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THE IMPACT OF THE NUMBER OF TRAINING SESSIONS PER WEEK ON THE STRENGTH OF THE ABDOMINAL MUSCLES AND SHOULDER GIRDLE OF 9 TO 11 YEARS OLD GIRLS

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ABSTRACT

Introduction: Studies of the effect of the training frequency of sessions are limited, especially on the motion and physical fitness of girls.Conflicting results have also been observed. In this research, we want to evaluate the effect of the number of training sessions per week on the motion and physical fitness indicators of girls. On the basis, a research was designed and implemented with the aim of comparing the number of training sessions per week on the motion and physical fitness of 9 to 11 years old elementary school girls in Beyza City.

Method: For this reason, 30 girls were divided into three experimental groups of 10 people, group 1 (mean age: 10.20, Weight: 28.12kg, Height: 1.36m), group 2 (average age: 10, weight: 33.4, Height: 1.43) Group 3 (average age: 10.1, weight: 28.92, Height: 1.38) and a control group (average age: 10.31, weight: 27.82, Height: 1.28) who began usual trainingexercise 2 days per week. The experimental groups had usual exercise training 3 days a week along withthe special motion and physical fitness training in other days a week. One session training program includes running at 60% intensity HRmax18 minutes a week, and two session training program includes running at the same intensity 9 minutes, two times a week, and three session training program includes running at the same intensity 6 minutes, three times a week for 8 weeks. In this way that, the volume and intensity of training were similar in all experimental groups. Crunch (curl-

up) and modified gymbar tests were used to measure the mentioned indicators in the same situation before and after 8 weeks.

Results: Analysis of data using one-tail ANOVA and ANCOVA with dependent t-test at a significance level ($P \leq 0.05$) showed that musculoskeletal fitness indicators in all three groups were improved. While abdominal muscle endurance, shoulder girdle strength in the modified gymbar was significantly improved only in three sessions group($P \leq 0.05$).

Conclusions: Generally, running all three training programs may have useful adaptations, and changing the number of sessions may affect only on the degree of recovery, but probably the effect of changing the number of sessions about the strength of the abdominal muscles and shoulder girdle in the modified gymbar test was more than the total time of training in a week.

Keywords: Frequency of training sessions, strength of abdominal muscles and shoulder girdle

1. INTRODUCTION

Childhood and adolescence period are the crucial stages of life, in which a person's lifestyle in the future is shaped. Epidemiological studies have shown that having an active lifestyle through physical activity, playing, and having high fitness and suitable weight are effective on reducing all types of mortality and diseases and mental health (Dietz, 1998). Physical activity improves the health by increasing muscular fitness, cardio-respiratory function improvement, and weight loss (Wells, 2006). In the early years of the twenty-first century and while infectious diseases have been controlled in the world, the international community is faced with the problem of non-communicable diseases.Changes that emerged by civilization development and using new technologies in human life have faced him with diseases that previously were rarely occurred. Complications of these diseases that affect both the individual and society remain in the individual forever and it is considered as a constant threat to his health. Meanwhile, obese disease that many diseases are its direct and indirect effects (wells, 2006; Dietz, 1998) had a significant expansion in recent years especially among children and adolescents (James, 2001).

With the increasing development of science, the world had profound developments, and the sciences depended on physical education and sports are not isolated to this rule. Improving sports records in various disciplines indicate the scientific approach of educational and training programs for

athletes. This progress and advancement in the records is due to many researches and the correct applying sport science, the principles of nutrition, mental skills, and modern methods of fitness training. Today, it has been proved that elite and superior athletes have a significant impact on improving the physiological, physical, and body composition because they had a regular exercise in childhood and adolescence (Torabi, 2013). One of the issues related to physical education and sport sciences, especially in the field of sport, is physical fitness in greater efficiency of motion abilities and skills of athletes in various sports (Amir Syfaddini, 1996).

