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The Effect Of Central Stability Exercises And Vitamin D On Women's Fitness Indicators With MS

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Article	Abstract
<p>Received: 17th June 2022 Received in revised form: 15th July 2022 Accepted: 19th July 2022</p> <p>Keywords: Physical Fitness, Central Stability Exercises, Vitamin D, MS</p>	<p>This study aimed to determine the effect of central stability training and vitamin D on fitness indicators of young women with MS. For this purpose, 36 women with relapsing-remitting MS with the level of extended disability status less than or equal to 164, 6/57 year disease history kg; weight 11/4, 65/1; height 4/23, 164cm height; 6/57 + 32/72 years mean with three participated in the study voluntarily and randomly divided into four groups (including three groups of supplement, exercise and combination of exercise + supplement and group Controls) were divided. Before and after the test period, all subjects were tested for endometrial extensor muscle strength with a dynamometer, endurance, trunk flexor muscle with trunk retention test at 60 ° angle, flexibility with wells test, coordination with ball throw test Tennis, and balance participated in the Takpa standing test. Central stability exercises for eight weeks and three times a week Incremental) the first session, five seconds of movement with six repetitions until the last session, eight seconds of movement with ten repetitions (performed. The supplement was taken once every two weeks for 1,500 IU of vitamin D capsules. From the statistical test of analysis of covariance to evaluate information used. Findings show that exercise combined with vitamin D consumption improves strength compared to the control group (P = 0/001) balance and (P = 0/001) coordination, (P = 0/001) flexibility, muscular (P = 0/001) endurance and (P = 0/002) compared with vitamin D, it leads to improved muscle endurance (P = 0/001), flexibility (P = 0/001), coordination (P = 0/001) and Equilibrium (P = 0/001). Also, exercise without vitamin D improves improvement compared to the vitamin D group. Muscular endurance (P = 0/015) and in comparison with the control group improved endurance (P = 0/002) coordination (P = 0/031) and The equilibrium is (P = 0/001). Still, consumption of vitamin D alone did not have a positive and significant effect on research variables (P <0.05). According to the research results, it can be said that the order of priority is an exercise with vitamin D and then exercise the effect. It has a good effect on improving physical fitness indicators.</p>

Introduction

MS is one of the most common neurological diseases of multiple sclerosis. That damage results from a substance called myelin, which causes several symptoms. In recent years, the number of MS patients

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in Iran has increased, and the prevalence of this disease has grown from five to five; it has reached 51% per thousand people. Stay away from the equator and reduce exposure Sun and, consequently, reduced production of vitamin D or reduced intake of vitamin D, increased stress, Vaccination, deficiency of some foods including antioxidants such as vitamin E, acid Uric and omega-3 fatty acids, an increase in some hormones including prolactin, decreased hormones Sex, especially estrogen, abnormal regulation of cytokines, production of free radicals in the immune system Peripheral and nervous system, increased oxidative stress, production of reactive oxygen species in the system central nervous system and display of nitric oxide (NO) is known to exacerbate the disease. Pro-inflammatory drugs such as some interleukins are involved in the onset or exacerbation of MS symptoms [1]. In addition, they have been shown to increase glucocorticoids.

Since exercise increases the blood flow of glucocorticoids, its possible association with MS has been studied in several studies. Increased corticosteroids Androgenesis through regular exercise can moderate MS's activity and reduce its progress; thus, sports stimulation is probably an essential moderator of balance Cytokines and MS disease activity. (Medical studies show the benefits of exercise in some Symptoms or complications of MS have been identified as improvement in functional capacity; Quality of life, and fatigue) and modulation of immune system function) it is worth noting that MS is associated with various problems, some of which are: nerve damage, Fatigue, Mild paralysis, Numbness, Concentration disorder, muscle weakness, muscle wasting, loss of muscle strength, imbalance, Difficulty walking, weakness and limitation in movement and impaired coordination on the other hand, in connection with some important indicators of physical fitness in patients with MS they suffer from disorders such as the balance of strength and muscular endurance coordination and flexibility of balance, physiological-mechanical status and desire. The centre of gravity displacement is within the desired level of support [2].

Exercises receivers activate proprioceptive and improve performance control and balance. The practice causes people with MS to gain new balance control and is better than their balance receptors; another indicator that patients with MS feel weak is strength is muscular. Increased strength may be due to changes in communication between motor neurons. These changes lead to synchronization and recall of more motion units, and the production rate improves the force and capacity to apply a stable pressure) due to the nerve's weak function in patients with MS, muscle strength is likely to decrease. Power also reduces the muscular endurance of patients with MS. Ability to endure muscle for long-term activity. Numerous factors affect muscle endurance are; Such as general muscle strength of the body, energy storage, circulatory factors, capability of Heat exchange, the ability of the nervous system to maintain high skills and coordination, and muscle capability to produce the energy needed due to neuromuscular disorders and heat dissipation in patients with MS, their muscular endurance is likely to decrease [3].

