

## Effect of Focal Muscle Vibration on Pain, Mobility, Balance, and Sensation in Diabetic Peripheral Neuropathy

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**Background:** Diabetic Peripheral Neuropathy (DPN), the most common complication of Type 2 diabetes mellitus (T2DM), affects 50-70% of all with T2DM and it is characterized by pain, impaired balance and functional mobility, and sensory loss. DPN negatively impacts the activity of daily living and quality of life of all with DPN. However, few effective interventions exist to address the aforementioned symptoms and impairments.

**Purpose:** This primary aim of this study was to analyze the effects of focal muscle vibration (FMV) on pain, mobility, balance, and sensation in individuals with DPN and the secondary aim involved analyzing the effects of FMV in individuals with DPN based on their pain severity at baseline.

**Methods:** Participants were recruited based on the following inclusion criteria: diagnosis of T2DM for at least 1 year, diagnosis of DPN, age of 18 and above, standing with both feet independently, no other comorbidities, English-speaking, and have normal/corrected vision. The study involved a 4-week intervention where Brief Pain Index – DPN (BPI-DPN) for pain, Berg Balance Scale (BBS) for balance, Timed Up-and-Go (TUG) for functional mobility, and Semmes Weinstein Monofilament Test (SWMT) for sensation were measured at baseline and at 4 weeks post-intervention. Two modified Myovolt wearable focal muscle vibration (FMV) devices with frequency 120Hz were applied bilaterally, at 3 different muscles, 10 minutes per muscle, 3 times a week, for 4 weeks. In addition to analyzing the scores of all 13 patients, the scores of the patients were also analyzed based on the severity of pain experienced by them at baseline. Three distinct groups were formed based on pain severity, where, individuals who scored 0-3 were considered to have mild pain, patients who scored between 4-6 were considered to have moderate pain, and lastly, patients who scored 7 and above were considered to have severe pain. Descriptive statistics and paired *t*-tests were used for data analysis.

**Results:** 13 patients with DPN, 9 Female, 4 Male, aged  $65.7 \pm 8.4$  years had completed the study so far. Compared to baseline, statistically significant improvements were observed in functional mobility as measured by TUG ( $p=0.0036$ ) and TUG cognitive ( $p<0.001$ ), and sensation on the left foot as measured by SWMT ( $p=0.0389$ ) at post intervention. On comparing the scores of all measures separately for each group, based on pain severity, statistical significance was observed in the TUG for the moderate pain group ( $p = 0.019$ ) and TUG cognitive scores for the mild pain ( $p = 0.047$ ) and moderate pain ( $p = 0.002$ ) group, and the SWMT scores for the left foot in the mild pain group ( $p = 0.049$ ).

**Conclusion:** Despite the small sample size, results show FMV relieves pain, improves balance, functional mobility, and sensation in individuals with DPN.

**Relevance to Allied Health:** All allied health professionals working in the field of rehabilitation sciences could benefit from learning about the effects of FMV in DPN. The findings of this study is beneficial to all disciplines of allied health as it provides evidence to clinicians to use FMV as an intervention for other diagnoses such as multiple sclerosis (MS), other forms of peripheral neuropathy such as chemotherapy induced peripheral neuropathy (CIPN), or stroke, among others.