By evaluating the research findings about the number of sessions, the differences of such training programs cannot be denied. Therefore, further studies in the field of the number of training sessions on the motion and physical fitness indicators of adolescents can help explaining this issue better. The importance of saving time and money in athletes and appropriate training programs for girls is one of the objectives of the researcher. Given the health organization report based on 3 sessions per week, and different results of different researches with different intervals and its amazing effect on athletic performance and health, the present study aimed to answer this question that in the case of changing the frequency (1 session, 2 sessions, 3 sessions per week) at the time of implementation in improving the motion and physical fitness of girls; whether there is a significant difference between the three exercise programs that emphasize further development of physical fitness or not?

1.1. Frequency of exercise:

Exercise frequency is the number of training sessions in a certain period (e.g. a week). Training mode function is the type of exercise per session and the ability to recover people (Bird, 2005). Educators and researchers try to achieve a high level of muscular fitness by manipulating the training variables such as severity, frequency, amount of exercise. They believe that overload pressure should be applied during the strength training program over the entire body to increase the strength improvement (Gonzales, 2005).

Training frequency in novice athletes is suggested 1 time per week, but in competitive weightlifting, the training frequency of 5 to 7 days a week is applied. To achieve the maximum muscle size and strength (Bird, 2005). The important variable in designing any strength training program is training frequency that refers to the number

of training sessions per week. Factors such as strength training records of participants, training goals, exercise involvement, training load are required. Without a proper training frequency,the training may be ineffective or harmful. Totally, children should exercise 2 or 3 times a week in non-consecutive days to achievestrength(American College 2000, Faigenbaum 1996).

1.2. The effect of training frequency on the abdominal muscle strength:

In the research that Torabi (2013) conducted about the abdominal muscles strength and the abdominal subcutaneous fat in non-athletic girls,he concluded that the two periodic and continuous methods on the local muscle strength, subcutaneous fat and abdominal circumference, of non-athletic girls in the range of 18 to 22 years old for two months and 2 sessions a week increased the abdominal muscles strength. However, continuous training had more effect. Periodic and continuous trainings could not reduce the abdominal circumference, but they reduced the localized fat. In this case, periodic training was more effective (Torabi, 2013).

2. Method

The present study is an applied study in terms of subject and purpose. In addition, this research is semi-experimental regarding the use of human subjects and the lack of control over all effective elements. This research is also prospective because the researcher manipulates the independent variable to assess its impact on the subsequent changes in the dependent variable. The research design is the pretest and posttest of random groups with three experimental groups and one control group.

2.1. Research statistical population

The statistical population is the 9 to 11 years old elementary school girls in Beyza City. The research sample in this study is 40 elementary school girls in the range of 9 to 11 years old who were randomly selected. Initially, the height, weight, and exercise records of the samples were matched basic tests and measurements. These tests were taken on days other than training days, and a questionnaire was distributed among the participants to determine the general health and consent of the parents. The subjects were randomly divided into 3 experimental groups (group A: 1 session per week, group B: 2 sessions per week, Group 3: 3 sessions per week) and a control group. All the experimental and control groups has the same exercise program (including warm-up, reviewing technique and training in their specialized sports field, and cool-down) for the period of 8 weeks. The difference was

that the experimental groups had 3 additional training sessions on other days. It was tried to make the proportion of programs in a series of 1 session, 2 sessions, and 3 sessions (to determine the net impact of the training sessions) equal.

2.2. Methods of measuring the elasticity of Modified gymbar:

The test was performed in the supine mode and a part of body weight was transferred to the heel. The subject was laid back under gymbar so that her shoulders were under the gymbar. Then, she raised her hands up with open palms and the gymbar is placed in the upper hole. For example, if the subject's fingertips researched the fourth hole or a slightly higher than the fourth hole, the gymbar is placed in the fifth hole. Then, the subject took the gymbar and separated her body and legs from the ground. In this case, only her heels touch the ground. The body should not be bent at the knee and hip, but will be straight and parallel. Then, she performed the stretch from the gymbar. While stretching, the chin should reach the top of a rope or elastic that is closed below the bar. In this case, the number of correct repetitions in one minute was recorded. Test errors include: (1) the participants must touch her knees and body. 2. The body should be fully stretched. The hip should not touch the ground while moving down. 3. The elbows should be stretched while moving down and then, the stretch of gymbar is started (Torabi, 2013).

