# Whole Body Vibration Effect on Fibromyalgia

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**Abstract: Background:** Fibromyalgia is a common chronic condition involving widespread pain, cognitive sym ptoms, non-restorative sleep, and somatic symptoms and associated with changes in the activity of brain structures. Vibration is a mechanical stimulus and an important tool characterized by an oscillatory motion, which determine by the frequency and amplitude. WBV is a novel training exercises, can aid to increase safe and effective exercise protocols. Therefore, the objective of the current study is the evaluation of the efficacy of whole body vibration in treatment of fibromyalgia. **Methods:** An interventional prospective study was carried out. 50 female patients suffering from fibromyalgia were equally divided into two groups: group I: received whole body vibration while group II received conventional medical treatment as controls. **Results:** In GI, whole body vibration resulted in significant improvement of pain, fatigue VAS scores, and FIQ. Whereas, significant improvement in pain VAS scores only found in control group. **Conclusion:** WBF is effective treatment in treatment of FM. It reduced pain, fatigue, and quality of life of the treated patients.

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**Keywords:** Fibromyalgia, Whole body vibration (WBV)

## 1. Introduction:

Fibromyalgia is a common chronic condition involving widespread pain, cognitive symptoms, non-restorative sleep, fatigue, poor health-related quality of life (HRQoL), and a number of somatic symptoms[1, 2]. It is associated with changes in the activity of brain structures involved in pain processing [3]. A plethora of scientific evidence that has accumulated during the last decades resulted in a significant improvement of the understanding of the pathophysiology of the disease. It could be due to changes in either the peripheral or central nervous system (CNS). Alterations in the high brain area of fibromyalgia patients have been investigated but the definite mechanisms are still unclear [4]. Current therapeutic approaches in patients with FM remains a multidimensional approach including patient education, behavioral therapy, exercise, pain management, and relief of chronic symptoms, rather than the use drug therapies, based on the mechanisms of disease development [5]. Nonpharmacological therapies include physical therapies such as yoga, tai chi, walking, and whole-body vibration (WBV)[6].

WBV can be delivered by two types of exercise platform. One is a sinusoidal vibration device that induces reciprocal vertical displacements on the left and right sides of a fulcrum and generates higher lateral acceleration than vertical acceleration. The second is a vertical vibration device that induces up-and-down oscillations over a vertical axis and produces high strain in the vertical axis [7]. The intensity of vibration is determined by three parameters, namely, amplitude, frequency, and oscillation acceleration[8].

Whole Body Vibration is widely used in rehabilitation and sports training to improve muscle strength, balance, and flexibility [9]. Controlled whole body vibration is a type of physical therapy (PT) thought to activate muscles via reflexes[10]. In the therapy involving whole body vibration, normally, the subject stands on an oscillating platform that generates sinusoidal vertical vibrations with frequency and amplitude that are selected and controlled by a trained professional. The time of the subject in the platform working, the time of the subject in the platform resting, the number of sets in a session and the number of sessions are determined following the clinical disorder to be treated, as well as the physical conditions of the subject[11]. Biomechanical parameters, included in WBV training, are body position, amplitude, frequency, magnitude and duration[12]. The effects of the whole body vibration are probably related to direct and indirect actions [13]. Whole body mechanical vibration on the muscle performance would be due to the activation of a tonic excitatory effect, the tonic vibration reflex [14].

## 2. Patients and Methods

### Participants

The current study is an interventional prospective study, which conducted at Al-Azhar University Hospitals. 50 female cases presented with

fibromyalgia were included. The inclusion criteria that were set 1)- Patient age from 20 to 60 years old, 2)- Duration of pain is more than three months, and 3)- Pain is mild to moderate in severity according to visual analog scale (VAS). On the hand, exclusion criteria were 1)- chronic medical diseases hypertension, cardiac, hepatic and renal, use of any medication that may significantly affect balance; diabetes; use of any medication with potential neurotoxic effects. 2)- sever Pain according to visual analog scale (VAS).

**Study intervention**

Patients were equally divided into two groups according to treatment protocol. Group A, 25 patients treated by whole body vibration with low frequency vibrating board. They were subjected to 6 week vibration therapy program consisted of a total of 18 training session, 3 sessions per week. Group B**,** 25 patients as a control group and were treated by medical treatment only.

