

The “vibro-annular” abdominal vibration therapy improves sleep quality and life quality of insomnia patient: A case report

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Abstract

Introduction: Vibro-annular abdominal vibration is an effective treatment for insomnia. In this article, we report a case of vibro-annular abdominal vibration therapy for insomnia in a male patient.

Case presentation: A 52-year-old man with insomnia for 10 years was treated with vibro-annular abdominal vibration therapy for four weeks. The Pittsburgh Sleep Quality Index (PSQI), Short Form-36 Health Survey (SF-36), Encephalofluctuograph Technology (ET) and polysomnography (PSG) were evaluated before and after therapy.

Compared to the baseline measurements, the PSQI values were significantly lower and the SF-36 score was higher after treatment with vibro-annular abdominal vibration therapy. In PSG data, total sleep time and sleep efficiency were increased after treatment; ET showed improvements in the levels of ischemia, hypoxia, and fatigue.

Conclusion: Vibro-annular abdominal vibration therapy can improve sleep quality and quality of life in patients with insomnia, as well as improve ischemia, hypoxia, and fatigue.

Keywords: Chronic insomnia; Traditional Chinese Medicine therapy; Vibro-annular abdominal vibration; Complementary alternative therapy; Case report.

Abbreviations: ET: Encephalofluctuograph Technology; NREM: Non-Rapid-Eye-Movement; PSG: Polysomnography; PSQI: Pittsburgh Sleep Quality Index; REM: Rapid-Eye-Movement; SF-36: Short Form-36 Health Survey.

Introduction

Insomnia is a sleep disorder associated with neurological disorders [1]. Most adults are not completely satisfied with the quantity or quality that is achieved which may be due to waking up early or sleepless throughout the night [2]. Insomnia is a major social problem with a high incidence and is difficult to manage [3]. The diagnosis and treatment of insomnia should be based on a complete sleep history to address the causes and triggers of poor sleep quality [4]. First-line treatments are behavioral interventions but these can often be difficult to access for some patients. Recently, alternatives to behavioral therapies have been developed to allow effective treatments to be more easily accessible for patients with insomnia [5].

The Tuina Department of the Affiliated Hospital of Changchun University of Traditional Chinese Medicine has inherited the diagnosis and treatment concepts of Changbai Mountain's meridian regulating the visceral genre. Previously, within our department. Abdominal vibration therapy has demonstrated positive clinical results in the treatment of insomnia. This study aimed to verify the curative effects of vibro-annular abdominal vibration therapy as an optimized treatment for insomnia.

Case Presentation

A 52-year-old male patient from Changchun, China, was diagnosed with chronic insomnia according to the criteria of the International Classification of Sleep Disorders (3rd Edition). The patient was 170 cm tall, weighed 60 kg and complained of chronic insomnia that had lasted for 10 years. The patient had difficulty falling asleep more than three times a week and had received "Baizi Yangxin Pills" for insomnia. One month previously, the patient complained that the "Baizi Yangxin Pills" did not improve the insomnia and the patient was offered vibro-annular abdominal vibration therapy. The patient had no history of allergies, genetic diseases, or chronic diseases such as heart disease, hypertension, diabetes mellitus, cerebrovascular disease, hepatitis, tuberculosis or trauma. The patient had no history of blood transfusion and no recent history of vaccinations.

This treatment was performed by doctors from the Affiliated Hospital of Changchun University of Chinese Medicine. The acupoints involved during treatment refer to the 2006 National Standard of the People's Republic of China (GB/T12346-2006). The patient was treated and recruited for the study under written informed consent. The clinic was maintained at a stable temperature and was in a clean and quiet environment. The patient was placed in the supine position on the treatment bed, the abdomen was exposed, and the body was relaxed. The doctor was positioned on the right side of the patient. After warming his hands, the doctor applied talcum powder as the vibration medium which was applied to the abdomen of the patient and the vibration technique involved slow and gentle movements.

