

THE INVESTIGATION OF THE EFFECTS OF 9-WEEK ELASTIC BAND EXERCISES ON PHYSICAL PARAMETERS

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A Çalışma Deseni (Study Design)

B Verilerin Toplanması (Data Collection)

C Veri Analizi (Statistical Analysis)

D Makalenin Hazırlanması (Manuscript Preparation)

E Maddi İmkânların Sağlanması (Funds Collection)



Abstract: Elastic bands are one of the functional equipment used for physical development. The elastic band, which has recently become a widely used material for exercises, is thought to be a major factor that helps the body to develop and change. Present paper aimed to investigate the effects of the elasticity band on the physical properties of university students who have been taking gymnastics lessons. 34 students with a mean age of 19.76 ± 3.25 years were enrolled voluntarily. In the study, physical measurements of the subjects were taken before and after 9-week exercises to observe the physical changes. These measurements consisted of body fat percentage (BFP), handgrip strength (right-left), flexibility, leg strength. SPSS 22.0 program was used for the statistical analysis of the data obtained after the measurements. In the analyses of the data in addition to descriptive statistics, paired-samples t-test was used. According to analyze results, after the nine-week elastic band exercises flexibility, waist circumference measurement, back strength, leg strength, and BFP values of the subjects were found to improve significantly. As a result, this paper showed that regular band exercises have positive effects on physical appearance.

Keywords: Elastic band, Flexibility, Force, Hand-grip

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1. INTRODUCTION

We met the elastic band as a sports material, having presented a different visuality and training richness created by a new material like innovative trends, precisely as we confront during life. An elastic band as spelling and pronunciation can be used under various nomenclatures: i.e., tera-band or resistance band. Even if the movement restrictions caused by the technology epoch and all-around automatization seems like time-saving, it has become one of the most critical factors for the development of many diseases due to human's physical inactivity. In order to increase the movement and physical activity desire, it has become an enormous necessity to make exercising attractive, accessible, and preferable. Thus it has become possible to use various colorful materials and attractive in visual sense i.e., elastic band that purposes promoting sportive activities. Further regular utilization of such auxiliary materials showed beside the exercise to be a shaper quite helpful for a smooth posture, a beautiful body stance.

There are different studies and opinions regarding the elastic band. Opinions are submitted, which are, in general, positive. Elastic bands are quite more preferred because they are more suitable for the training of different muscle groups, more accessible, and more affordable (Hostler et al., 2001; Thomas et al., 2005). The elastic band also provides a broader range of motion and also increases muscle power, resistance, and eccentric muscle contraction ability (Hostler et al., 2001; Patterson et al., 2001). In order to obtain better efficiency, it is possible to gain quite higher performances by increasing the rigidity of the elastic band (Kraemer et al., 2001). The elastic band can increase the physical appearance and thus indirectly the life quality concerning physical appearance and functionality (Holviala et al., 2006; Takarada and Ishii, 2002).

This study aimed to define the effects of 9 weekly elastic band exercises on the physical appearance of the students.

2. TOOLS AND METHOD

The study was conducted providing the students of the 1st class of the Physical Education and Sports Teaching Department of the School of Physical Education and Sports of the Erzincan University 9 weeks long weekly regularly two days gymnastics lessons besides the application of elastic band exercises. Totally 34 students consisting of 12 females and 22 males with an age average of 19.76 ± 3.25 years participated in the study. Official identity cards were used for the determination of the participant's ages. Their lengths were measured using a wall-mounted Metlife brand length measurer, and their body weights were measured using a CVS DN 1722 brand digital bascule.

Further physical parameters were waist and hip measurements (cm), flexibility (cm), back and leg strength (kgf), right-left hand paw strength (kgf) tests. Skinfold thickness (biceps, triceps, suprailiac, subscapula) values obtained with

Skinfold Caliper according to the Durning-Wormesley formula. Also, for the determination of the body mass, the body fat percentages were obtained with the Siri formula calculated according to the Durnin-Womersley formula (Durnin and Womersley, 1974; Siri, 1956).

$$\text{Siri Formula: } (4.950/\text{body density} - 4.5) \times 100$$

And the Durning and Womersley formulas used in proportion to the ages means;

$$\text{Male - 17 - 19 age, } d = 1.1620 - 0.0630.x$$

$$\text{Female - 16 - 19 age, } d = 1.549 - 0.0678.x$$

$$\text{Male - 20 - 29 age, } d = 1.1631 - 0.0632.x$$

$$\text{Female - 20 - 29 age, } d = 1.599 - 0.0717.x$$

* x = total of the skin thicknesses (Biceps, Triceps, Supscapula, Suprailiak) and their logarithmic values (\log_{10}). * d = body density

Exercise Program; the gymnastic and elastic band pieces of training were applied regularly to the participants weekly two days for a total time of 9 weeks (table 2). Every exercise started with 10 minutes of the warm-up run, followed by 5 minutes of activity, 5 minutes of flexibility exercises as a totally of 20 minutes of warm-up (table 2). Additionally, exercises were included with green resistance bands of mid and advanced level difficulty grades. At the end of each exercise, cool-down exercises were ensured through active and passive stretching moves. The nine weekly exercise contents performed using elastic bands (tables 1 & 2).