**Outcomes measures**

At baseline and after 6 weeks vibration therapy program, demographic data, clinical examination which include (inspection of the whole body joints, palpation of several tender points, range of motion, and examination of motor system of lower limbs, sensory system and reflexes), and laboratory data were collected. In addition, all patients were subjected to full history taking and assessment of disability and current health status using the fibromyalgia impact questionnaire (FIQ). Plain X-Ray and Magnetic Resonance Imaging (MRI) if needed. **Statistical analysis**

Data obtained from the present study were computed using SPSS versions 17 under the platform of Microsoft Windows 7. Continuous data were expressed in the form of mean ± SD while categorical data were expressed in the form of count and percent. Comparison of continuous data was performed utilizing student t test, while categorical data were done using Chi-square test. P value less than 0.05 was considered statistically significant.

**3. Results:**

Main characteristics and musculoskeletal manifestations of participants at baseline in the present study are listed in Table 1. No significant differences between the studied groups were found. Table 2 revealed that significant improvement in pain, fatigue VAS scores, and FIQ was found in GI after WBV treatment. Whereas, GII showed only significant improvement in pain after conventional treatment. Additionally, Comparison between GI and GII patients after treatment found significant lower pain VAS score and improvement of FIQ scores in patients who treated with WBV (GI), graphically represented by Fig1. On the other hand, no significant differences between the studied groups regarding the associated clinical conditions after treatment, Fig2.

