12,5
	Individual sports	114	31,0
	Both	79	21,5
	No sports	129	35,1

The research has been carried out on a total of 368 students, between the age range of 19-23 of which, 135 female and 233 male. It is found out that 239 of the students work out and 129 students do not. It is also determined that students who work out mainly do it 3 hours and under in a week and also they predominantly are interested in individual sports.

Table 2: Results of T-Test according to Breakoff Phenomenon and Gender of Students

Gender	N	X	Ss	t	p
Female	135	53,87	6,474	2,526	0,016*
Male	233	52,26	5,544	2,424	

Among the averages of the scores of male and female students on the breakoff phenomenon scale, it is found out that there is significant differences in P; 0.05 level. It is also found out that breakoff phenomenon levels in female students are higher than male students.

Table 3: The Averages of the Student Scores of Breakoff Phenomenon Scale with Their Ages and the Values of Standard Deviations and Differences between these Averages

Age	N	X	Ss	F	P	Difference
19 years and under	23	52,30	7,963	,110	,896	-----
Between 20-22 years	136	52,85	4,654			
23 years and over	209	52,92	6,446			
Total	368	52,85	5,945			

Among the averages of the scores of students of different ages on the breakoff phenomenon scale, it is deduced that there is no significant differences in P; 0.05 level. Although there is no significant difference,it is a remarkable result that as one grow older breakoff phenomenon levels also slightly increase.

Table 4: The Averages of the Student Scores of Breakoff Phenomenon Scale with Their Family Structure and the Values of Standard Deviations and Differences between these Averages

Family Structure	N	X	Ss	F	P	Difference
Nuclear Family	204	52,63	6,147	,110	,004*	3>1,2
Extended Family	142	52,54	5,453			
Broken Family	22	57,00	5,790			
Total	368	52,85	5,945			

Among the averages of the scores of students with different family structures, on the breakoff phenomenon scale, it is found out that there is significant differences in P; 0.05 level. It is also determined that students with a broken family shows higher results concerning breakoff phenomenon compared to students having a nuclear or extended family.

Table 5: T-Test Results According to Work Out Routines of Students and Breakoff Phenomenon Levels

Work Out	N	X	Ss	t	p
Yes	239	53,36	5,879	2,218	**0,027***
No	129	51,92	5,976	2,208	

Among the averages of the breakoff phenomenon scale scores of students who work out and those who do not, it is found out that there is significant differences in P; 0.05 level. It is also deduced that breakoff phenomenon levels of students who work out are higher than students who do not.

Table 6: The Averages of the Student Scores of Breakoff Phenomenon Scale with Their Family Structure and the Values of Standard Deviations and Differences between these Averages

Work Out Routine in a Week	N	X	Ss	F	P	Difference
3 hours and under	134	53,40	6,300	,011	,989	-----
Between 4-5 hours	58	53,26	5,866			
6 hours and over	47	53,36	4,632			
Total	239	53,36	5,879			

Among the averages of the breakoff phenomenon scale scores of students with a different weekly exercise period, it is found out that there is no significant differences in P; 0.05 level.

Table 7: The Averages of the Student Scores of Breakoff Phenomenon Scale with Their Family Structure and the Values of Standard Deviations and Differences between these Average

Sports Type	N	X	Ss	F	P	Difference
Team	46	54,46	3,650	1,589	,206	-----
Individual	114	53,47	6,669			
Both	79	52,54	5,652			
Total	239	53,36	5,879			

It is found out that there is no significant differences in P; 0.05 level, between the averages of the breakoff phenomenon scale scores and the kind of sport students are doing.

Conclusion and Recommendations

The study has been carried out ona total of 368 students, between the age range of 19-23 of which, 135 female and 233 male. It is determined that 239 of the students work out and 129 students do not. It is also determined that students who work out, mainly do it 3 hours and less in a week and they are mostly interested in individual sports.

Among the averages of the scores of male and female students on the breakoff phenomenon scale, it is found out that there is significant difference. It is determined that breakoff phenomenon levels in female students are higher than male students. Kutlu found that girls' breakoff phenomenon levels were higher than boys in his study regarding the levels of breakoff phenomenon of young people living with their families and orphanages (3). Medora and others (1987) also concluded that breakoff phenomenon levels in female students are higher than male students (5). What is more, other studies also indicates a significant relationship between gender and breakoff phenomenon levels and are in parallel with the results of our study.