In addition to strength and endurance, muscle also reduces the flexibility of patients with MS. Weakness of flexibility causes incoordination in movements and increases the number of injuries. Patients with MS also have weaknesses and limitations in action. Another disorder in patients with MS due to neuromuscular problems is decreased coordination. Coordination, order and balance between the body's organs during the movements of patients with MS are usually disrupted. Various studies have shown that a combination of aerobic and resistance training on balance; Combined aerobic and resistance training on muscle strength; combined exercises on flexibility; Aerobic exercises on coordination; combined aerobic exercise and resistance affect the muscular endurance of patients with MS. From Sweden, the effect of exercise for patients with MS is primarily aerobic, opposition or a combination has been studied, But one type of exercise that requires fewer facilities and is easier to do and also causes a significant increase in core temperature is likely for this patients are not harmful, stability exercises are central [4]. Major stability exercises, specific descriptive, are about abdominal and lumbar-pelvic exercises. Although these muscles can balance, strength, endurance, coordination and nerve control are fundamental problems for patients with MS, they have a role and also that it has been observed to increase muscle strength if doing the suitable training method does not negatively affect flexibility or even increase it the question arises as to whether doing central stability exercises that can cause Increase muscle strength and endurance and improve flexibility in patients with MS it has an effect. It is worth noting that despite the research, the impact of this type of exercise in patients with MS was not found [5].

In addition, studies show that MS patients need the vitamin D they need. Receive more minor than the daily amount. Vitamin D is a hormone that functions, and its deficiency can impair muscle function and lead to sarcopenia, and as a result, muscle strength decreases. Some studies suggest a lack of Vitamin D by reducing the strength and muscle function and the power of the fingers of adolescent girls has a direct relationship. Still, some research has suggested that Vitamin D receptors have not been observed on muscle membranes because they exist so far. It is likely that it indirectly affects muscle growth and function according to the mentioned effects. Vitamin D on muscle function appears to be an indicator of performance-related physical fitness Muscles such as strength, endurance, flexibility and coordination are affected by vitamin D intake. Epidemiological studies, genetics and animal models show the role of vitamin D in MS according to the above; the possibility of the effect of these vitamins on the process of nerve regeneration can be considered according to the probability of the impact of exercise training in the form of central stability and also the effect mentioned in vitamin D, the question arises as to whether taking vitamin D and major stability exercises separately and in combination improves the indicators of balance, muscle strength, muscle endurance, coordination and is flexibility adequate? [6].

Research method

This research is an applied study regarding the results and semi-experimental research design. The study's statistical population was women with MS referred to the MS Association of the city where they

formed Sari. The researcher referred to the association of Patients with MS in Sari and medical centres. The place of referral of these patients is Toba clinic of Sari, first with the coordination of the mentioned centres for several sessions. It was held for the patients, and the purpose of the research and the stages of its implementation were explained to them. From the approximately 120 participants in the sessions, 36 were eligible for investigation. They participated in this study voluntarily as a statistical sample and were randomly divided into four groups) included: three experimental groups of supplement, exercise and combination of exercise + supplement and a control group (were divided; therefore, the primary sampling method in this study was voluntary. In Table 1, the descriptive information of the characteristics of the subjects in the control, supplement, exercise and Exercise + Supplement is provided.

Table 1- Descriptive characteristics of the subjects

Exercise groups		Control	Exercise	Exercise - Supplement	Supplement
Age	Average	34/10	31/50	28/77	36/22
	Standard deviation	5/30	7/80	3/59	7/47
Weight (kg)	Average	67/59	67/05	59/03	66/70
	Standard deviation	12/32	12/34	8/77	11/48
Height (cm)	Average	164/50	164/06	164/72	162/78
	Standard deviation	4/35	3/60	3/03	5/82