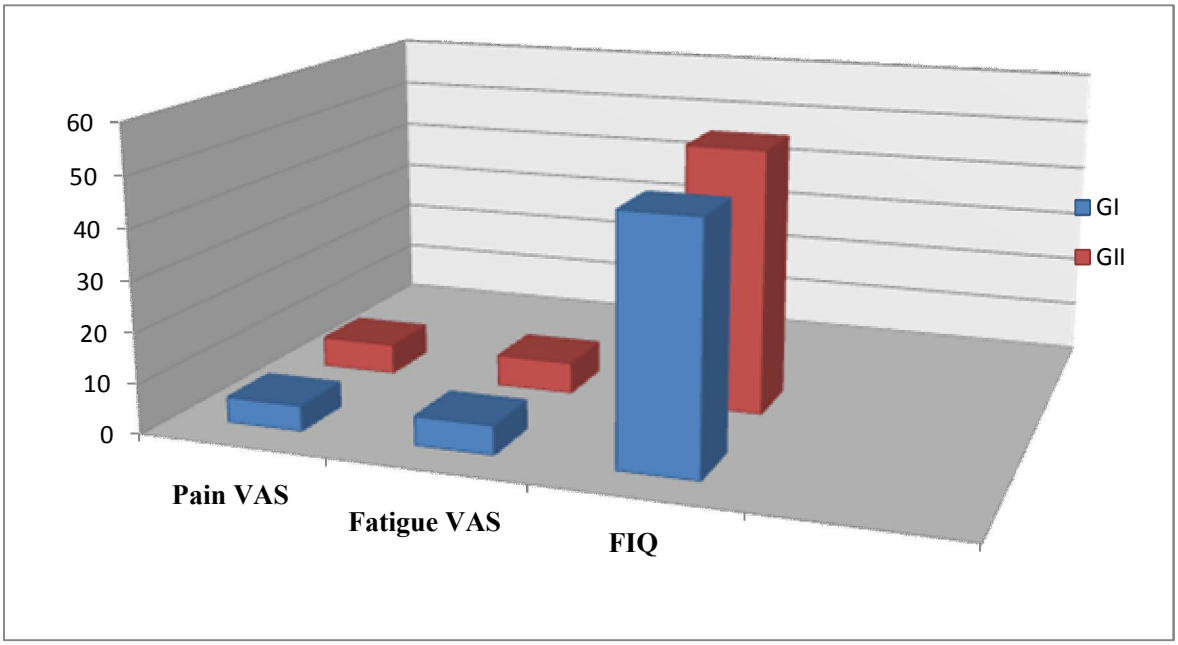


**Fig.1 Musculoskeletal manifestations and FIQ in GI compared to GII**

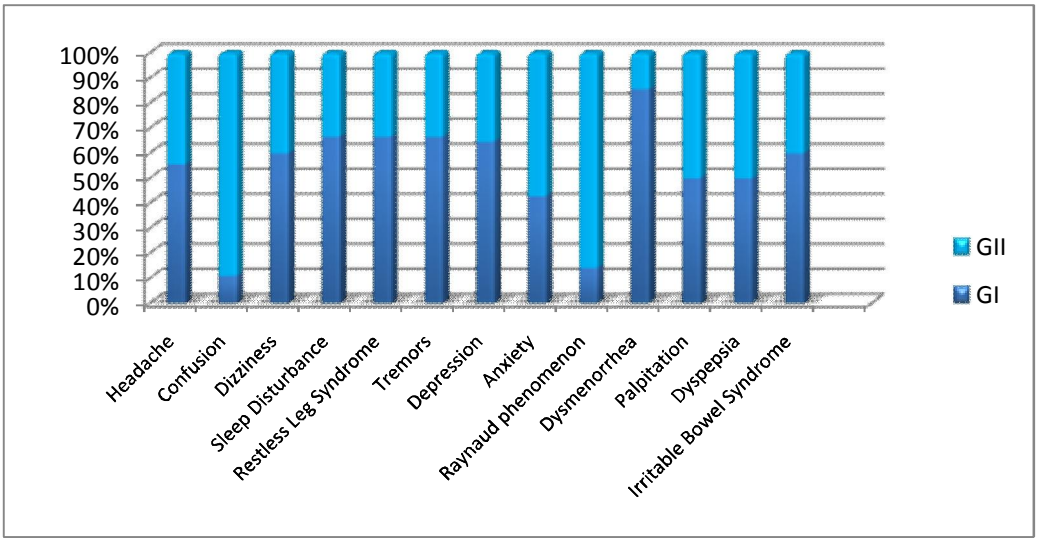


**Fig.2. Clinical manifestations in studied groups after treatment**

**Table 1. Main characteristics and musculoskeletal manifestations at baseline in studied groups.**

| | GI (n=25) | GII (n=25) | Student t test t p | |
|---|---|---|---|---|
| Age | 37.3 ± 4.0 | 37.9 ± 3.7 | t -0.55 | *p* 0.58 |
| BMI | 28.2 ± 2.8 | 27.1 ± 2.9 | 1.4 | 0.17 |
| Symptoms duration | 4.9 ± 1.2 | 5.4 ± 1.1 | -1.6 | 0.13 |
| Tender Points Count | 7.7 ± 3.5 | 7.8 ± 2.7 | -0.08 | 0.93 |
| Pain VAS | 6.4 ± 0.7 | 6.8 ± 0.4 | -1.2 | 0.26 |
| Fatigue VAS | 7.5 ± 0.9 | 7.0 ± 1.0 | 1.4 | 0.18 |
| | | | **Chi-square test P X2** | |
| Post-exertional pain | 9 (36.0 %) | 9 (36.0 %) | 0.0 | 1.0 |
| Stiffness | 5 (20.0 %) | 3 (12.0 %) | 0.6 | 0.44 |
| Fatigue | 14 (56.0 %) | 14 (56.0 %) | 0.0 | 1.0 |
| Notes: Values expressed as mean (SD). *p-value of the Student's t test, values between arches represent ratio | | | | |

**Table 2. Comparison between musculoskeletal manifestations and FIQ before and treatment in studied groups.**

| | | Before treatment | After treatment | Student t test t | P |
|---|---|---|---|---|---|
| GI | Pain VAS | 6.4 ± 0.7 | 5.1 ± 1.1 | 3.1 | 0.007* |
| | Fatigue VAS | 7.5 ± 0.9 | 5.8 ± 1.0 | 4.7 | 0.0001* |
| | FIQ | 52.3 ± 3.7 | 48.3 ± 4.4 | 3.4 | 0.001* |
| GII | Pain VAS | 6.7 ± 0.4 | 6.1 ± 0.8 | 2.2 | 0.041* |
| | Fatigue VAS | 7.0 ± 1.0 | 6.3 ± 1.0 | 1.9 | 0.064 |
| | FIQ | 54.1 ± 4.8 | 52.9 ± 5.4 | 0.82 | 0.42 |

Notes: Values expressed as mean (SD).
*p-value of the Student's t test.

