

Clinical Evidence for Sustained Pain Relief Following 60-Day Percutaneous PNS: A Review

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BACKGROUND

- Peripheral nerve stimulation (PNS) for the treatment of chronic pain can be an effective tool, and recent years have seen the development of PNS technologies and approaches intended to overcome the historical limitations of conventional PNS.
- Recent studies have reported that PNS treatments using temporary (e.g., up to 60-day) percutaneous leads can produce significant and sustained pain relief, but no study has reviewed this clinical evidence across pain indications.
- This pragmatic review discusses the clinical evidence for sustained relief of pain following temporary percutaneous PNS treatment.

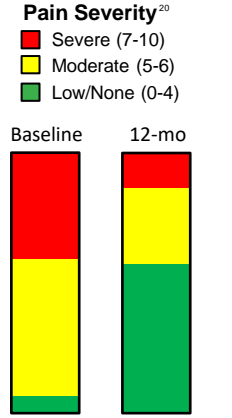
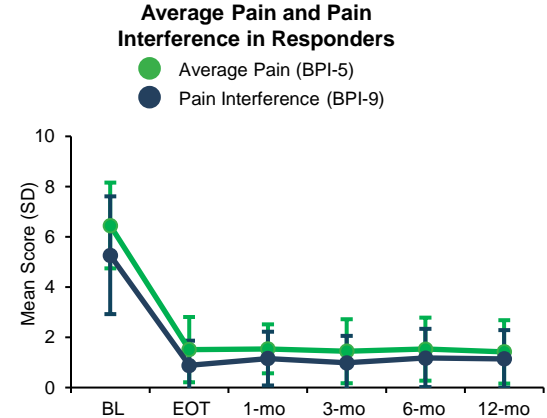
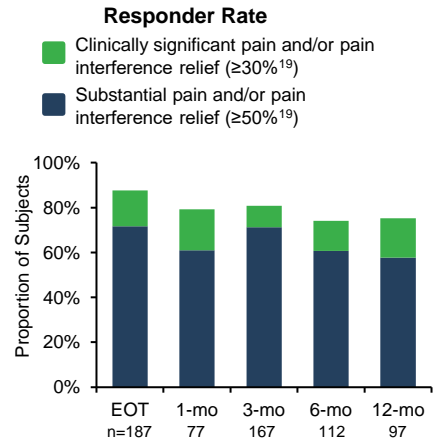


METHODS

- MEDLINE, Google Scholar, and Web of Science were searched through September 2021 for studies using percutaneous PNS for chronic pain with leads that were removed at the end of treatment (EOT).
- Search terms: "peripheral nerve stimulation", "percutaneous", "chronic pain"
- Study exclusions: permanently implanted PNS systems, in-office needle-based stimulation (e.g., PENS, PNT, TENS, or subcutaneous field stimulation).
- Per-subject data were compiled, as available, for each study to enable aggregate analyses of responder rates (defined as those that had $\geq 50\%$ relief) and average reductions in pain and pain interference in responders at baseline (BL), end of treatment (EOT), and at 1-mo, 3-mo, 6-mo, and 12-mo follow-up.

RESULTS & DISCUSSION

- 18 publications representing 11 studies were identified, including 3 randomized controlled trials (RCTs) and 8 prospective case series.¹⁻¹⁸
- Studies delivered percutaneous PNS for up to 60 days for the treatment of chronic pain without a permanently implanted device, though there were some differences in devices and approach. Pain indications included shoulder pain, low back pain, and post-amputation pain.



- The aggregate proportion of subjects with $\geq 50\%$ relief was 72% (134/187) at the end of treatment, with an average of 78% reduction in pain intensity and 84% reduction in pain interference among responders. Furthermore, 88% (164/187) reported $\geq 30\%$ relief at EOT.
- A majority of subjects reported sustained relief during long-term follow-up. Four studies (including two RCTs) reported outcomes at one year of follow-up, with 58% (73/97) continuing to report $\geq 50\%$ relief.

• **Studies using percutaneous PNS for up to 60 days for chronic pain have reported substantial and sustained reductions in pain with follow-up periods up to 12 months and consequent improvements in quality of life.**
• **A growing body of recent literature supports that percutaneous PNS for up to 60 days may provide significant and enduring pain relief.**

1. Yu et al., 2001; 2. Chae et al., 2001; 3. Yu et al., 2004; 4. Chae et al., 2005; 5. Renzenbrink et al., 2004; 6. Rauck et al., 2012; 7. Rauck et al., 2014; 8. Wilson et al., 2011; 9. Chae et al., 2013; 10. Wilson et al., 2014a; 11. Wilson et al., 2014b; 12. Kapural et al., 2018; 13. Gilmore et al., 2018; 14. Gilmore et al., 2019a; 15. Gilmore et al., 2019b; 16. Gilmore et al., 2020; 17. Deer et al., 2021; 18. Gilmore et al., 2021; 19. Dworkin et al., 2008; 20. Jensen et al., 2001
 AG, MD, JR, and SC are consultants and meeting participants/lecturers with SPR Therapeutics. NC and JB are employees of SPR Therapeutics.