The owner of the entry into the research was: the ability to perform sports activities) by the relevant physician confirmed (recurrent-recurrent MS disease, advanced disability status (Less than or equal to three) confirmation of the disease's existence, type and severity in them by an expert physician and results in diagnostic tests such as MRI were performed (no cardiovascular disease, diabetes, thyroid abnormalities, gout, and movement limitations that prevented the exercise from being completed). Do not use antispasmodics and prednisone, in the age range of 20-45 years, ability to understand Persian conversation, not to be in the acute stage of the disease and to pass about one year of illness. With the owners of exit from the research, the following can also be mentioned: Absence from more than three sessions in the relevant exercises, contracting a disease that affects the performance of sports movements or indicators to be measured, use of certain medications or supplements (vitamins and minerals) severe stress outside of the usual treatment and research program that may have influenced the results Psychology that based on the participants' statements affected the individual's disease condition, recurrence of the disease in All groups, do not use vitamin D supplements in supplement groups, participate in any exercise activity in control groups and supplementation and use of vitamin D supplementation in groups practice and control [7]. It is worth noting that, according to the researcher's control, none of the subjects was removed from the study according to these criteria. It is necessary to mention that it is the most commonly used drug. The issues were resigned and Synovox, both from the

interferon family. Written consent was obtained from the subjects before the start of the training program, and then, at random, three experimental groups) include supplement group, exercise and combination of exercise + supplement and a control group (division Became. One week before the intervention, a pre-test was taken from all four groups, which included: Dynamometer to measure the strength of the extensor muscle of the torso, a body maintenance test at a 60-degree angle to measure the flexibility of the trunk flexor muscle, wells test to assess flexibility, throw test. The follow-up of the tennis ball was to evaluate coordination, and the stand-up difficulty was to measure balance. Protocol Exercise includes central stability exercises for eight weeks, three times a week as one. It was in the middle of the day that the sessions started from 20 minutes and increased to one hour (from the first session, five seconds of movement with six repetitions until the last session, eight seconds of training with ten repetitions) performed [8].

In addition, central stability training consisted of two parts: flexibility and strength training. Includes exercises such as flexor and hip adductor stretching, hamstring stretching, C-shaped stretching, Camel-cat movement, and body movement to the sides while lying on the back) muscle contraction and stretching Abdominal inclination, abdominal contraction and knee extension towards the chest, Superman movement, quadruped movement opposite, squatting while lying on your stomach, jumping back and forth, and snake moving. It was a cobra. Rest time between movements was considered as much as changing position and being in a difficult situation. In addition, increasing the training load was applied in two ways: a. Increase the number of repetitions in each round and b. Add limb movement to the previous activity. Vitamin D groups each took 1,500 IU vitamin D capsules every two weeks; the control group was asked to continue their daily life and refrain from exercising [9].

It should be noted that at the end of the intervention period (similar to the pre-test), all subjects were tested. SPSS software version 16 was used to analyze the collected data. From statistics, a description including mean and standard deviation was also used to describe the results. Also, to check the normality of the distribution of scores, the Kolmogorov-Smirnov test was used, and Confirmation of defaults was used to answer all research questions using ANKOA statistical method. Entered to control its possible effect on the posttest. Then and after the test, four groups were compared, and pre-test scores as an auxiliary variable. It is worth noting that Bonferroni's post hoc test was used to compare the pairs to see if it is meaningful differences between groups. The significance level of statistical analysis was also considered equal to (0/05).

Results

According to the results, central stability exercises and vitamin D significantly affected muscle strength ($F=9/12$, $P=0/002$). The pairwise comparison of the groups also shows that between the control-exercise + groups Supplement ($P=0/002$) and Practice-Practice + Supplement ($P=0/024$) and Supplement-Supplement + Practice ($P=0/001$), there is a significant difference; That is, in the group of exercise + supplement and then exercise, the most increase Muscle strength is observed (Tables two

and three (but between control-exercise groups (P=1) There is no significant difference between control-supplement (P=1) and exercise-supplement (P=1). In addition, central exercise stability and vitamin D significantly affected muscle endurance (F=0/68, P=0/001). Based on the comparison of pairs, between control-training (P=0/002) and control-training + supplement groups (P=0/001) and exercise-supplement (P=0/015) and supplement-supplement + exercise (P=0/001) Significant difference It can be seen; That is, muscle endurance increases in complementary and then exercise groups but between control-complementary groups) (P=1) and exercise-exercise + Supplement (P=1) There is no significant difference.