It is deduced that there is no significant difference among the averages of the student scores of different ages on the breakoff phenomenon scale. Si-

milar studies have also revealed similar results (7). A study carried out on university students of a different culture revealed that age does not affect break off phenomenon levels (4). Other studies do not indicate a significant relationship between age and breakoff phenomenon levels and are in parallel with the results of our study. Demir, in his work regarding the validity and reliability of breakoff phenomenon scale, indicates that as the age gets older the level of breakoff phenomenon decreases (1).

Among the averages of the student scores with different family structures on the breakoff phenomenon scale, it is determined that there is a significant difference. It is also revealed that students who are from a broken family tend to have higher results on breakoff phenomenon levels with regard to nuclear and extended families. A study which was carried out by Yılmaz and friends on the other hand, revealed that there is no connection between family structure and breakoff phenomenon levels (17). Analyzed results shows an incongruity between Yılmaz's study and our work.

Among the averages of the breakoff phenomenon scale scores of students who work out and those who do not, it is found out that there is significant difference. It is also deduced that breakoff phenomenon levels of students who work out are higher than students who do not. Yazıcılar revealed that breakoff phenomenon levels of exercising females are less than those who do not (16).Özçelik and friends also revealed that there is a significant difference between students who work out and those who do not with regard to breakoff phenomenon (9).The results of these studies are in parallel with the results of our study.

There has been no significant differences among the averages ofbreakoff phenomenon scale scores of students who exercise different durations in aweekly exercise routine. The studies, which investigate the connection between breakoff phenomenon levels and work out routines, reveal that students who exercise less have lower scores on breakoff phenomenon levels (9, 16, 10, 2). The results of these studies are in parallel with the results of our study.

Among the averages of the breakoff phenomenon scale scores of students with a different weekly exercise period, it is found out that there is no significant difference.The studies, which investigatethe connection between work out routines and breakoff phenomenonreveal that students who work out more frequently have a lower level of breakoff phenomenon than those who exercise less.

There has been no significant differencebetween the averages of breakoff phenomenon scale scores of students and the sports types they perform. Özçelik and his colleagues also found that there was no statistically significant difference in the results of the comparison between the sport branch and the level of loneliness.

What is more, it is revealed that there is no significant difference between the average scores of the types of sports students perform and the scores of loneliness attitude scale.Özçelik and his colleagues also found that there was

no statistically significant difference in the results of the comparison between the sport branch and the breakoff phenomenon level (9). This outcome also shows a parallelism with this study.

Studies in the literature concerning our topic including this work suggest that sports have positive effects on breakoff phenomenon level. Thusit is suggested that individuals with different demographic characteristicsshould be directed to sportive activities in order to be successful and to reduce the breakoff phenomenon level in school, work and social life.

Note: A part of this paper was presented as an oral presentation at the 15th International Congress of Sport Sciences.November 15-18 ANTALYA.

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CHAPTER 3

OBESITY IN CHILDHOOD

Halil TANIR[1]

Obesity is defined as the state of having a higher body fat ratio in proportion to basic components such as muscle, bone and water and the caloric imbalance between energy consumed and energy expended (Yayan & Çelebioğlu 2018). Obesity is known to occur as a result of the complex interaction among genetic, metabolic, and behavioral factors (Gracia-Marco et al. 2011). It can be observed not only at later ages but also starting from very early ages. Adult-onset metabolic disorders could occur in infants with intrauterine growth restriction, which may affect the adiposetissue, liver, islet beta-cells, kidneys and the vascular system. These disorders are a significant risk factor for the development of obesity. In addition, children are prone to become obese in adulthood also due to the effect of non-metabolic factors (Zitsman et al. 2014). It is known that in the majority of the adults with obesity, the onset of the disorder dates back to childhood. One-third of obese children and 80% of obese adolescents remain obese when they reach adulthood. The persistence of obesity which especially starts between the ages of 4-11 in adulthood triggers health problems such as hypertension, cardiovascular diseases and diabetes (Şimşek, 2005).