The entire abdomen was massaged clockwise with «Shenque» (CV8) as the center for 5 min, up to «Zhongwan» (CV12) and down to «Zhongji» (CV3). The whole abdomen was rubbed for 10 min to balance the Yin and Yang. The abdomen was vibrated with a «Zhongwan» (CV12) for 2 min, a palm «Shenque» (CV8) for 3 min and a flash «Zhongji» (CV3) for 5 min. The frequency of massage was more than 200 times per minute. The abdomen was then pressed with the palm centered on the «Shenque» (CV8). Deep pressing

was performed on the inhale with gentle lifting for 5 min. The whole process lasted 30 min.

The course of treatment lasted for four weeks with 5 treatments per week. A follow-up visit was conducted on the 8th week after the treatment. During treatment, the patient did not receive any other treatment from any other clinic or hospital.

In this study, observations of the impact of vibro-annular abdominal vibration therapy were observed in a patient with insomnia at baseline (before treatment), and at 2, 4 and 8 weeks after treatment. We showed that after treatment, the PSQI score (Figure 1) was lower compared to baseline levels, while the SF-36 score (Figure 2) was higher compared to the baseline (Table 1). PSG was evaluated at baseline and after 4 weeks of treatment (Table 2), and we found that total sleep time and sleep efficiency were increased after 4 weeks of treatment. ET was evaluated at baseline and after 4 weeks of treatment (Figures 3 and 4) and showed that the levels of ischemia, hypoxia and fatigue were improved in the patient. No side effects such as skin damage or soft tissue injury were observed during the treatment and the patient reported improved sleep quality after receiving the abdominal vibration.

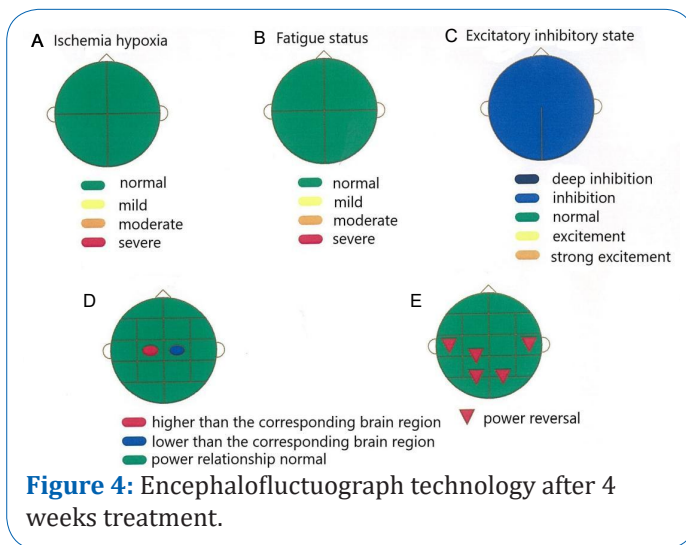
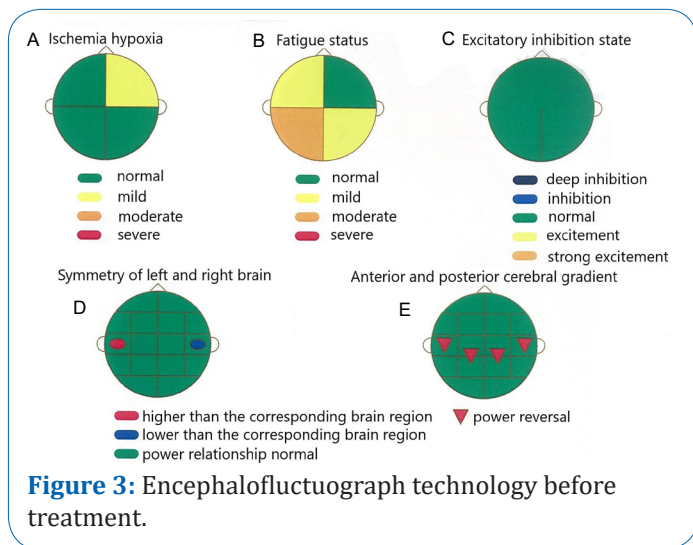
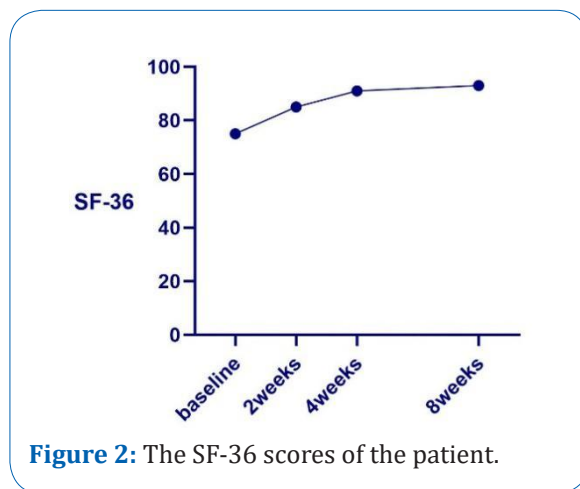
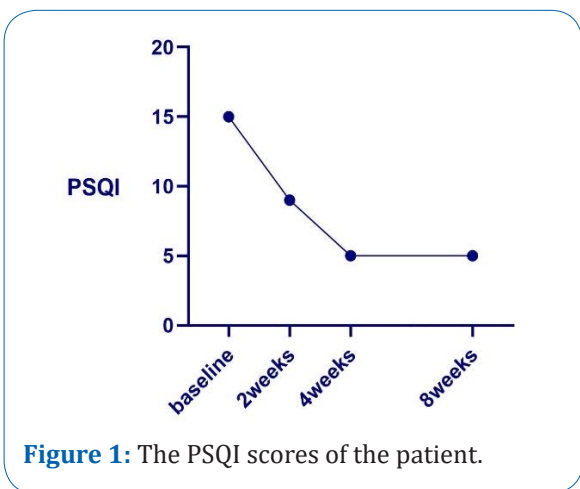