In addition, the results indicate that central stability exercises and vitamin D affect flexibility. (F=13/46, P=0/001). Comparison of groups also shows that between groups Control-exercise + supplement (P=0/001) and supplement-supplement + exercise (P=0/001) Significant difference has it; this means that in the exercise + supplement group, flexibility has increased; But between groups Control-exercise (P=0/122) and control-supplement (P=1) and exercise-supplement supplement (P=0/066) and exercise Supplement (P = 0/070) There is no significant difference. On the other hand, Central stability exercises and vitamin D significantly affected coordination (F=10/58, P= 0/001). In addition, the comparison of the pairs indicates that between the control-training groups (P=0/031), Control-exercise + supplement (P=0/001) and supplement-supplement + exercise (P=0/001) Significant difference has it; This means that coordination is increased in the exercise+supplement and then exercise groups, respectively; But between control-supplement groups (P=1), exercise-exercise + supplement (P =0/786) and exercise- Supplement (P=0/055) no significant difference (Tables two and three). Central stability exercises and vitamin D on balance were significant (F=23/49, P=0/001). Comparison Pairs of groups also indicate that between control-training (P=0/001) and control-training groups + Supplement (P=0/001) and Practice - Practice + Supplement (P=0/001) and Practice - Supplement (P=0/001) and Supplement - Supplement + Exercise (P=0/001) There is a significant difference (Tables two and three); The balance was increased in the order of priority in the exercise + supplement and then exercised groups, But between there was no significant difference between control and complement groups (P=1).

Table 2 - Description and comparison results of variables in four study groups using analysis of covariance

Variable	Group	Time	Average	Standard Deviation	Value of F	Level Meaning
Power (Kg)	Control	pre-exam	100/20	45/71	9/12	0/002
	Exercise	pre-exam	108/30	38/89		
	Exercise - Supplement	pre-exam	103/25	40/93		
	Supplement	pre-exam	131	36/65		
Muscular endurance	Control	pre-exam	106/56	29/51	9/68	0/001
	Exercise	pre-exam	184/22	47/53		

(Seconds)	Exercise - Supplement	pre-exam	91/88	53/51		
	Supplement	pre-exam	102/56	50/61		
Flexibility	Control	pre-exam	28/30	25/002	13/46	0/001
	Exercise	pre-exam	20/30	12/56		
	Exercise - Supplement	pre-exam	26	17/27		
	Supplement	pre-exam	66/87	47/45		
Coordination (Number of ball collisions)	Control	pre-exam	43/77	18/74	10/58	0/001
	Exercise	pre-exam	86	37/27		

Table 3 - The result of the Bonferroni test for comparing variables between pairs of studied groups

Study groups	The power Muscular	Endurance Muscular	Flexibility	Coordination	Balance
Control-excersoce	1	0/002	0/122	0/031	0/001
Control-Exercise+ Supplement	0/002	0/001	0/001	0/001	1
Control-Supplement	1	1	1	1	1
Exercise-Control+ Supplement	0/024	1	0/066	0/786	0/010
Exercise- Control Supplement-	1	0/015	0/070	0/055	0/015
Supplement- Supplement+ Exercise	0/001	0/011	0/001	0/001	0/001

Discussion and conclusion

The present study showed that central stability exercises and vitamin D significantly increased strength muscles were trained in priority + supplementation and then exercised, respectively. Regarding the effect of exercise compared to control, the results of this study are based on the findings. But he found research on the impact of supplementation failed. A combination training course has a positive and significant effect on the muscle strength of women with MS. Also, eight weeks of resistance training reported a significant impact on muscle strength in women with MS. Still, the effect of yoga exercises. It focused on the muscle strength of patients with MS, but it was inconsistent, which is probably why fewer strength activities are used in yoga exercises. It is worth mentioning about the effect of vitamin D on muscle strength in patients with MS was not found in a study. Due to the reduced Vitamin D levels in old age and its similarity to vitamin D deficiency in patients with MS. Taking vitamin D supplements and resistance training caused improved muscle strength in postmenopausal women.

According to another finding of the present study, central stability exercises and vitamin D cause a significant increase in muscle endurance was supplemented and trained in practice + groups, respectively [10].

In connection with the effect of activity compared with control, the results of this study are in line and co-workers matched. Yoga exercises have a significant impact on muscle endurance. Also, a period of central body stabilizing exercises has a positive and significant effect on the persistence of futsal players. Also, three weeks of the physical rehabilitation program positively impacted gait parameters, including index it has endurance. Also, a significant effect of four and eight Water exercise weeks focused on endurance walking in female patients with MS [11].

Regarding the impact of Exercise + Supplement Compared with control, the results of this study are consistent with the honourable findings of architects who examined the effect of combined exercise and magnesium supplementation on the endurance of patients with MS. Still, no study was found to compare other research variables. According to another finding of the present study, central stability exercises and vitamin D cause a significant increase. Muscle endurance was prioritized in the exercise + supplement groups and then exercised.