Obesity is an important nutritional disorder that affects 25-30% of children and adolescents. Childhood obesity has an increasing prevalence all around the world andparticularly in developed countries(Berberoğlu, 2008). Hepatic steatosis was ultrasonographically detected or transaminase level was observed to increase in laboratory findings in 20% of obese children. It is also emphasized that obese children suffered from silent liver diseases and overweight children should be treated in order to prevent this destruction. Furthermore, it is stated that in many countries type 2diabetes occurred in the early period, childhood obesity emerged as a strong risk factor for this disease and early diagnosis and treatment of obesity should be the basic approach for preventing the long term complications of type 2 diabetes. The increase in type 2 diabetes observed in adolescence is attributed to the failure of efforts to prevent obesity and it is emphasized that one of the frequent common denominators in adolescents with type 2 diabetes is body mass indexes of 35-38 kg/cm^2 (Pinhas &Zeitler 2000).

Obesity has historically been attributed to the result of a bad lifestyle, psychological character defects and lack of willpower. Exogenous factors in the etiology of obesity are genetics, age, gender, eating habits, physical activity, socio-economic and cultural status and psychological effects, while endogenous factors can be listed as hormonal factors and obesity that develops

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depending on a genetic disorder. At the same time, genetic factors that include individual predisposition are also mentioned and studies are pursued in this direction. On the other hand, contemporary approaches view obesity as a result of the modern environment (Hurt et al. 2011). However, the rate of increase of obesity cannot be explained by these traditional approaches alone (Sallis & Glanz 2006). Numerous factors play a role in the development of obesity along with continuous high-calorie food intake. The first law of thermodynamics and energy balance adjustment can be listed among these factors. Although not completely understood, the pathophysiology which involves an interaction between genetic and environmental factors plays a significant role (Hurt et al. 2011). The primary reason for the increase in the incidence of obesity within the last 10 to 20 years seems to be the transition from a lifestyle based on physical strength to a lifestyle based on inactivity, industrialization, and consumption of calorie-intensive food. The nutrition preferences, socio-economic and cultural characteristics of the family, which is the first nurturing environment of the child, and the level of physical activity can be listed among preliminary factors (İnal & Şahiner 2013). From a socio-economic point of view, the primary reason of obesity is the environment and behaviors (Pengpid & Peltzer 2013).

With developing technology, physical activity has significantly decreased in children and adolescents. Children today prefer to spend their free time in front of the television or computerrather than playing in parks or gardens. Nowadays, the balance of calorie intake has also collapsed with the adoption of wrong nutrition habits (fast-food style diet, increase in convenience food consumption, vitamin and fiber-poor diet, food consumption in front of the television) (Bagriacik et al. 2009).

Sleeping time is also indicated to have an effect on the development of obesity. As sleeping time increases, not only does the calorie consumption decrease, but also there remains no adequate time for exercise. On the other hand, short sleeping time is also listed among the causes of obesity(Must & Parisi 2009).

The incidence rate of obesity in the preschool period has been gradually increasing all over the world (Wang & Lobstein 2006). In this period, mothers need to take a significant role in preventing obesity in children, because mothers have an important role in sharing their diet and activities with their children. Strategies for determining and eliminating preventable risk factors should be developed in order to decrease and prevent obesity in preschool children (Jain et al. 2001).

Obesity brings along varioushealth problems. Obesity that starts in childhood and the insulin resistance it causes triggers the occurrence of type 2 diabetes at very early ages, hypertension in children and adolescents, and cardiovascular episodes in adulthood by leading to metabolic syndrome together with accompanying hyperlipidemia. There is a close relationship between obesity and diabetes, hypertension, musculoskeletal system problems, hyperlipidemia, respiratory system diseases and cerebrovascular disorders.

Obesity predisposes children and adolescents to such illnesses or decreases their quality of life by causing these illnesses to occur at earlier ages (Cali & Caprio 2008).

This rapid increase in childhood obesity at the global level also negatively affects the economies of countries by causing several physiological and psychological problems. Besides, it may cause psycho-social problems such as a decreased self-esteem, depression and withdrawal from social relationships. Because of thesenegative reasons, the prevention,early diagnosis and treatment of childhood obesity areimportant for preventing obesity-related complications that may occur in childhood and adulthood(Karasalihoğlu, 2005).