Table 1: The PSQI and SF-36 scores of the patient at four observation points.

	Baseline	2 weeks	4 weeks	8 weeks (Follow-up)
PSQI	15	9	5	5
SF-36	75	85	91	93

PSQI = Pittsburgh Sleep Quality Index (score >5 indicates poor sleep quality); SF-36 = Short Form-36 Health Survey (higher score indicates better quality of life)

Table 2: The PSG parameters of the patient at two observation points.

PSG parameters	Baseline	4 Weeks
Total sleep time (min)	366	468
Sleep efficiency (%)	49.3	59.4
Sleep latency (min)	286.7	21.6
Deep sleep latency (min)	301.7	111.1
Wake times	22	14

PSG: Polysomnography

Discussion and Conclusion

Insomnia has high health care costs and poses a significant risk for the development of cardiovascular and cerebrovascular diseases, including cognitive deficits and neurological diseases [6,7]. It increases fatigue, reduces work efficiency, and affects social and interpersonal relationships [8]. Studies have shown that vibrating the abdomen activates hypothalamic adrenal Cortical Hormone Releasing Hormone (CRH) / Corticotropin Releasing Hormone Type I Receptor (CRHR1) signaling, which initiates the HPA axis [9]. During the control of sleep and wakefulness, the neuroendocrine axis is mainly regulated by the HPA axis [10]. Deep sleep inhibits the HPA axis and reduces the secretion of ACTH and glucocorticoids after stress, which can improve the symptoms of insomnia, however, the activation of the HPA axis or the use of glucocorticoids can lead to insomnia [11]. Studies have shown that patients with insomnia often have HPA axis dysfunction [12]. Insomnia is a predictor of subsequent mental illness [13] and has a major impact on the quality of life of patients.

The treatment and observation of this patient showed that the PSQI was significantly lower after 4 weeks of vibro-annular abdominal vibration therapy compared with the scores at baseline. In addition, SF-36 was found to be significantly higher after treatment. The PSQI and SF-36 both showed little difference after 8 weeks of treatment compared to 4 weeks after treatment. The PSG results showed that the total sleep time and sleep efficiency increased significantly after vibration treatment. Based on these data, we hypothesize that vibro-annular abdominal vibration can alleviate the symptoms of insomnia and improve the quality of life of patients.