2.3. Crunch (curl-up)

The individual sleeps on her back so that her knees are bent, and the soles of the feet touch the mattress. An assist person is used to prevent getting up the leg from the ground. Hands are placed in crossed mode on the chest. In this test, the hands should not be separated from the shoulder. The elbows touch the knee or thigh while sitting. In the case of separating the hands from the shoulder or getting up the hip from the ground, the repetition is not counted. Therefore, the number of correct repetitions that a person can do correctly is recorded (Torabi, 2013).

Descriptive statistics of the measured variables in this research (the experimental group with 1, 2, and 3 days frequency per a week and the control group) have been shown respectively in the following tables 3, 4.

Table 1. Training of program participants

Groups / Intervention protocol	Experimental 1 session	Experimental 2 session	Experimental 3 session
Running on a treadmill at 60% HRR	18 minutes	9 minutes	6 minutes
Shoulder girdle muscular strength exercises to maximum level	3 sets	2 sets	1 set
Abdomen and shoulder girdle muscular strength exercises to maximum level	3 sets	2 sets	1 set

Table 2. Demographic characteristics of participants

Variable – statistics / Group - Test		Age		Height		Weight	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Experimental with 1 day frequency	Pretest	10.202	0.782	1.361	0.079	28.12	4.09
	posttest			1.362	0.080	28.34	4.10
Experimental with 2 day frequency	Pretest	10	0.813	1.432	0.093	33.4	5.89
	posttest			1.435	0.094	34.2	5.72
Experimental with 3 day frequency	Pretest	10.1	0.813	1.382	0.086	28.92	5.08
	posttest			1.39	0.087	29.10	5.02
Control group	Pretest	10.31	0.684	1.28	0.065	27.82	5.12
	posttest			1.30	0.066	28.30	5.01

Table 3. Descriptive statistics of measured variables in abdominal muscle strength

Test-statistics / Variable	Pretest		posttest	
	Mean	Standard deviation	Mean	Standard deviation
Experimental with 1 day frequency per a week	23.412	5.891	25.823	4.876
Experimental with 2 day frequency per a week	26.613	5.274	29.245	4.341
Experimental with 3 day frequency per a week	27.526	7.516	33.428	4.971
Control group	24.879	4.210	26.421	5.103

Table 4. Descriptive statistics of the measured variables in the shoulder girdle strength

Test-statistics / Variable	Pretest		posttest	
	Mean	Standard deviation	Mean	Standard deviation
Experimental with 1 day frequency per a week	11	5.557	12.967	5.130
Experimental with 2 day frequency per a week	10	5.818	13.213	6.051
Experimental with 3 day frequency per a week	8.613	3.596	16.913	3.956
Control group	11.834	5.821	12.967	6.010

3. RESULTS

The results show that there is no significant difference between the amount of abdominal muscle strength in the experimental and control groups (frequency of 1 and 2 day per a week) after doing 8 weeks of motion and physical fitness exercises. There is a significant difference between the

experimental groups (frequency of 3 day per a week) after doing 8 weeks of motion and physical fitness exercises.

Figure 1. Average of abdominal muscle strength variable in the experimental and control groups with 1, 2, and 3 days frequency per a week before and after 8 weeks of motion and physical fitness exercises.

The results of the follow-up tests show that there is a significant difference between the averages of abdominal muscle strength in the experimental group with the frequency of 3 days per week.

The results show that there is no significant difference between the amount of strength in hands and shoulder muscles in the modified gymbar in the experimental and control groups (frequency of 1, 2, 3 days per a week) after doing 8 weeks of motion and physical fitness exercises.