Regarding the impact of exercise compared to control, no research was found on the effect of supplementation. Besides, a significant impact of tai chi training on muscle coordination in patients with they were MS. Also, mental training significantly affected the eyes and hands of healthy girls 20-25 years old. It should be noted that the research is inconsistent, not found in this field nor compared with other research variables. In addition, the present study showed that central stability exercises and vitamin D in combination) Time caused the most significant increase in flexibility.

Regarding the effect of exercise compared to control, no research was found on the impact of supplementation. Yoga exercises increased the flexibility of patients with MS. The development of Pilates exercises on the flexibility of non-athlete women. Also, regular yoga exercises positively and significantly impact the flexibility of healthy non-athlete working women. One of the reasons for the increase in flexibility is frequent active muscle stretching exercises, which are inactive and focus on the major powers of the trunk. Stretching exercises increase the number of cells. It builds strength throughout the muscle and, as a result, increases flexibility. In addition, the present study showed that exercise with supplementation increases balance; the effect of exercise and supplementation has been more significant than exercise alone [12].

In the effect of exercise compared to control, no complementary impact of research was found. In this regard, tai chi exercises significantly affect the balance of women with MS. In another study, substantial impact of central body stability exercises on the balance of blind female athletes. Tai chi exercises significantly affect patients' balance with MS. Also, balance exercises positively affect the proportion of patients with MS [13].

According to the research results about the more significant effect of exercise with supplements and then exercise on often Indicators to be studied in patients with MS, based on existing studies, are likely to be this, production of 1 radical in patients due to disruption of the nicotinamide system of adenine dinucleotide phosphate-free, including nitric oxide, is expected to increase, and these factors exacerbate inflammatory reactions, and as a result, brain damage is exacerbated; hence, it is hypothesized that vitamin D is possible Is to prevent the progression of the disease by inhibiting the production of nitric oxide. Also, vitamin D reduces myostatin's expression (a negative regulator of skeletal muscle growth) and increases cell differentiation. The positive regulator of muscle growth becomes myogenic [14]. However, growth factor-like insulin type one is skeletal and, in interaction with myostatin and myogenic agents, plays a crucial role in maintaining and increasing the mass it has skeletal muscle. Studies have shown that there may be vitamin D receptors in skeletal muscle, and metabolites of this vitamin increase muscle metabolism by stimulating protein synthesis, affecting the ratio of type 2 muscle fibres and improving muscle function. Also, activity in the body has an anti-inflammatory moderating role; therefore, it is likely to reduce the potential enjoy disease processes. Also, endurance exercise makes use of it follows the muscle fibres that these exercises stimulate for structural and functional changes it is a muscle. It increases capillary availability, myoglobin storage, mitochondrial function and oxidative enzymes [15].

People with MS experience a percentage of walking disorders so that they can have more blood supply to their muscles through exercise. The more blood flow to the muscles, the greater the muscular efficiency of the individual and, as a result, the greater the muscular endurance Finds; Therefore, exercising with vitamin D may have a complementary effect on strength, endurance, flexibility and coordination. In addition, during exercise, our body's nervous system is constantly working to provide the necessary feedback. Reflect on the central nervous system regarding different positions of the body. Among the receivers, the primary senses that function during exercise are the spindles, the iliac crest organs, and so on. Joint receptors are important receptors for neuromuscular function. When muscle contraction and the body moves, the neurotransmitters continuously respond to the source of the receptors in the muscle. The spindle is the central receptor for skeletal muscle to which neural information constantly sends muscle tension, muscle length, and the amount of change in muscle length to the central nervous system it does [16].

Therefore, by doing exercise, these mechanisms are strengthened and lead to improvement; it is coordinated that the results of the present study also confirmed this issue. The increase in balance in the present study likely reflects the effect of central stability exercises on increased neuromuscular adaptation, improving the function of atrial and visual systems and increasing sensation be deep. Possible reasons for the increase in the balance following central stability exercises can be changed Mechanoreceptor feedback is known to lead to major nervous system reorganization, integration it becomes sensory-profound and changes in motor response. Also, it is possible to activate the receptors Sensory-deep, preparation of motor neurons in a group of muscles and joints to perform the movement,

increase coordination and integration of motor units, partner muscle contraction and increase inhibition of the opposite strength noted. It is worth noting that exercise and vitamin D probably have an increasing effect in this regard.

Article Message: In order of priority, exercise with vitamin D supplementation and exercise can have the most significant impact on improving the physical symptoms of women with MS; therefore, central stability training programs can be preferred, preferably with vitamin D supplementation. The recommended amount in the study or alone to improve the physical fitness of these patients.

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