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Research Article

The effect of selected taekwondo exercises and ginseng consumption on body composition and some selected factors of physical fitness of overweight girls

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Abstract

Background: The Aim of The Study Was to Investigate the Effect of Selected Taekwondo Exercises and Ginseng Supplement Consumption on Body Composition and Some Selected Factors of Physical and Movement Fitness of Overweight Girls.

Materials and Methods: The Research Is a Semi-Experimental Research That Was Conducted in The Field Method, For This Purpose, 28 Overweight Girls Interested in Taekwondo in Tehran, Who Had At Least Three Years of Taekwondo Experience. By Cluster Sampling Method and Using G-POWER Software, They Were Selected Purposefully and Randomly Divided Equally in to Four Experimental and Control Groups of Seven People. Taekwondo Training Program as Well as HIIT Training Program Including 8 Weeks of Training Were Implemented. HIIT Training Includes a rest Test, Meaning 6 Intervals Of 35 Meters, With A 10-Second Rest At The End Of Each Interval. After Eight Weeks of Training, All Dependent Variables of The Research Were Measured Using Standard Tests in The Statistics Section, T Test, Variance Analysis and LSD Post Hoc Test Were Used.

Results: The Results of One-Way Analysis of Variance (ANOVA) Showed that the Percentage of Body Fat in The Experimental Groups Decreased Compared to The Control Group and Showed a Significant Difference (P≤0.05). Also, In the Supplement Group, Due to The Consumption of Ginseng Supplement and Its Relationship with The Increase in Muscle Volume and Strength, An Increase in Sargent's Jump Was Reported (P≤0.05).

Conclusion: It Was Found that the Reason Can Be Considered the Nature of The HIIT Exercise That Has Been Performed Under High Pressure.

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1. Introduction

Scientific and technological progress, the expansion of modernity and urbanization in human societies, increase inactivity and lead to bigger problems such as obesity, overweight and reduced aerobic capacity that many people are dealing with today (1). Various methods such as drug therapy, surgery, diet therapy and exercise are used to control obesity and overweight, but all health experts confirm that exercise is the cheapest and most appropriate way to prevent non-communicable diseases and maintain health (2). A lot of research has been done in the field of physical structure and physical factors in different sports, but it seems that the study in the field of examining the physical and structural characteristics of athletes in individual sports, especially taekwondo, is less in our country or in some The fields are less done. Also, there is a close relationship between body composition and physical fitness In order to ensure that athletes acquire the physiological characteristics, physical fitness and performance of the desired discipline, numerous tests and profile descriptions of each section are used, and through practice we can improve the functional and physiological characteristics of Taekwondo (3). Exercise specifically improves the ability of muscles to produce force, Previous studies have shown that exercise improves explosiveness in all individuals of all strength levels, Therefore, training during the off season of the competition and before the start of the season not only improves the supporting structure by making the supporting structures (ligaments, tendons and bones) stronger and increasing muscle function (muscular strength, endurance and muscle power), but it may also occur Reduce apples during the competition (4).

Taekwondo is a traditional martial art from Korea and is recognized as a world martial sport (5). Taekwondo as a sport has positive effects in psychological and physiological fields, it also brings positive effects for the growth and development of children and teenagers in addition, taekwondo training prevents obesity, dyslipidemia, diabetes, high blood pressure, or improves cerebrovascular and cardiovascular diseases in adults and the elderly (6). High-intensity interval training (HIIT) results in greater fat loss in young adults than aerobic exercise. Also, researches have shown that there is a significant increase in lean mass after intense interval training, while lean mass remained unchanged in the group that did aerobic exercise (7). This is despite the fact that the lack of increase in lean mass with sustained aerobic training has been observed in another previous research (8). In another study, the effect of 12 weeks of high-intensity interval training on the body composition of overweight young men has been investigated, they reported that there was a significant reduction in total fat mass in the exercise group Also, abdominal and trunk obesity decreased significantly, but no significant change was seen in their insulin levels (9). Some study showed the short-term HIIT period with low volume improves health variables such as increased insulin sensitivity, which indicates the entry of other substrates into the metabolism during recovery. In this regard, other researchers also stated in their research that HIIT does not have a significant effect on obesity measurement indices in adult women and men compared to long-term exercises (10). Sports performance of athletes depends on the ability to maintain and produce a high yield of energy per unit of time (11).

