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Effect of Whole Body Vibration Training on Depression Level

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Abstract

Recently, the Whole Body Vibration (WBV) training has been introduced as an alternative method of exercise or as a type of physical exercise in health and fitness centers. The purpose of the present study was to examine the effect of Whole Body Vibration (WBV) training applied for 12 weeks on depression level. A total of 53 healthy young male individuals participated in this study. Volunteers were randomly divided into two groups as the Whole Body Vibration Training Group (n=27) and the Control Group (n=26). WBV group did training 3 times a week for 12 weeks. The Control Group did not do any trainings. The Beck Depression Inventory (BDI) was applied to both groups before and after the 12-week WBV training. When the Beck Depression Inventory (BDI) scores of the WBV training group and Control groups were compared, it was determined that there were no significant differences in the pre-test Beck Depression Inventory (BDI) scores of the WBVT and Control Group according to the Mann-Whitney U-Test.

However, the post-test scores of the WBV training and Control groups was significant at a statistical level (p=.013). According to the Wilcoxon Signed Ranks test, the difference between the pre- and post-test scores of the WBV training group was significant at a statistical level (p=.014); and the difference between the pre-test and post-test scores of the Control Group was not statistically significant (p=.596). The effect of the Whole Body Vibration training on depression is positive and decreases the depression level.

Keywords: whole body vibration, training, depression, men

1. Introduction

It was reported in previous studies that depression affects more than 340 million people in the whole world (Kessler et al., 2003). Depression is a normal response of the individual to many situations that cause stress. Among the situations interpreted as depression, there are failures, death of a loved one, illnesses or understanding that old age is consuming one's resources (Atkinson et al., 1990).

There are many symptoms influencing the human psychological and physical functions under the umbrella terms of depression. Depression is actually a disorder of the human mood (Blackburn, 2003). People who are depressed generally isole themselves. There is also a decrease in sexual interest and desire (Hirschfeld, 1999). According to the World Health Organization (WHO), people with depression normally have several of the following: a loss of energy, a change in appetite, sleeping more or less, anxiety, reduced concentration, indecisiveness, restlessness, feelings of worthlessness, guilt or hopelessness, and thoughts of self-harm or suicide (https://www.who.int/en/news-room/fact-sheets/detail/depression#).

It is already known that exercise is beneficial both in physical and psychological terms (Bouchard et al., 1994; Szabo,1998; Szabo, 2000). In addition to physical and physiological benefits, exercise also reduces the tension and makes individuals feel better (Morgan, 1971).

Recently, the Whole Body Vibration (WBV) training has been introduced as an alternative method of exercise or as a type of physical exercise in health and fitness centers (Roelants, et al., 2004a; Roelants et al., 2004b; Cardinale & Bosco, 2003)

The WBV training is a safe method to increase the muscle activity and performance of athletes and healthy people (Burke et al., 1978). Many studies were conducted on the effects of WBV training on bio-motor features and physiological mechanisms (Nordlund et al., 2007; Rittweger, 2010; Cardinale & Erskine, 2008; Bogaerts et al.,2007; Delecluse et al., 2003). The WBV training is applied on the whole body via a vibrating platform (Nordlund et al., 2007; Rittweger, 2010; Cardinale & Erskine, 2008). The acute and chronic effects of the WBV training were examined by employing different protocols. In previous studies, the physiological effects of WBV training programs were examined,

and it was shown that it increased the muscle strength, flexibility, muscle cross-sectional area, bone mineral density and decreased abdominal fat (Delecluse, 2003; Petit, 2010; Fagnani, 2006; Bogaerts, 2007; Machado, 2010; Osawa & Oguma, 2013; Verschueren, 2004).

The purpose of the present study was to examine the effects of the 12-week Whole Body Vibration training on depression level.

2. Materials and Methods

2.1 Participants

A total of 53 volunteering male individuals between 20 and 30 years of age, who did not do regular exercise and who had no health problems were included in the study. The volunteers were randomly divided into two groups as the WBV Training Group (n=27) and the Control Group (n=26). The exclusion criteria were having any types of prosthesis, having a bone metabolism, muscle or neurological disease, or having chronic inflammatory diseases. The study was approved by the Ethics Committee of Akdeniz University Medical Faculty according to the Declaration of Helsinki. All participants signed an informed consent form.

2.2 Study Procedure

Volunteers were randomly divided into two groups as the WBV Training Group and the Control Group. The WBV training group received vibration training three days a week for 12 weeks. The Control Group did not receive any form of training. The WBV training group and the Control Group completed the Depression Scale before the start of the training program, at the end of the 12th week, and after the last training was over.