Figure 2 shows the averages of hands and shoulder musclesstrengthin the modified gymbar in the experimental and control groups (frequency of 1, 2, 3 days per a week) after doing 8 weeks of motion and physical fitness exercises.

The results of the follow-up tests show that there is a significant difference between the averages of hands and shoulder musclesstrength in the experimental group with the frequency of 2 and 3 days per week and the control group.

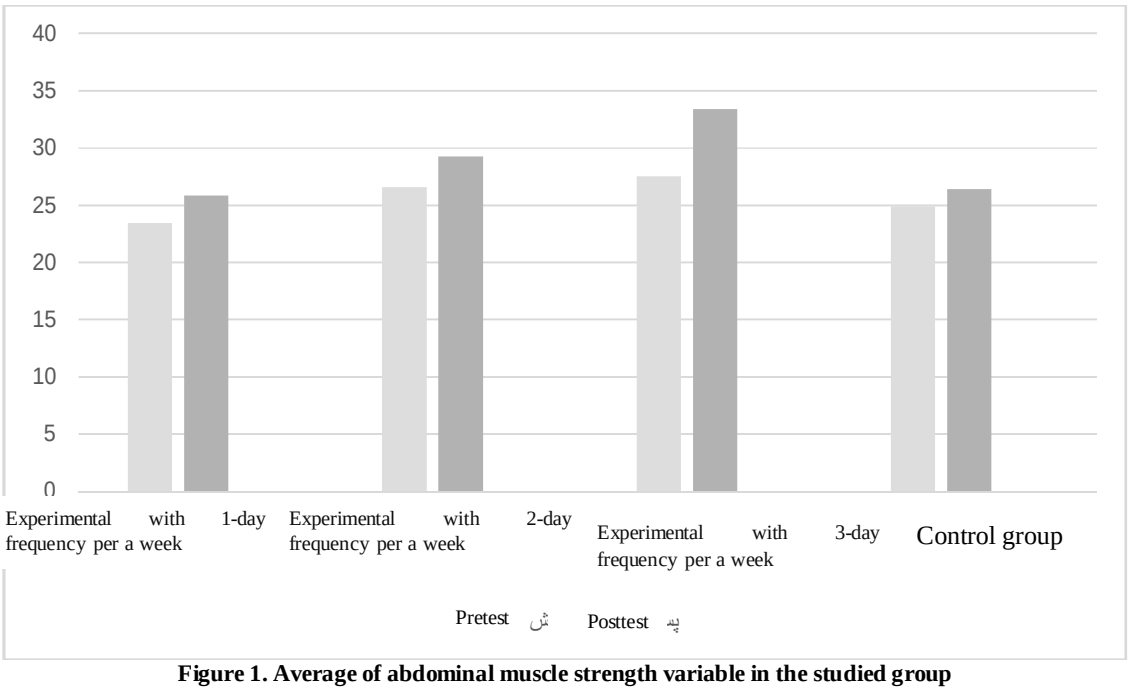

Figure 1. Average of abdominal muscle strength variable in the studied group

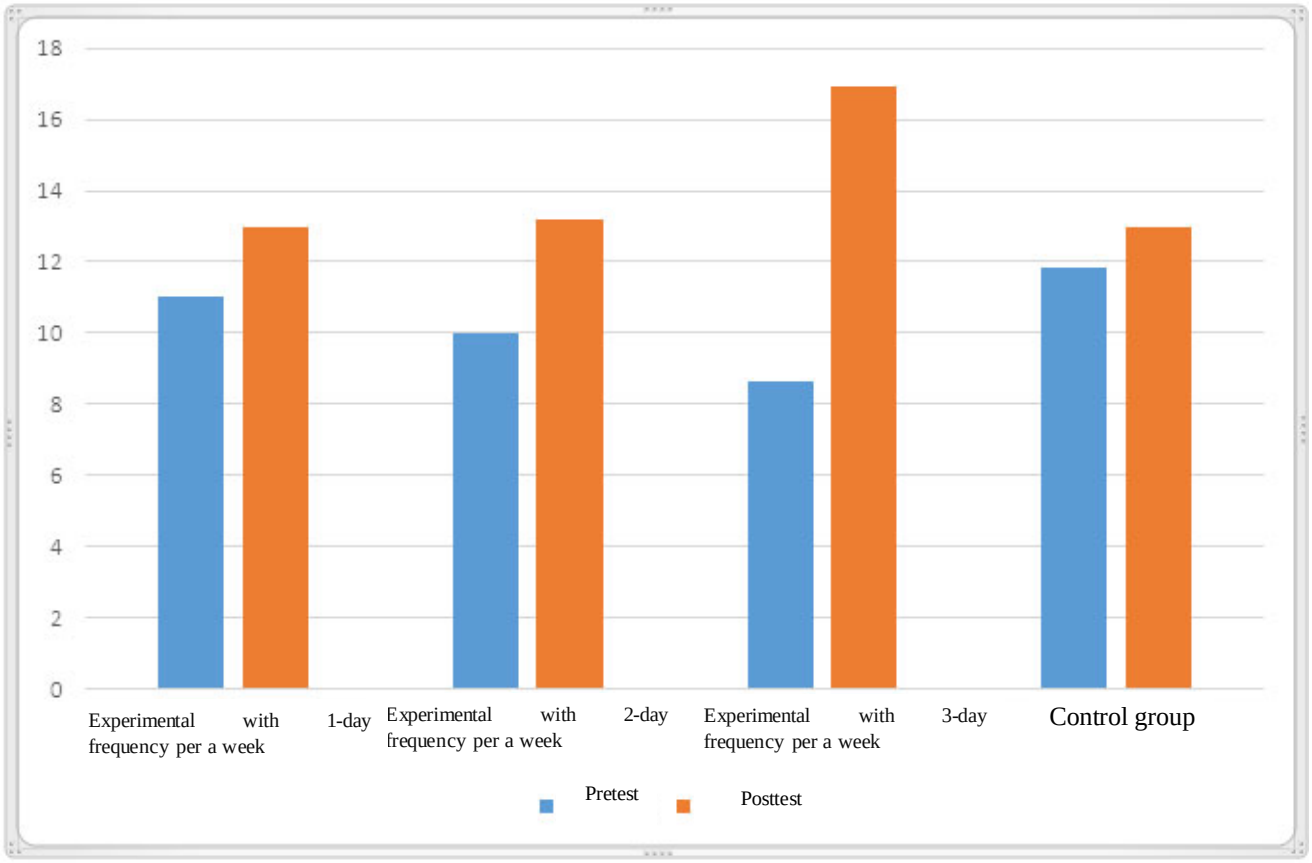

Figure 2. The average of shoulder girdle variable in the studied groups

4. CONCLUSION

According to the results of the present study, almost all the measured physical variables have been increased after 8 weeks of the physical activity with the mentioned protocols along with exercise trainings. According to the results of this research and other papers, higher exercise frequencies are better to increase the strength of the abdomen and the shoulder belt. There is a significant difference between the pretest and posttest of hands and shoulder musclesstrength in all studied groups.

Kopp et al. reviewed the effect of the frequency of training on maintaining strength in boy baseball athletes (mean age of 13 years). These people had progressive strength training 3 days per week before the competition and they were divided into three training groups (training maintaining stage). Group 1 had one training session in a week and group 2 had two training sessions in a week, and the control group did not have a training session. Strength training program in all groups before the competition significantly increased the upper-body

strength (chest press) and lower-body (leg press)and dynamic muscular strength in upper-body (gymbar). After 12 weeks of maintaining power program, a significant difference was observed between the control group and two other training group in chest press. However, no significant difference was observed between the groups in the leg press and gymbar. Thus, the strength maintaining program of 1 day per week in boys is sufficed to maintain power during the racing season.