Accordingly, athletes have a great desire to consume energy supplements so that they can provide the energy they need to perform long-term sports activities However, the use of food supplements sometimes leads to unwanted side effects and it is possible that the total amount of micronutrients received from the diet of any food supplements may exceed their natural limit in the body On the other hand, the use of some food supplements may even reduce the power and potential of a person in performing sports activities Therefore, today a lot of research has been done in order to prepare suitable food supplements with the least side effects and the most efficiency Medicinal plants, which have a long history, especially in the Middle East, have received special attention today. And many studies have been done on them in order to produce different medicines and recently food supplements, Nowadays, weight training is considered as one of the important elements of the training programs of athletes in order to increase strength, power and muscular endurance (12). With more than 4000 years of history, the ginseng plant has taken a special place among the invigorating medicines of the East, which, in addition, has other properties such as anti-hypertension, anti-diabetes, anti-pain and is rich in vitamins A, C, B complex is an estrogen hormone (13). Ginkgobiloba is a plant of Chinese origin, the part of which is used is the leaf of this plant, which contains troponoid derivatives such as gincolide A, B, C, bilobalide and flavonoids such as quercetin, canol, bilostein and gincotin . Ginkgobiloba has many properties, including anti-hypoxia, anti-depressant, anti-pain and strengthening of physical strength (14). The available supplements have attracted the attention of many researchers and have led their inquisitive minds to investigate the effects of different supplements on muscle strength, body composition and other physiological mechanisms Many sports supplements are consumed by athletes with the claim that they improve muscle strength and body composition However, few studies have investigated the effect of simultaneous consumption of supplements on the strength performance and body composition of athletes (15). Paying attention to the said content is important to use a supplement that has the greatest impact on the factors of physical fitness and body composition and causes less cell damage According to the mentioned cases, the researcher seeks to answer the question that whether selected Taekwondo exercises with the use of ginseng supplement have an effect on the body composition, some factors of physical fitness of overweight girls?

2. Materials and Methods

The current research is applied research in terms of its purpose and semi-experimental and comparative in terms of data collection. Using a multi-stage cluster sampling method, 40 overweight girls with a three-year history of taekwondo participation in women's sports clubs in Tehran participated in the study voluntarily. By using a questionnaire, measuring BMI and examining their medical history, screening was done and people with acute cardiovascular disease, blood pressure, severe inflammation, nervous disorders, obesity, severe joint and back pain, inability to walk, stenosis Strong breath or asthma, sensitivity to plants and other things that prevented the full and active participation of people in the research, were removed and the number of 28 people using G power software in 4 groups of 7 people (Taekwondo exercises, Taekwondo exercises + ginseng, taekwondo exercises + HIIT exercises

and ginseng supplement) were selected. The HIIT training program included 8 weeks of training and after measuring the variables of explosive power, strength, flexibility, speed, agility, muscular endurance, BMI, weight and fat percentage, the grouping of people was determined. The research protocol was such that the first group, called the control group, after warming up taekwondo exercises, which consisted of 3 sessions a week, included performing taekwondo exercises regularly and performing taekwondo techniques, instead of taking ginseng supplements, placebo capsules containing Thank goodness they used it. The second group only received ginseng supplement and did taekwondo training. The consumption of ginseng supplement in this group was the same as the consumption of this supplement in the other group. Its amount in both groups was 2 grams per day at 4 p.m. In the third group, only HIIT and taekwondo exercises were performed. The fourth group did taekwondo training, HIIT training and ginseng supplementation. In the third week, the above procedures were done and the only change that took place this week was the increase of HIIT exercises to 2 sets in each session and 3 minutes of rest between each set. These steps were done incrementally until the eighth week (once every two weeks), and in the seventh and eighth weeks, 4 sets of the REST training protocol were formed with a 3-minute rest between each set in each training session.

Also, to investigate the effect of training on the indicators among the four groups, analysis of variance and LSD follow-up test were used at a significance level of 0.05 using SPSS version 24 software. The research tools included athlete profile questionnaire, nutritional questionnaire, medical form, phys (casio sport) stopwatch made in Thailand and INBODY370 model gMW140 body composition device made in South Korea. Descriptive and inferential statistical methods are used to analyze the data. Correlated t-test is used to check the effect of training on indicators.

