

Neurostimulation in painful diabetic neuropathy

Aim: Electrical modulation of the nervous system is known to aid in pain relief and spinal cord stimulation (SCS) is a recommended intervention for the management of chronic neuropathic pain conditions. This systematic review and network meta-analysis evaluated the relative effectiveness of SCS for managing painful diabetic neuropathy and compare low-frequency and high-frequency SCS.

Methods: Articles from MEDLINE, CENTRAL, Embase, and WikiStim were screened. Articles were eligible if they were randomized controlled trials in adults with refractory diabetic neuropathic pain, with SCS as intervention and a comparator of either usual care, an active intervention, or a placebo. Outcomes were pain intensity on a visual analog scale, the proportion of patients achieving a 50% reduction in pain intensity, and health-related quality of life.

Results: Three studies including 272 participants from 27 research sites across Europe and the United States were included. Both low and high-frequency SCS reduced pain intensity after 3 and 6 months, resulted in a larger proportion of patients who achieved at least a 50% reduction in pain intensity and increased health-related quality of life scores compared to conventional medical management. No differences were seen between low and high-frequency SCS in the percentage of 50% responders and in health-related quality of life whereas high frequency provided a larger pain relief after 6 months (mean difference 2.07, 95% CI -3.26 to -0.87) but not after 3 months.

Conclusions: This review showed that both low and high-frequency SCS has a positive effect on people with painful diabetic neuropathy in terms of pain relief and life quality. Despite the limited number of studies included and the lack of a head-to-head comparison of low and high-frequency SCS, SCS may still prove an effective tool in the management of diabetic painful neuropathy for people not responding to analgesics.

Comment. Management of painful diabetic neuropathy can be difficult, as current neuropathic pain medications show limited effects with a high risk of adverse effects. However, non-pharmacological interventions such as neurostimulation show promising effects. SCS works by masking painful stimuli and pain transmission, thus easing the pain of the patients. Key differences between low and high-frequency SCS seem to be the paresthesia-inducing effect of low-frequency stimulation and intolerance or decreased efficacy over time, not seen to the same degree with high frequency. This review appears to confirm the superiority of high-frequency stimulations over time, despite the few studies included.

However, SCS is an invasive treatment as the device is implanted. Thus, non-invasive central or peripheral neuromodulation techniques are gaining traction for pain management. Transcutaneous electrical neural stimulation studies have shown beneficial effects on pain relief in diabetic painful neuropathy (Zeng H et al *Sci Rep.* 2020;10:19184), with fewer adverse effects and with a possible added benefit on glycemic control. Thus, it shall be interesting to follow the development of neurostimulation as a treatment of diabetic painful neuropathy in the future.

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Reference. Duarte RV, Nevitt S, Copley S, Maden M, de Vos CC, Taylor RS, Eldabe S. Systematic Review and Network Meta-analysis of Neurostimulation for Painful Diabetic Neuropathy. *Diabetes Care.* 2022 Oct 1;45(10):2466-2475. doi: 10.2337/dc22-0932. PMID: 36150057.

<https://diabetesjournals.org/care/article/45/10/2466/147650/Systematic-Review-and-Network-Meta-analysis-of>