DETERMINING OBESITY IN CHILDREN

Although obesity can be phenotypically distinguished at once, there are various diagnostic methods that objectively measure the amount of body fat. The measure generally used for the diagnosis in children is Body Mass Index (BMI), which is simple, practical, affordable and more reliable. BMI is calculated by dividing the child's weight (in kilograms) by the square of the child's height (in meters). BMI percentiles are used because of the fact that BMI varies depending on age and gender in childrenin a different way from adults. According to percentile curves, those with a BMI above the 85th percentile are classified as overweight and those with a value above the 95th percentile are classified as obese. Another easy method is measuring weight with respect to height. If the weight is over 120% of the height, the case is defined as obesity. More sophisticated methods such as body densitometry through water weighing, total body water calculation, total body potassium measurement, neutron activation analysis, ultrasonography (USG), computerized tomography, magnetic resonance imaging, bioelectric impedance analysis (BIA), total body electrical conductivity (TOBEC), dual photon absorptiometry (DPA) and dual-energy X-ray absorptiometry (DEXA) can be used for directly calculating the body fat ratio. However, these methods are not only difficult to apply on children but are also very expensive examinations. Another method is the measurement of the skinfold thickness by using a special tool named caliper. The method is based on the rationale that half of the total body fat is subcutaneous. The most suitable place for measurement in children is the triceps skinfold thickness. Again for children, above 85% on percentile curves is considered as overweight and above 95% is considered as obese depending on age and gender. A disadvantage of this method could be that children may be unwilling to have skinfold thickness measurement. Although BMI is the diagnostic method used for overweight and obese children, it does not provide precise information about their body fat ratio (Hatipoğlu et al. 2010). For this reason,waist circumference, waist circumference/height ratio and neck circumference measurements can be performed (Taylor et al. 2002). Neck circumference measurement is a quite good method for measuring body fat ratio in children and adolescents (Guo et al. 2012). However, there are no parameters determined for children regarding these three methods in the resources (Magalhães et al. 2014). Again, waist circumference/height ratio

is indicated to be highly important for childrenin several resources. The increase of this ratio above 0.5 is related to an increase in the fat ratio (Ricardo et al. 2012). There is a proportional relationship among waist circumference measurement, BMI, and body fat ratio. According to several studies, waist circumference provides us sufficient information regarding abdominal obesity. A waist circumference above 90 percentile is considered as a critical value (Brannsether et al. 2011).

PREVENTING OBESITY IN CHILDREN

Efforts for protecting individuals from obesity should continue for a lifetime starting from the perinatal period. For this reason, health professionals should perform preventive interventions to protect all age groups in the society from obesity. The preventions are classified as primary, secondary, and tertiary. Primary prevention involves interventions that aim to decrease Body Mass Index (BMI) in the society, keep individuals at the proper weight for their age and that target all the individuals in the society. Secondary prevention involves interventions targeted at high risk individuals whose parents are obese and who have a history of type 2 diabetes in the family. The aim of the interventions performed within this scope is to increase individual competence to protect oneself from excessive weight gain and develop positive health attitudes. Tertiary prevention involves practices performed to decrease the weight of overweight and obese individuals and prevent further weight gain(Müller et al. 2001).

A preventive strategy against obesity should be adopted starting from the early periods of life and mothers should be encouraged to breast-feed for at least 6 months, because the incidence of obesity is lower in children who were breast-fed infants. It is necessary to measure the height and weights of children, calculate their BMI and assess their physical conditionsevery year. Families should constantly be informed about preventive behaviors (Waters et al. 2011). Informing about healthy diet and physical activity should be a routine part of a child's medical examinations (Khan et al. 2009).

The concept underlying obesity management is behavioral change. The basic principles of behavioral change are giving up undesirable behaviors related to eating, suppressing behaviors that cannot be given up and continuing and repeating desirable eating and exercise behaviors. The important thing is to maintain the acquired behavior throughout life (Rabbitt, 2012).

BMI measurements are suggested in determining a child's obesity or risk of obesity. Children with a BMI at the 95th percentile or higher are under high risk in terms of accompanying diseases related to obesity. For this reason, it is suggested to measure the heights and weights of children and calculate their BMI values (Yıldız et al. 2015). BMI should be determined and evaluated for obesity in childrenevery year, especially in those with intrauterine growth restriction or a history of obesity in the family(Khan et al. 2009).