3. Results

The descriptive findings of the subjects participating in the research in table number 1 showed that in the table below, the central indicators related to the general characteristics of the subjects including weight, body fat percentage and body mass index in the subject groups including the experimental group 1 (Taekwondo exercises + consumption Ginseng supplement), experimental group 2 (Taekwondo exercises + HIIT exercises), experimental group 3 (Taekwondo exercises + HIIT exercises + taking Ginseng supplement) and the control group were presented in two phases: pre-test and post-test.

Table 1. anthropometric characteristics of subjects

VARIABLE	GROUP	PRE-TEST		POST-TEST	
		MEAN	Standard.Dev	MEAN	Standard.Dev
Weight	Gensing	70.45	1.80	70.20	1.83
	HIIT-Training	70.35	1.70	70.20	1.79
	Gensing+ HIIT	71.00	1.84	70.52	1.73
	Control	70.91	6.33	70.61	6.15
Body Fat Percent	Gensing	7.94	2.70	7.5	2.67
	HIIT-Training	5.71	2.08	5.28	1.97
	Gensing+ HIIT	8.61	2.36	7.28	2.14
	Control	5.80	3.12	4.82	2.76
BMI	Gensing	27.25	2.73	26.95	2.79
	HIIT-Training	27.20	2.28	26.07	2.35
	Gensing+ HIIT	27.15	3.01	26.00	2.97
	Control	27.48	2.70	27.28	2.80

The results table no 2 of variance analysis and paired sample t test of the research hypotheses showed; The percentage of fat in the intervention groups compared to the control group showed a significant difference (P≤0.05) in the ginseng group (P=0.00), in the HIIT group (P=0.001), and the combination of ginseng + HIIT was less than P is ≤0.05. Therefore, the average difference before and after the intervention in these three groups is significant, The BMI observed in the control group was not significant (P=0.09). But in the ginseng supplement group (P=0.00) and in the HIIT exercise group (P=0.01) it is less than P≤0.05, so the difference between the mean before and after the intervention in these two groups was reported to be significant. In other words, presenting the independent variable has had a significant effect on the change of BMI in these two experimental groups. But this value was reported to be significant in the combination group of HIIT exercise by ginseng (P=0.02). Also, the results of one-way analysis of variance showed that the effect of the independent variable in three groups (experimental 1, 2 and 3) on muscle endurance is not significant. Therefore, the null hypothesis is accepted.

As a result, there is no significant difference in muscle endurance between the four groups. The results of the comparison between the groups in the agility variable showed that the supplement group + HIIT exercise had the greatest effect, followed by the ginseng supplement group (P=0.01) and then the HIIT exercise group (P=0.01) in reducing the agility time of taekwondo athletes. It has been effective. In addition, the results of the comparison between the groups with the control group showed; Supplement group + HIIT exercises (P=0.001), followed by ginseng supplement group (P=0.00) and finally HIIT exercises group (P=0.03) have been effective in reducing the speed time of taekwondo athletes. The results of the comparison between the groups in the strength variable showed that the supplement group + HIIT exercise (P=0.00) and then the ginseng supplement group (P=0.004) showed a significant effect in increasing the strength of taekwondo athletes. In other words, presenting the independent variable has had a significant effect on increasing strength in the ginseng group and the combination of ginseng and HIIT.

In the comparison between the groups with the control group, first the supplement group + HIIT exercise (P=0.00) and then the ginseng consumption method (P=0.003) was effective in increasing the explosive power of taekwondo athletes. According to the results of the table, the HIIT exercise group (P=0.014) was not effective compared to the control group.