## 4. Discussion

Fibromyalgia (FM) is a common, complex chronic widespread pain condition is characterized by fatigue, sleep disturbance and cognitive dysfunction [15]. WBV is a physical therapy that was shown to improve muscle strength [16], body balance[17], gait mobility [18], cardiorespiratory fitness [19], bone-density[20], and pain [21] in healthy and various clinical

populations. WBV may be an adequate treatment for FM as a main therapy or when added to a physical exercise programme as it could improve the balance, disability index, quality of life, fatigue, and pain of patients with FM[22]. Therefore, the present study aimed to evaluate the efficacy of whole body vibration in the treatment of fibromyalgia. The study comprised 50 patients who were randomly and equally divided into two groups: group I: received whole body vibration while group II received conventional medical treatment. The main finding of the current study was that whole body vibration resulted in significant improvement of pain and fatigue VAS scores in addition to significant improvement in FIQ. Whereas, the conventional medical treatment showed only significant improvement in pain VAS scores.

This is in agreement with the study of ***Alentorn-Geli et al., (2008)***[23] who reported significant reduced in pain and fatigue scores from baseline in the exercise and vibration group (EVG ), but not in the exercise group or control group. In addition, the EVG showed significantly lower pain and fatigue scores at week 6 compared to the CG, whereas no significant differences were found between the EG and CG ($p > 0.05$). Therefore, 6-week traditional exercise program with supplementary WBV safely reduces pain and fatigue, whereas exercise alone fails to induce improvements. In another study, ***Sañudo et al., (2010)*** [24] investigated the effectiveness of a 6-week traditional exercise programme with supplementary whole-body vibration (WBV) in improving strength and health status in women with fibromyalgia (FM). A 5% improvement from baseline in total FIQ score was observed in the exercise groups ($p \leq 0.05$), and was accompanied by reductions in SF36 scores of 9.8% ($p<0.001$) and 7.9% ($p<0.001$) in the GEV and GEnV group, respectively. Improvements were also observed in muscle strength in both groups but greater in the GEV group. Moreover, ***Olivares et al., (2011)***[25] analyzed the effect of 12-week tilting Whole Body Vibration therapy (WBV) on Health Related Quality of Life (HRQoL) in fibromyalgia (FM). A 12-week course of tilting WBV therapy was associated with improvements in FIQ scores (12%) but not in the 15D questionnaire. From all the above listed data, WBV is an effective method on supporting fibromyalgia treatment and relief pain.

**5. Conclusions:**

Whole body vibration (WBV) is effective treatment in treatment of FM. It reduced pain, fatigue, and quality of life of the treated patients.

**Recommendations:**

Two main recommendations can be clarified from the results of the present study.

1) WBF is recommended for FM patients.

2) Another larger multicenter study is advised to confirm results of the present study.

**References:**


1. Segura-Jimenez V, Alvarez-Gallardo IC, Carbonell-Baeza A, et al. Fibromyalgia has a larger impact on physical health than on psychological health, yet both are markedly affected: the al-Andalus project. Semin Arthritis Rheum. 2015;44: 563-570.
2. Wolfe F. Editorial: the status of fibromyalgia criteria. Arthritis Rheumatol. 2015;67: 330-333.
3. Giesecke T, Gracely RH, Williams DA, Geisser ME, Petzke FW, Clauw DJ. The relationship between depression, clinical pain, and experimental pain in a chronic pain cohort. Arthritis Rheum. 2005;52: 1577-1584.
4. Sawaddiruk P, Paiboonworachat S, Chattipakorn N, Chattipakorn SC. Alterations of brain activity in fibromyalgia patients. J Clin Neurosci. 2017;38: 13-22.
5. Karras S, Rapti E, Matsoukas S, Kotsa K. Vitamin D in Fibromyalgia: A Causative or Confounding Biological Interplay? Nutrients. 2016;8.
6. Busch AJ, Webber SC, Brachaniec M, et al. Exercise therapy for fibromyalgia. Curr Pain Headache Rep. 2011;15: 358-367.
7. Elmantaser M, McMillan M, Smith K, et al. A comparison of the effect of two types of vibration exercise on the endocrine and musculoskeletal system. J Musculoskelet Neuronal Interact. 2012;12: 144-154.
8. Cardinale M, Bosco C. The use of vibration as an exercise intervention. Exerc Sport Sci Rev. 2003;31: 3-7.
9. Kawanabe K, Kawashima A, Sashimoto I, Takeda T, Sato Y, Iwamoto J. Effect of whole-body vibration exercise and muscle strengthening, balance, and walking exercises on walking ability in the elderly. Keio J Med. 2007;56: 28-33.
10. Cakar HI, Cidem M, Sebik O, et al. Whole-body vibration-induced muscular reflex: Is it a stretch-induced reflex? J Phys Ther Sci. 2015;27: 2279-2284.
11. Cardinale M, Wakeling J. Whole body vibration exercise: are vibrations good for you? Br J Sports Med. 2005;39: 585-589; discussion 589.
12. Johnson AW, Myrer JW, Hunter I, et al. Whole-body vibration strengthening compared to traditional strengthening during physical therapy in individuals with total knee arthroplasty. Physiother Theory Pract. 2010;26: 215-225.

