Iran J Public Health, Vol. 51, No.8, Aug 2022, pp.1914-1915

Letter to the Editor

Implication of Local Plantar Vibration in Patients with Diabetic Neuropathy

Mahsa Sabziparvar [1], *Soofia Naghdi [1,2], Noureddin Nakhostin Ansari [1,2,3], Hamidreza Fateh [4,5]

1. *Department of Physiotherapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran*
2. *Neuromusculoskeletal Research Center, Iran University of Medical Sciences, Tehran, Iran*
3. *Research Center for War-Affected People, Tehran University of Medical Sciences, Tehran, Iran*
4. *Department of Physical Medicine and Rehabilitation, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*
5. *Endocrinology and Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, Iran*

***Corresponding Author:** Email: naghdi@sina.tums.ac.ir

(Received 12 Aug 2020; accepted 21 Aug 2020)

Dear Editor-in-Chief

The prevalence of diabetes in Iranian population aged 25–70 years was reported 11.9% in 2011 (1). Type 2 diabetes is a worldwide disease with several secondary complications. Peripheral neuropathy is a common complication, which affects up to 50% of the patients with diabetes (2). Neuropathic pain, decreased sensitivity, lower intensity of proprioceptive and reflex responses, and muscle weakness in the lower limbs are sensory and motor impairments presented in Diabetic Polyneuropathy (DPN) which impacts activities of daily living and the patient's quality of life (3). These factors also affect motor coordination of gait performance and, together with the loss of feet protective sensation, increase the risk of falling (4). Besides the glycemic control, the maintenance of feet protective sensation, neuropathic pain management, and fall prevention are patient-important outcomes for individuals with DPN (5).

Strict glycemic control and changes in lifestyle are the most effective approach to prevent DPN and its complications (1). However, once developed, there is no appropriate intervention to treat or reverse DPN. Pharmacologic therapies for the management of the neuropathic pain are limited due to frequent side effects such as urinary retention, fatigue, and drowsiness leading some patients to discontinue the treatment (3).

Physical treatment modalities are options that have few contraindications, rare side effects, and nearly no drug interactions. One of the physical modalities used in neuropathy is therapeutic vibration, which is used in both forms of the whole body vibration and the local vibration (5).

Local vibration is inexpensive and available intervention, but limited studies have been done in relation to its effects in diabetic patients (6). Local vibration can increase blood flow and improve nitric oxide level (7). The application of vibrating insole can improve the foot sensation, vibration sense threshold, decrease the postural sways, and finally improve the static balance in healthy human, diabetic patients, and patients with stroke (8, 9).

The high prevalence of diabetic peripheral neuropathy, its debilitating symptoms including pain, decrease of the foot sensation, balance disorders,

and the lack of effective drug treatments for these complications suggest the need for non-pharmacological and non-invasive treatments for this population (10). Physical interventions such as vibration are suitable choices for the treatment of these patients. These non-invasive treatments are effective in the management of chronic complications related to diabetes and neuropathy (e.g. neuropathic pain) and can have a positive effect on the quality of life of individuals (10).

Taken together, it is conceivable that the application of local vibration on the sole of the foot in patients with DNP has the implication to increase blood flow, improve foot protective sensation (light touch and pressure), vibration threshold and finally improve the balance. Hence, we suggest further investigations following rigorous methodology on the application of local plantar vibration in patients with DNP.

Conflict of interest

The authors declare that there is no conflict of interests.

References

1. Esteghamati A, Larijani B, Aghajani MH, et al (2017). Diabetes in Iran: prospective analysis from first Nationwide diabetes report of National Program for prevention and control of diabetes (NPPCD-2016). *Sci Rep.* 7(1):13461.
2. Dyck PJ, Kratz KM, Karnes JL, et al (1993). The prevalence by staged severity of various types of diabetic neuropathy, retinopathy, and nephropathy in a population-based cohort: the Rochester diabetic neuropathy study. *Neurology,*43:817-24.
3. Boulton AJM, Vinik AL, Arezzo JC, et al (2005). Diabetic neuropathies: a statement by the American Diabetes Association. *Diabetes Care,* 28(4):956-62.
4. Allet L AS, Golay A, Monnin D, de Bie RA, de Bruin ED (2008). Gait characteristics of diabetic patients: a systematic review. *Diabetes Metab Res Rev*, 24(3):173-91.
5. Caroline CR, Rodrigo PB, Rodrigo DP (2018). Effects of whole body vibration in individuals with diabetic peripheral neuropathy: a systematic review. *J Musculoskelet Neuronal Interact*, 18(3):382-388.
6. Lundeberg T (1984). Long-term results of vibratory stimulation as a pain relieving measure for chronic pain. *Pain*, 20(1):13-23.
7. Maloney-Hinds C, Petrofsky JS, Zimmerman G, Hessinger DA (2009). The role of nitric oxide in skin blood flow increases due to vibration in healthy adults and adults with type 2 diabetes. *Diabetes Technol Ther,* 11(1):39-43.
8. Hijmans J GJ, Zijlstra W, Hof A, Postema K (2008). Effects of vibrating insoles on standing balance in diabetic neuropathy. *J Rehabil Res Dev*, 45(9):1441-9.
9. Priplata A, Niemi J, Salen M, Harry J, Lipsitz LA, Collins JJ (2002). Noise enhanced human balance control. *Phys Rev Lett*, 89 (23):238101.
10. Kessler NJ. B, Hong J (2013). Whole body vibration therapy for painful diabetic peripheral neuropathy: A pilot study. *J Bodyw Mov Ther*, 17(4):518-22.