PAIN REDUCTION IMPROVES BALANCE CONFIDENCE IN PEOPLE WITH PERIPHERAL NEUROPATHY

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Introduction

Peripheral neuropathy (PN) is a growing epidemic that affects nearly 20% of U.S. citizens aged 75-85 (Franklin et al.1990). This disease is classified by the progressive deterioration to sensory nerves. It is often accompanied by allodynia, or the perception of pain from non-noxious stimuli (Boulton et al 2004).

Individuals with PN also exhibit decreased self-reported daily physical activity. Chronic pain negatively impacts many psychological factors, and often leads to depression and poor quality of life. However, it is currently unknown if decreased confidence in performing normal activities of daily living is associated with PN-related pain.

The purpose of study was to 1) examine the relationship between PN-related foot pain and activity-specific balance confidence, and 2) examine the potential for acute reduction in foot pain to influence confidence in balance within this population.

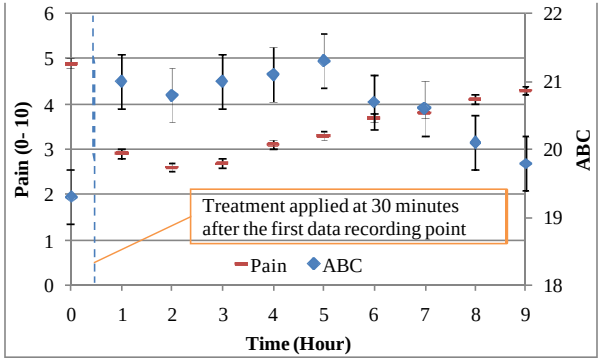

Figure 1 – Pain and ABC levels across nine continuous hours of data collection. Following treatment, pain level decreased and ABC scores increased. By 9hr, both pain level and ABC scores returned to close pre-test (0hr) levels.

Method

Participants with physician-diagnosed PN were recruited from the community. Initial screening was completed to ensure the presence of foot pain. Self-reported foot pain was measured by a Visual Analog Scale (VAS) for pain. The scale ranged from 0-10 with 10 being the worst pain possible. Participants were included if they reported pain ranging from 3-8.

Participants completed three days of testing separated by one week. Balance confidence was assessed by the modified Activities-specific Balance Confidence (ABC) questionnaire (Filiatrault et al. 2007). Respondents self-rated the degree of confidence in their balance when performing 15 different activities of daily living. A four-category response format with descriptive anchors was used (0, not at all confident; 1, slightly confident; 2, moderately confident; 3 very confident). Responses were summed to produce an ABC score ranging from 0-45.

Following completion of the VAS pain scale and the ABC, one of three topical analgesic treatments was applied to the participant's feet. A double blind, placebo-controlled format was employed. Treatment order was randomized using a Latin-square method such that participants received each treatment exactly once.

Foot pain level (VAS) and balance confidence (ABC) were reassessed 30 minutes following treatment application. The same variables were also assessed once per hour for the following eight hours using a palm pilot and the Purdue Momentary Assessment Tool (PMAT, Bangstate, Inc.).

Pain levels and ABC scores were analyzed using two-factor (Treatment X Time) ANOVA with repeated measures. Pearson product correlations (R) were used to examine the relationship of pain and balance confidence. Tukey'spost hoc analysis was used wherever appropriate.

Acknowledgements

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Results

Included participants (20 men, 22 women, mean ? SE age = 70.8 ? 1.4 yrs, height = 151.6 ? 1.60, body mass = 79.4 ? 3.3) had been diagnosed with PN for 6.4 ? 0.7 years.

While additional main effects and interactions were observed, only time effects are presented here. Pain level was significantly affected across time ($F_{9,36}$ = 29.85, $p < 0.01$). A two point reduction in pain was observed from pre-test (i.e., 0hr) to 1hr (treatments were applied at 0.5hr). Significant pain reduction was present until 5hr, upon which time sensation of pain gradually rose to pre-test levels by 9hr (Figure 1).

ABC scores also changed within the 9hr study period ($F_{9,36}$ = 2.59, $p < 0.01$). ABC significantly increased from 0hr to 1hr, and remained elevated between hours 3-5hr (Figure 1).

Correlation analysis revealed a significant negative correlation between pain and ABC (Pearson R = -.2762, $p < 0.0001$). However, detailed inspection of the graph (Figure 1) revealed that the inverse relationship between pain and ABC only occurred at 0-1hr and again at 6-9hr. Between these time points (i.e., 2-5hr), pain and ABC changed in parallel.

Conclusion

The presence of PN-related foot pain negatively impacts confidence in balance needed to complete normal activities of daily living. Interestingly, this inverse relationship may only hold for relatively high self-reported pain levels (i.e., VAS pain scale > 3.5). Future research is needed to fully explore this relationship.

An acute reduction in foot pain significantly increases one's confidence in balance. The inclusion of a topical analgesic should therefore be considered in both the management PN and the design of future intervention studies for this population.

References

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