Diet regulation and sustainable lifestyle changes with exercise are the cornerstones of obesity management. A successful weight management program

includes strategies that decrease weight gain and increase physical activity. Small changes in nutrient intake and physical activity may have significant effects on body weight and obesity. Physical activity and modifications in eating habits should be encouraged through emphasizing healthy changes. Restrictive diet and excessive exercise should not be encouraged since they can cause the development of eating disorders especially in adolescents and young people (Haerens et al. 2010).

Children should be encouraged to take part in exercises. Exercise increases insulin sensitivity and muscle glycogengeneration by improving glucose transport to muscle cells. In addition, physical activity increases the fat free mass and the volume of muscular tissue which can transport glucose. This results in a long-term increase of insulin sensitivity. Insulin sensitivity is considerably increased by 40-60 minutes of daily aerobic exercise, but if the exercise is not continuous, the increase in insulin sensitivity also gets reversed. Furthermore, lack of physical activity is associated with an increase in endothelial function disorder, which contributes to the development of atherosclerosis. It is necessary to emphasize the importance of continuing physical activity to decrease the risk of developing a cardiovascular disease. An increase in physical activity helps protect the suitable metabolic rate for children and at the same time controls appetite and regulates psychological wellbeing. Sedentary activities such as watching television and playing computer/video games should be limited to a maximum of two hours a day. The daily physical activity for children should be planned as 60 minutes and they should be encouraged to participate. Parents can encourage children by rewarding positive behavior with praise and may approve special privileges as a reward for achieving certain goals. The use of reinforcements (giving points for checkboxes, sticker activities like stars/smileys) can be sources of motivation for all the family members to achieve the planned short and long-term goals (Yıldız et al. 2015).

Parents have a significant role in the development of their children's nutrition preferences and the formation of their own nutrition habits. The type and amount of the food in the nutrition habits of the parents unintentionally serves as an example for the child. If one or both of the parents are obese, the child is under the risk of obesity. This association results in children who are adapted to the obesogenic lifestyle determined by their parents, which may lead to a sedentary lifestyle and a poor diet (Pittson & Wallace 2010). The connection between obesity, increasing portion sizes and a poor diet is stated as an indicator of an insufficiency in parental skills related to predicting the suitable portion size and buying groceries. Besides, there are also social factors which have an important effect on the eating styles of families. Although parents and children mayhave a correct understanding of what healthy food is, the conditions of the food, marketing and cost may affect their decisions. In developed countries, dual-income families that have less time for eating and in which the mother works eat together at home less compared to other families. Compared to previous years, more families eat out and snacks are generally consumed instead of regular meals.In addition, convenience foods

that include high levels of sugar and fat are easily accessible, and because of their low prices, healthy food preferences of individuals may be negatively affected by these factors. For this reason, "family-based behavioral treatment" approach, which involves not only the child but also the family members, is important in obesity management. Behavior change methods such as self-observation, stimulus control, alternative behavior development, reinforcement, self-rewarding, cognitive restructuring and social support are also useful in obesity management. For example in self-observation, which is an approach that can be implemented by children who are at schooling age and above, children are asked to record the amount and time of the food they consume and their physical activity. This at the same time is a good method to observe the child's state of development. Thus, it improves the family's and child's observation of their own eating and exercise habits and enables them to experience the feeling of success. Children can be given self-observation brochures on which the weekly food they consume and the energy and fat contents of these nutrients are presented (Nauta et al. 2009).

The family's willingness, participation and support to practices for protection against obesity are highly important for the success of the interventions. It is necessary to start the practices when the family is willing and ready, and the child and the family should be informed about obesity and its medical complications. After the informing stage, the family should be taught how to monitor the child's height and weight and informed about the importance of assessing their child's nutrition and physical activity together with personal characteristics. At the same time, it is suggested to emphasize that the rewarding and praising behavior of parents for reinforcing the child's positive behavior is effective in the child's adoption of a positive eating behavior. The family's and the child's level of motivation is highly important in obesity management. If they do not perceive obesity as their own problem, they might have unrealistic expectations regarding the duration of treatment and exhibit attitudes like not being able to prepare oneself for a long-term endeavor. For this reason, it is necessary to increase the level of adaptation to family-based programs which enable the family and the child to see that obesity originates from their own lifestyles and is a problem related to their own selves (Ergül & Kalkım 2011).

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