2.3 Whole Body Vibration Training

WBV training group performed WBV training 3 days per week for 12 weeks. WBV training was performed on the Vibration Platform (Aspire 588, Istanbul, Turkey). The WBV training group jogged for 10 min (40%-50% maximum heart rate) and performed stretching exercises for 15 min before starting the vibration training. At the end of the training session, they walked at a slow tempo for 5 min to cool down and did stretching for 5 minutes.

The training sessions consisted of eight standardized exercises: Squat, Deep squat, Wide stance squat, Lunge, Toes stand, Toes stand deep, Bent over pull, Lateral side rise. In the first week of the training, the training was carried out as 30 seconds exercise time, 30 Hz vibration frequency and 2mm vibration amplitude training for each movement; and 60 seconds resting time was given between the sets. Each week, the training duration, the WBV raining frequency, and the amplitude were increased gradually; and the resting time was shortened. At the end of the 12th week, the exercises were completed as 60 sec exercise time, 50Hz vibration frequency, 4mm amplitude, and 15 sec resting time between the exercises.

2.4 Data Collection Tools

Beck Depression Inventory (BDI) was used to collect the data.

2.4.1 Beck Depression Inventory (BDI)

Beck Depression Inventory (BDI) is a 21-item, self-report scale designed to measures characteristic attitudes and symptoms of depression. Each item consists of four-statement scale to indicate increasing depressive symptomatology. The scores 5-9 indicate that these ups and downs are considered normal; 10-18, mild to moderate depression; 19-29, moderate to severe depression, and 30-63, severe depression. The scale was applied on the first day of evaluation and after the training period (Beck et al.,1961). BDI was developed by Beck et al. and Turkish adaptation of the BDI had been done by Hisli, (1988).

2.5 Statistical Analyses

The results are given in mean ±standard error. The Mann-Whitney U-test was employed to evaluate the scores received from the Beck Depression Inventory, which is the dependent variable, (pre-test and post-test in the WBV training and Control Group) in the independent groups (pre-test and post-test in the WBV training and Control Group); and the Wilcoxon Signed Ranks test was employed in the evaluations in dependent groups (the pre-test and post-test of the WBV training Group, and the pre-test and post-test of the Control Group). The significance level was taken as $p<.05$.

3. Results

Comparison of pre-test and post-test Beck Depression Inventory (BDI) scores of the Whole Body Vibration Training and Control Group are shown in Table 1.

Table 1. Comparison of the pre-test and post-test Beck Depression Inventory (BDI) Scores of the Whole Body Vibration Training and Control Group

Variables	Pre-test		Post-test	
	WBV (M ± SD)	Control (M ± SD)	WBV (M ± SD)	Control (M ± SD)
BDI	10.78 ± 7.49	7.00 ± 6.24	7.04 ± 6.08	7.12 ± 8.65
Significance Level	t= .080	p=.936	t= -2.475	p=.013

When the Beck Depression Inventory (BDI) scores of the WBV training group and control group were examined, it was determined that the WBV training and Control Group pre-test scores were not statistically significant according to the Mann-Whitney U-Test (p=.936). The post-test of the WBV training and Control Group was found to be statistically significant (p=.013), (Table 1).

Table 2. Comparison of the Whole Body Vibration Training and Control Group Scores in the Intergroup Beck Depression Inventory (BDI)

Variables	WBV		Control	
	Pre-test (M ± SD)	Post-test (M ± SD)	Pre-test (M ± SD)	Post-test (M ± SD)
BDI	10.78 ± 7.49	7.04 ± 6.08	7.00 ± 6.24	7.12 ± 8.65
Significance Level	t= -2.445	p=.014	t= -.530	p=.596

According to the Wilcoxon Signed Ranks test, although the difference between the pre- and post-test scores of the WBV training group was found to be statistically significant (p=.014), the difference between the pre- and post-test scores of the Control Group was not found to be significant (p=.596), (Table 2). The WBV Training Group score, which was 10.78 in the pre-test, was found to be 7.04 in the post-test. This decrease in the depression scores shows that the WBV training has a positive effect on depression.

4. Discussion

The effect of exercise on depression has been the subject matter of many studies throughout the history. It was reported that exercise is required to improve depression symptoms; however, there is a need for further studies in this respect (Rimer et al., 2013).

Depression disorders are one of the most important problems on human health. To avoid depression, changing life style and similar exercises have an important place in the success of the treatment (Martinsen, 2008).

When the antidepressant effect of doing exercises therapy was investigated, it was reported that the effect size of exercise therapy was not bigger than any treatment modalities. To decrease the symptoms of depression, moderate-level exercise is faster than an effective control intervention (Lawlor & Hopker, 2001).