Table 2. Result Analysis of ANOVA Between Group of subjects

Variable	Sum square	df	Mean square	F	P
Power	25.85	3	8.61	10.97	0.000
	18.85	24	0.78		
	44.71	27			
Strength	21.75	3	7.25	11.43	0.000
	15.21	24	0.78		
	36.96	27			
Flexibility	3.82	3	1.27	2.14	0.12
	14.28	24	0.59		
	18.10	27			
SPEED	4.17	3	1.39	48.12	0.000
	0.69	24	0.02		
	14.28	27			
BMI	1.22	3	0.40	0.52	0.67
	18.66	24	0.77		
	19.88	27			
Body Fat Percentage	4.82	3	1.60	15.19	0.000
	2.53	24	0.10		
	7.35	27			
Weight	0.36	3	0.12	2.05	0.13
	1.40	24	0.05		
	1.77	27			

4. Discussion

The present study was conducted with the aim of investigating the effect of ginseng supplement consumption along with HIIT exercises and selected taekwondo exercises on some factors of physical fitness and body composition of overweight and obese girls in order to provide solutions to improve the desired indicators in this research. Most of the athletes consume various sports supplements to maximize strength and other physical fitness factors. One of these sports supplements that has attracted the attention of athletes for several years is ginseng herbal supplement. The ginseng plant grows in different parts of the world (North America, Korea, China, Siberia). 100 grams of the root of this plant contains 12.2 grams. It contains protein, 70 grams of carbohydrates and also contains various vitamins, niacin and other rare elements (16). The results showed that there was a significant difference in the explosive power variable between the experimental and control groups. In the comparison between the groups

and the control group, first the combined method and then the ginseng consumption method were effective in increasing the explosive power of taekwondo athletes. According to the results of the table, the HIIT method was not effective compared to the control group, the reason can be attributed to the nature of the HIIT exercise that was performed under high pressure. In the control group, because there was no special program to increase explosive power, but in the ginseng supplement group, due to the consumption of ginseng supplement and its relationship with the increase in muscle volume and strength, it can be concluded that ginseng supplement increases the amount of Sargent's jump has been. This result is consistent with the research of researchers such as Paitit and (17). who determined that the exercises cause neural adaptations including the calling of more motor units, the stimulation of motor units with high frequency increases the explosive power. In the comparison between the groups with the control group, first the combined method and then the ginseng consumption method has been effective in increasing the strength of taekwondo athletes. According to the table results, HIIT method has not been effective compared to the control group. In general, it can be assessed that in the first group, because the nature of Taekwondo training alone increases general endurance and decreases local strength, the decrease in strength in this group can be due to this reason. But in the second group, due to the increase in general muscle volume and as a result, the increase in muscle volume in the areas of the deltoid, scapulae, parallelograms, trapezius, and arms increase strength. In the HIIT training group, a decrease in muscle mass and a decrease in strength causes a decrease in this group, but a decrease in fat mass also causes a decrease in weight and as a result an improvement in this group, but overall, the dominant phenomenon in this group is a decrease in strength compared to other experimental groups is This research with the research of researchers such as (1), Baek (2017), Naghav (2020), Hosseini (2020) same in result. It is consistent and no research was found that contradicts these results (18-20). Anyway, the results obtained in the present research show that eight weeks of ginseng supplement and HIIT training had a significant effect on body composition and some factors of physical and movement fitness of overweight girls interested in taekwondo. Except for the flexibility index, it has been confirmed and the research that have been investigated also confirm this. The one-way analysis of variance test shows that the effect of the independent variable in three groups (experimental 1, 2 and 3) on flexibility is not significant. Therefore, the null hypothesis is accepted. As a result, there is no significant difference between the four groups. Reilly and Boettcher (2011) showed that the increase of catecholamines, cortisol and growth hormone increases the muscle volume and thus decreases the flexibility (21). Also, in the comparison between the groups with the control group, first the combined method, then the ginseng consumption method, and then the HIIT method have been effective in reducing the speed time of taekwondo athletes. The ginseng and combined method, the ginseng and HIIT method, as well as the HIIT method and the combined method have significant differences from each other. In general, it can be concluded that because the first group did not have a special plan to increase the speed, this factor did not change significantly or changed very little, which can be attributed to the fan review during training. In the second group, taking ginseng supplements increases muscle volume, increases strength, and increases explosive power, and reduces the start time at the beginning and end of the track, and overall, it reduces the time traveled and improves speed. In the case of the third group, there was a kind of muscle weakness due to the stressful nature of