The local strength of abdominal muscles in the modified gymbar and curl-down has been increased after 1 session, 2 sessions, and 3 sessions training in the research of Folcom et al. (2006). Some cases have not been controlled in the present research, but most of the compatibilities in the subjects' strength after short-term researches may be due to neural compatibilities. Increasing the conductivity of nerve impulses, reducing the inhibition of Golgi organs, coordinated increasing of the nerve and muscle are some of the compatibilities that increase the local muscle strength (Torabi, 2013).

These results were consistent with the present results. By increasing the training frequency, the local strength of the shoulder girdle and abdominal muscles was improved that can be due to increasing the coordination of the athlete's muscles after increasing the training frequency.

5. REFERENCES

[1] Ali Seyfaddini, Mohammad Reza, comparison of flexibility and muscle strength in badminton, swimming, karate, wrestling, and handball athletes, master's thesis, Tehran University, 1996.

[2] Torabi, Maryam, comparison of the number of training sessions per week on the motion and physical fitness factors in adolescent wrestlers, Master's Thesis, 2013.

[3] Jafari, Akram, Moradi, Mohammad Reza, Salimi, Atena,Muhammadi, Ibrahim, comparison of the impact the number of f walking sessions per week on body composition changes, sedentary women, Olympic, (1): 36-27, 1386.

[4]American College of Sports Medicine.ACS'M Guidelines for exercise testing and prescription,(6th ed).Baltimore:Lippincott,Williams & Wilkins, 2000.

[5] *Bird SP,Tarpenning KM, Marino FE* Designing Resistance Training Programmes to Enhance Muscular Fitness. Sports Med; 35 (10): 841-851, *2005*.

[6] Chambliss.H.O. Exercise duration and intensity in a weight loss program.IAMA. 10:290(10):PP: 1323-30, 2003.

[7] Dietz WH. Health consequences of obesity in youth: childhood predictors of adult disease. Pediatrics 1998; 101:518-25.

[8] Edouard P, . Gautheron V, D'Anjou, Pupier L, Devillard X Training programs for children: literature review. Annales de réadaptation et de médecine physique 50, 510–519, 2007.

[9] Faigenbaum A, Kreamer WJ,et al. Youth resistance training: updated position statement paper from the national strength and conditioning association. J strength and conditioning research(23),S60-S79, 2009.

[10] Faigenbaum,A, Milliken,L.A, and etal.Comparison of 1 and 2 days per week of strength training in children.American Alliance for health, physical education.(4):416-424, 2002.

[11] Faigenbaum A, Myer GD.Resistance training among athletes: safety , efficacy and injury prevention effects.Br J Sports Med 44:56-63, 2009.

[12] Faigenbaum A, Ratamess, N, & etal Effect of rest interval length on bench press performance in boys,teen and men. Pediatr Exerc Sci 20:457-469, 2008.

[13] Fogelholm M, & et al, Waist circumference and BMI are independently associated with the variation of cardio-respiratory and neuromuscular fitness in young adult men; International Journal of Obesity 30, 962–969, 2006.

[14] Gonzalez-Badillo JJ, Gorostiaga EM, Arellano R. Moderate resistance training volume produces more favorable strength gains than high or low volumes during a short-term training cycle.J strength & conditioning research19:689-697, 2005.

[15] James PT, Leach R, Kalamara E, et al. The worldwide obesity epidemic. Obes Res; 9: 228s-33s, 2001.

[16] Michael, L. et al, Blood Lipid response after continuous and accumulated aerobic exercise. Inter. J. sport. Natri. Exerci. Meta, 95:PP:245-254, 2006.

[17] Nie man DC. Fitness and your health, bull publishing company, 1993.

[18] Wells JC, Fewtrell MS, Williams JE, Haroun D, Lawson MS, Cole TJ. Body composition in normal weight, overweight and obese, 2006.

[19] Willis,F.B,Smith,F.M, Willis,A.P, Frequency of exercise for body fat loss:A controlled, Cohort Study.J strength & conditioning Research.(8):2377-2380, 2009.