13. Santos-Filho SD, Cameron MH, Bernardo-Filho M. Benefits of whole-body vibration with an oscillating platform for people with multiple sclerosis: a systematic review. Mult Scler Int. 2012;2012: 274728.
14. Torvinen S, Kannus P, Sievanen H, et al. Effect of four-month vertical whole body vibration on performance and balance. Med Sci Sports Exerc. 2002;34: 1523-1528.
15. Lawson K. Potential drug therapies for the treatment of fibromyalgia. Expert Opin Investig Drugs. 2016;25: 1071-1081.
16. Rees SS, Murphy AJ, Watsford ML. Effects of whole-body vibration exercise on lower-extremity muscle strength and power in an older population: a randomized clinical trial. Phys Ther. 2008;88: 462-470.
17. Lee K, Lee S, Song C. Whole-body vibration training improves balance, muscle strength and glycosylated hemoglobin in elderly patients with diabetic neuropathy. Tohoku J Exp Med. 2013;231: 305-314.
18. Zhang L, Weng C, Liu M, Wang Q, Liu L, He Y. Effect of whole-body vibration exercise on mobility, balance ability and general health status in frail elderly patients: a pilot randomized controlled trial. Clin Rehabil. 2014;28: 59-68.
19. Bogaerts AC, Delecluse C, Claessens AL, Troosters T, Boonen S, Verschueren SM. Effects of whole body vibration training on cardiorespiratory fitness and muscle strength in older individuals (a 1-year randomised controlled trial). Age Ageing. 2009;38: 448-454.
20. Gusi N, Raimundo A, Leal A. Low-frequency vibratory exercise reduces the risk of bone fracture more than walking: a randomized controlled trial. BMC Musculoskelet Disord. 2006;7: 92.
21. del Pozo-Cruz B, Hernandez Mocholi MA, Adsuar JC, Parraca JA, Muro I, Gusi N. Effects of whole body vibration therapy on main outcome measures for chronic non-specific low back pain: a single-blind randomized controlled trial. J Rehabil Med. 2011;43: 689-694.
22. Collado-Mateo D, Adsuar JC, Olivares PR, et al. Effects of Whole-Body Vibration Therapy in Patients with Fibromyalgia: A Systematic Literature Review. Evid Based Complement Alternat Med. 2015;2015: 719082.
23. Alentorn-Geli E, Padilla J, Moras G, Lazaro Haro C, Fernandez-Sola J. Six weeks of whole-body vibration exercise improves pain and fatigue in women with fibromyalgia. J Altern Complement Med. 2008;14: 975-981.
24. Sanudo B, de Hoyo M, Carrasco L, et al. The effect of 6-week exercise programme and whole body vibration on strength and quality of life in women with fibromyalgia: a randomised study. Clin Exp Rheumatol. 2010;28: S40-45.
25. Olivares PR, Gusi N, Parraca JA, Adsuar JC, Del Pozo-Cruz B. Tilting Whole Body Vibration improves quality of life in women with fibromyalgia: a randomized controlled trial. J Altern Complement Med. 2011;17: 723-728.

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