Table 1. Regional movement practices in exercise program

1	2	3	4
Biceps Curl	Squat and Biceps Curl	Double Arm Bent Over	Bent-Over Lateral Raises
5	6	7	8
Push Motion	Leg Raises	Lateral Raises	Bent-Over Barbell Row

Table 2. Weekly exercise program

Week	Weekly Training Days (pcs)	Number of Sets (pcs)	Number of repetitions (pcs)	Rest Between Sets (Sec.)	Rest Between Movement (Sec.)
1.	2	3	10	15	30
2.	2	3	10	15	30
3.	2	3	10	15	30
4.	2	3	12	15	30
5.	2	3	12	15	30
6.	2	3	12	15	30
7.	2	3	15	15	30

8.	2	3	15	15	30
9.	2	3	15	15	30

The statistical analysis of the data was performed using the SPSS 22.0 pack-program. Descriptive statistics were used in order to define the mean age, length, and weight variables. Besides, for determining the difference between pre and post-tests values, the Paired-Samples t-test was applied. The statistical significance level was accepted as $p < .05$.

3. FINDINGS

Table 3. Determination of distributions in physical parameters

Variables	n	Minimum	Maximum	$\bar{X} \pm SS$
Age	34	18	33	19.76 \pm 3.25
Weight	34	45	85	65.12 \pm 10.72
Length	34	152	190	172.09 \pm 9.31

The examination of the table (3) resulted in a determination in respect of the age average of 19.76 \pm 3.25, the weight 65.12 \pm 10.72, and the length average of 172.09 \pm 9.31.

Table 4. Determination of differences between variable initial test and final test

Variables	\bar{X}	SD	t	p
Flexibility 1 Flexibility 2	-3.000	4.192	-4.173	.000
Waist Circumference 1 Waist Circumference 2	35.088	11.299	18.108	.000
Hip Circumference 1 Hip Circumference 2	.382	3.861	.577	.568
Back Strength 1 Back Strength 2	30.235	34.405	5.124	.000
Leg Strength 1 Leg Strength 2	22.353	34.739	3.752	.001
Right Hand Paw Strength 1 Right Hand Paw Strength 2	-.676	7.108	-.555	.583
Left Hand Paw Strength 1 Left Hand Paw Strength 2	-1.676	8.108	-1.206	.237
BFP 1 BFP 2	1.20343	1.91291	3.668	.001

* Initial test 1 / Final test 2

In the result of the examination of the table (4), a significant difference on a level of 0.01 was determined between the initial test and final tests for flexibility, waist circumference measurement, back strength, leg strength, and BFP values.

4. DISCUSSION AND CONCLUSION

This paper aimed to investigate the effects of the elasticity band on the physical properties of university students who have been taking gymnastics lessons. When we examine the literature, we can see that similar results were found in literature studies related to the subject. For example, Colado and Triplett (2008) reported an increase in lean body mass and a decrease in fat mass in middle-aged women after a 10-week elastic resistance band exercise program administered twice a week. Colado et al. (2009) compared the effects of a 24-week elastic resistance band and aquatic exercises on health and fitness in postmenopausal women. According to the findings of the study, it was observed that postmenopausal women had an increase in lean body mass and a decrease in body mass index (BMI). In another study, it was reported that 12-week elastic resistance band exercises did not change body weight and BMI in postmenopausal women and increased lean body mass (Egana et al., 2010). Similarly, in this study, a significant decrease in body fat percentage was observed as a result of elastic band application. The decrease in fat rates revealed that elastic band exercise is an exercise format suitable for all types of mass regardless of age group, metabolic functional differences, and other physical and physiological differences in sample groups.

Research has shown that resistance training reduces the total fat mass (Castaneda et al., 2002; Dunstan et al., 2002) and the amount of abdominal fat (Ibanez et al., 2005). Significant reductions in body fat percentage and waist circumference were also observed in this study. So, it was determined that elastic band studies had positive physical changes effect on both regional and body contours.

It was reported that adolescent girls increased their lean body mass by eight weeks of training with both free weight and elastic resistance band, and no significant changes were observed around the waist (Lubans et al., 2010). In this study, it was found that there was a significant change in waist circumference contrary to the literature. As a result of the contradiction of the results, internal-external factors, metabolism rate, and age ranges in the sample group were considered to be healthy, as the hormonal balance was significantly altered.

When the overall results of the study were examined; The mean age of the participants was 19.76 ± 3.25 , the average weight was 65.12 ± 10.72 , and the average height was 172.09 ± 9.31 (Table 3). As a result of the 9-week gymnastic and elastic band exercises applied to the students, no significant difference was observed on the hip circumference and hand paw strength. However, it was found that there was a significant difference between flexibility, waist circumference, back strength, leg strength, and BFP values before and after exercise tests. (table 4).

Based on the results of the study, it was determined that regular elastic band exercises created positive changes in body composition and physical appearance. It is thought that the elastic band is the right exercise material in terms of being more

preferred as an aid tool for exercises and creating a positive health and physical effects.

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