Comment on "Effectiveness of Peripheral Nerve Stimulation in Managing Chronic Pain: A Systematic Review and Meta-analysis of Randomized Controlled Trials"

To the Editor:

We read with interest the recently published article titled "Effectiveness of peripheral nerve stimulation in managing chronic pain: A systematic review and meta-analysis of randomized controlled trials" by Manchikanti et al (1), which evaluated the effectiveness of peripheral nerve stimulation for the management of chronic pain using meta-analysis. While the study addresses an important topic, we wish to raise a concern regarding the authors' model selection strategy. Specifically, they reported applying a random-effects model without providing a rationale for this choice.

In meta-analysis, selecting an appropriate model—either fixed-effect or random-effects—is critical for accurately pooling effect size estimates. The fixed-effect model assumes that all included studies estimate the same true effect size, whereas the random-effects model allows for variability in true effect sizes across studies, reflecting underlying heterogeneity (2,3).

In practice, the decision to apply a fixed-effect or random-effects model remains contentious due to the lack of universally accepted criteria or a standardized framework for guiding model selection across different contexts. Some authors have suggested that model choice should be informed by the methodological characteristics of the included studies and the assumptions underpinning them. The fixed-effect model is generally considered appropriate when all studies are functionally identical, with the goal of estimating a single effect size applicable only to the population under study (2). By contrast, the random-effects model is typically recommended when the included studies are independent and heterogeneous in terms of participants or interventions, with the aim of drawing inferences that extend beyond the population studied (2). This reasoning likely underlies Manchikanti et al.'s decision to apply a random-effects model. However, we consider this rationale subjective and insufficiently supported by robust evidence.

Each of the existing approaches to model selection has strengths and limitations. Nonetheless, in the interest of objectivity and practical application, we support the approach whereby a fixed-effect model is applied when $I^2 < 50\%$ and $P > 0.05$, and a random-effects model is applied when $I^2 \geq 50\%$ and $P \leq 0.05$. In cases where $I^2 < 50\%$ with $P \leq 0.05$ or $I^2 \geq 50\%$ with $P > 0.05$, model selection is guided by study methodology and underlying assumptions, as outlined above.

A further issue concerns the lack of explicit reporting of I^2 thresholds for classifying heterogeneity in Manchikanti et al.'s article. One frequently cited reference is Higgins et al., who tentatively proposed values of 25%, 50%, and 75% to represent low, moderate, and high heterogeneity, respectively (4).

In conclusion, we believe that Manchikanti et al. should have explicitly stated the criteria used for model selection as well as the thresholds applied for classifying heterogeneity.

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References

1. Manchikanti L, Khaira MB, Soin A, et al. Effectiveness of peripheral nerve stimulation in managing chronic pain: A systematic review and meta-analysis of randomized controlled trials. *Pain Physician* 2025; 28:E481-E507.
2. Borenstein M, Hedges LV, Higgins JPT, Rothstein HR. Fixed-effect versus random-effects models. In: *Introduction to meta-analysis. 1st edition.* Chichester, UK: John Wiley & Sons; 2009:83-85.
3. Deeks JJ, Higgins JPT, Altman DG, McKenzie JE, Veroniki AA; on behalf of the Cochrane Statistical Methods Group. Chapter 10: Analysing data and undertaking meta-analyses. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, eds. *Cochrane Handbook for Systematic Reviews of Interventions. Version 6.5.* Cochrane; 2024. Updated November 2024. Accessed September 26, 2025. https://training.cochrane.org/handbook/current/chapter-10
4. Higgins JPT. Measuring inconsistency in meta-analyses. *BMJ* 2003;327:557-560.