this exercise, especially in the final weeks, which increases the time and decreases the performance compared to the second and last group. But it has improved compared to the first group and confirms the researcher's theory. But in the last group, due to the fact that the type of interval training can increase the stimulation of the fast-twitch fibers and the ginseng supplement prevents muscle weakness, these two variables are aligned and improve performance. If possible, it is suggested to use these two variables when the goal is to improve speed. The comparison between the groups with the control group showed that first the combined method, then the ginseng method, and then the HIIT method were effective in reducing the agility time of taekwondo athletes. In general, it can be concluded that the first group (control) did not have a special program to increase agility, so this factor did not change significantly or changed very little In the second group, the consumption of ginseng supplement increases muscle volume, increases strength and increases explosive power, and reduces the start time at the beginning and end of the track, and overall reduces the time traveled and increases agility. In the case of the third group, it can be concluded that even though HIIT training (RAST) can be called as a type of training to increase agility, there was a kind of muscle weakness due to the stressful nature of this training, especially in the final weeks, when The starting time occurs at the beginning and the end of the track and causes an increase in time and a decrease in performance compared to the second group and the last group, but overall it confirms the researcher's theory. But in the last group, considering that the type of interval training is actually a type of exercise to increase agility and also that ginseng supplement prevents muscle weakness, finally these two variables are aligned and improve performance. If possible, it is suggested to use these two variables when the goal is to increase agility Based on the results, the effect of the independent variable in three groups (experimental 1, 2 and 3) on muscle endurance is not significant. Therefore, the null hypothesis is accepted as a result, there is no significant difference between the four groups. According to the results of analysis of variance, the effect of the independent variable in three groups (experimental 1, 2 and 3) on BMI is not significant Therefore, the null hypothesis is accepted. As a result, there is no significant difference between the four groups. Based on the results of the one-way analysis of variance test, it shows that the effect of the independent variable on the percentage of fat is different in three groups (experimental 1, 2 and 3). The average difference of the four groups was significant with a probability of 95%, so the null hypothesis is rejected. Therefore, in the comparison between the groups with the control group, first the combined method and then the ginseng consumption method has been effective in reducing the fat percentage of taekwondo athletes. The ginseng method and the ginseng supplement + HIIT training group, as well as the HIIT training method and the combined method, showed a significant difference with each other. Also, Ginseng and HIIT methods reported a significant difference. Also, Ginseng and HIIT methods reported a significant difference. In general, it can be concluded that the variable of fat percentage in the ginseng supplement group and the last group has the same significant level, which can be caused by the increase in growth hormone activity and the subsequent increase in muscle mass and decrease in fat tissue. In the third group, it is believed that the intensity of HIIT exercises has caused a significant decrease in body fat percentage. In the control group, there is no special program or supplement to change the fat percentage, but thanks to taekwondo

exercises,we see an imperceptible decrease in fat percentage. The research hypotheses regarding two variables (body mass index and body fat percentage) in the control group in taekwondo athletes showed that the use of ginseng supplement, HIIT training and the combination of both did not have a significant effect on these two variables, although these three variables improved, According to the P obtained from the table for the control group, except for the weight index, the null hypothesis is strongly confirmed for all subjects, that is, the effect of eight weeks of ginseng supplementation and HIIT training and the combination of both on body fat percentage and body mass index. These results are consistent with the research of researchers such as Miranda (2012), Bagherpour (2022), Dehghan (2010), Vakili (2020) and were against the research of Milans 4, 22-24). Probably due to gender, these indicators are different among subjects. The results of Miranda's research showed that ten weeks of training on special functional parameters of young football players caused significant changes in weight, body mass index. The results of the research related to body composition showed that resistance training with ginseng does not affect the ratio of waist to hip circumference and it was contrary to the research of Rogers and colleagues (2006). Among the reasons for the contradiction of the findings, we can mention the dose of ginseng and the intensity of the exercise, which was different from the present study.

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Compliance with ethical standards

Conflict of interest None declared.

Ethical approval the research was conducted with regard to the ethical principles.

Informed consent Informed consent was obtained from all participants.

Author contributions

Conceptualization: B.D, S.A, P.G; Methodology: B.D, S.A, P.G; Software: B.D, S.A, P.G; Validation: B.D, P.G; Formal analysis: B.D, S.A, P.G; Investigation: S.A, P.G; Resources: , S.A, P.G; Data curation: S.A, P.G; Writing - original draft: B.D, S.A; Writing - review & editing: B.D, S.A, P.G; Visualization: B.D, S.A,; Supervision: B.D, S.A, P.G; Project administration: B.D, P.G; Funding acquisition: B.D, S.A, P.G.

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