In this study, the assessment of changes in ET indicated that vibro-annular abdominal vibration therapy improved the levels of ischemia, hypoxia and fatigue in this patient. Several factors are associated with an increased risk of cancer including insomnia, obesity and intermittent hypoxia due to obstructive sleep apnea [14]. Fatigue is one of the most common comorbidities of insomnia; however, the clinical significance of fatigue in patients with insomnia is largely unknown [15]. Improvements in cerebral ischemia, hypoxia and fatigue are beneficial for patients with insomnia.

Patients with insomnia can be treated using a variety of approaches including behavioral and drug therapies [16]. Although drug treatments are effective, they have associated side effects and can result in dependency. Alternative non-pharmacological treatments for insomnia include psychological, behavioral and physical therapies. Cognitive-Behavioral Therapy (CBT) is considered a safe and effective alternative to

drug treatment for insomnia. CBT for insomnia (CBTi) shortens the latency of falling asleep and improves sleep quality and efficiency by changing sleep hygiene and sleep habits [17]. However, this method requires more input and time from doctors, is expensive, and is not widely used in clinical practice.

Chinese medicine includes a wide range of treatments for insomnia including the oral administration of Chinese herbs, acupuncture, massage, and exercise training. Herbal medicines have been widely used in clinics, such as licorice, tuckahoe, jujube kernels and other herbs that have sedative effects [18]. However, the consumption of traditional Chinese herbs is inconvenient and cannot be performed by some patients with insomnia. A randomized controlled trial found that acupuncture has a significant effect on improving sleep quality and mental health in patients with insomnia [19]. However, acupuncture cannot be performed in all patients, particularly those with low pain thresholds. Clinically, abdominal massage has previously been used to treat a female patient with chronic insomnia for 30 years due to heart and spleen deficiency, anxiety and depression. After treatment, the patient showed significant improvements in sleep quality, with reduced levels of anxiety and depression [20].

In this study, we observed improvements in sleep quality and quality of life in an insomnia patient treated with vibro-annular abdominal vibration therapy. Abdominal vibration therapy is based on the vibration of acupoints at the root of the palm, the «Zhongwan» (CV12) and down to the «Zhongji» (CV3), focusing on tonifying the spleen and stomach, relieving abdominal distension, promoting peristalsis, and unblocking the whole body's qi, in order to achieve the effect of calming and tranquilizing the mind. Finally, the palm of the «Shenque» (CV8) was used to balance Yin and Yang and calm the patient calm.

Vibration therapy must avoid specific contraindications such as skin damage, abdominal inflammation and tumors. Doctors performing the procedure must be qualified, formally trained and have extensive clinical experience. A high degree of patient cooperation greatly influences on the therapeutic effect. Some of the indicators observed may be subject to individual subjective influences, therefore, future studies may add rs-fMRI as an objective indicator to accurately assess the effects of vibro-annular abdominal vibration therapy in patients with insomnia.

Declarations

Acknowledgements: The authors would like to thank the patient for letting us publish his case and all the contributors for their input and work.

Author contributions: Liu P designed the experiments; Data were acquired and analyzed by Jiao JD, Zhang jindan, Zhang Y , Qu ZH and Cong DY. The manuscript was drafted by Zhi XY and revised by Zhang HS. All authors reviewed and approved the final manuscript for submission.

Funding: Supported by National Natural Science Foundation of China (No.82074569). The funders had role in preparation of the manuscript.

Natural Science Foundation of Jilin Province (No.:20240304084SF)

Availability of data and materials: The data used and analyzed during the present study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate: The study plan is approved by the medical Ethics Committee of Affiliated Hospital of Changchun University of Traditional Chinese Medicine (CCZYFYLL2017 Standard word -051).

Consent for publication: Published clinical details and images of written informed consent are from the patient himself.

Competing interests: The authors have no conflicts of interest to declare.

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Manuscript Information: Received: August 12, 2024; Accepted: September 02, 2024; Published: September 16, 2024

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Citation: Hong-Shi Z, Jin-Dan Z, Zi-Han Q, Xiao-Yu Z, Jun-Dong J, Ye Z, De-Yu C, et al. The “vibro-annular” abdominal vibration therapy improves sleep quality and life quality of insomnia patient: A case report. *Open J Clin Med Case Rep*. 2024; 2280.

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