According to the findings obtained in the present study, the difference between the pre-test and post-test scores of the WBV training group and the post-test BDI scores of the WBV and Control Group was found to be statistically significant at the end of the 12^{th} week. It was determined that the 12-week regular WBV training was effective in decreasing the depression symptoms.

The relation between exercise and depression was examined in many previous studies, and it was demonstrated that regular exercise is beneficial for psychological disorders (Salmon, 2000; Weyerer, 1992).

It was seen that being active at the recreation level reduced the depression level. It was also concluded that physical activity increased physical and psychological health (Stephens, 1998; Salmon, 2001).

Baybak et al., (2000) conducted a study with 156 depressed volunteering individuals for 4 months, and divided the individuals into three groups as aerobic exercise, medical treatment group, aerobic exercise and medical treatment group. The results of the evaluations were interpreted at the end of the fourth, sixth and tenth months of the study. According to these results, it was determined that the group that had the most decreasing depression symptoms was the first group that did exercises.

Gerber et al., (2014) examined the relation between aerobic sports, dance activity, sports with ball and resistance exercises and depression with university students. In the study, it was concluded that participating in sports played with ball and dancing activities decreased the depression symptoms; and resistance exercises showed low depression symptoms. Roth & Holmez, (1987) conducted a study with 1051 students for 11 weeks, and applied aerobic exercises to one group, and stretching training to the other group. As a result, they reported that the BDI scores of the aerobic exercise group decreased and the exercises were more effective in reducing the depression symptoms.

Tekin et al., (2009) determined that physical activities carried out in free time affected the depression levels in a positive way both in men and women.

Regular exercises were applied to young people who had tendency to depression, and as a result, it was observed that

the depressive and exercise scores operated in an inverse proportion, and regular exercises decreased depression and suicide rates (Taliaferro et al., 2009; Brown & Blanton, 2002).

Individuals who are not active are generally more prone to depression. It was demonstrated that the risk of developing depression was lower in physically active individuals compared to inactive individuals (Wyshak, 2001).

Camacho et al., (1991) conducted a study and reported in the literature people who had regular exercise in their past and then became inactive had 1.5-fold higher depression risk when compared to those who did regular exercises at high levels.

In a study conducted a program which consisted of aerobic and resistance exercise, was applied to the training group and the scores were compared with a control group in university students. As a result of the study, it was determined that the depression level decreased in the aerobic exercise group at a significant level compared to the other participants (Balkin et al., 2007).

It was determined that suicide tendencies of males, who did exercise at lower levels, were lower compared to those who did not do any exercise; and suicide tendencies of male individuals who did exercise at moderate and high levels did not decrease (Brown & Blanton, 2002).

It was determined that the increase in physical activity in males decreased suicide tendencies, and the suicide tendencies of women who did high-level physical activity increased (Unger, 1997).

In cross-sectional studies, it was investigated whether spontaneous exercise habits reduced depression, and in experimental studies, formal exercise programs were used to test the hypotheses and depression was reduced (Salmon, 2001).

5. Conclusion

A total of 53 healthy young male individuals participated in this study. Volunteers were randomly divided into two groups as the WBV Training Group (n=27) and the Control Group (n=26). WBV group did training 3 times a week for 12 weeks. The Control Group did not do any trainings. The Beck Depression Inventory (BDI) was applied to both groups before and after the 12-week WBV training. When the Beck Depression Inventory (BDI) scores of the WBV training group and Control groups were compared, it was determined that there were no significant differences in the pre-test Beck Depression Inventory (BDI) scores of the WBV training and Control Group according to the Mann-Whitney U-Test. The post-test scores of the WBV training and Control Groups was significant at a statistical level (p=.013). According to the Wilcoxon Signed Ranks test, the difference between the pre-test and post-test scores of the WBV training group was significant at a statistical level (p=.014) and the difference between the pre-test and post-test scores of the Control Group was not statistically significant (p=.596). The WBV training group score, which was 10.78 in the pre-test, was found to be 7.04 in the post-test.

As a result, 12-week WBV training had an effect at a significant level on depression scores, and depression scores decreased. It is possible to claim that WBV training has a positive contribution to depression levels. The results of the present study support the results of different studies in the literature.

Since the safety of the WBV training has a short duration for application and is safer, individuals may be encouraged to carry out WBV training to reduce depression levels. There are many studies in the literature conducted on the physiological outcomes of the WBV training. However, to evaluate the different outcomes of this training type in psychological terms, there is a need for more studies to be conducted with different age groups.

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