

# Focal Muscle Vibration: An Emerging Modality in Stroke Rehabilitation

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## Respected Editor,

Stroke is one of the highest contributors to mortality in South East Asia. Its prevalence in Pakistan is assessed to be 250/100,000 population with 350,000 new cases per annum [1]. Stroke is a leading cause of disability where 20-40% of stroke survivors are affected by spasticity, a complication of upper motor neurons [2]. Spastic paralysis secondary to stroke leads to functional limitations due to ataxia, gait disturbances, joint contracture, and pain that deteriorates the quality of life. Post-stroke spasticity management requires a mix of pharmacological and certain rehabilitative treatments, of which the prevalent ones in Pakistan are virtual reality, early mobilization, movement therapy induced by force and gait training and non-invasive brain stimulation. For the treatment of spasticity, focal muscle vibration (FMV) is more affordable, user-friendly, with no known adverse effects [3]. Despite its promising results, focal muscle vibration has not yet been introduced in Pakistan probably due to lack of literature.

Focal muscle vibration (FMV), an effective neuro-rehabilitative procedure, requires the focal application of vibration of appropriate frequency (variable according to the muscle) on the muscle belly. This stretches the muscle by producing muscle waves. The propagation of muscle waves results in muscle stretch which induces the tonic vibration reflex *via* spinal circuits [4]. Tonic vibration reflex is a phenomenon where vibration induces involuntary contraction in vibrated muscle and a relaxation of its antagonist [5].

Effectiveness of FMV was proven by Costantino C, *et al.* in their randomized control trial (RCT) published in 2017. A total of 32 post-stroke patients with chronic upper limb spasticity were divided into two groups. The experimental group (17 patients) was given low amplitude (2 mm), high frequency (300 Hz) vibrations for 30 minutes, thrice a week for a month. The control group received sham therapy. Statistically significant difference existed between two groups in modified ashworth scale (MAS) for shoulder ( $p=0.007$ ), elbow ( $p=0.003$ ), and wrist ( $p<0.001$ ) [6]. Further promising results were proved in RCT conducted by Oh J, *et al.* which was published in late 2017. They included hemiplegic patients with calf muscle spasticity and applied 80 Hz vibration with an

amplitude of 0.3 mm. It was found that FMV had an antispastic effect on Gastrocnemius. The angle of ankle dorsiflexion and range of movement of the ankle was increased after the application of FMV [7]. Moreover, the use of FMV was found to reduce the risk of falling in the elderly by improving balance [8].

Studies show that FMV has a promising outcome and it can significantly reduce spasticity which can improve quality of life in stroke patients. Further trials should be carried out in our population as well to develop a better understanding of the potential efficacy of FMV. The rehabilitative physicians should be vigilant of newer techniques and modalities being developed across the world and should aim to initiate the use of new scientifically proven beneficial techniques in their practice.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ACKNOWLEDGEMENTS

Jawad Ahmed and Marium Zafar contributed to the manuscript design. All authors significantly contributed to manuscript preparation. Farheen Malik critically revised the manuscript. All authors have read and approved the final version of the manuscript.

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Received: November 30, 2019; Revised: December 14, 2019; Accepted: December 20, 2019

DOI: <https://doi.org/10.37184/lnjpc.2707-3521.1.5>