Change in pain, disability, patient satisfaction and quality of life after 60-day PNS of the occipital nerve for chronic headache disorders: 12-month outcomes

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Introduction

- Headache disorders, including occipital neuralgia and chronic migraine phenotypes, are highly prevalent, disabling, and frequently refractory to conservative management (1).
- These conditions are associated with substantial healthcare utilization and reduced quality of life (2).
- Temporary 60-day percutaneous peripheral nerve stimulation (PNS) targeting the occipital nerves has emerged as a minimally invasive neuromodulation strategy, though prospective real-world data evaluating durability of response following device removal remain limited (3).

Objectives

- To prospectively evaluate changes in pain intensity, functional disability, headache-related disability, and patient-reported global improvement through 12 months following a 60-day course of occipital PNS.

Methods

- Consecutive adults presenting to a tertiary academic pain center underwent fluoroscopy- and ultrasound-guided percutaneous lead placement targeting the greater and/or lesser occipital nerves, connected to an external pulse generator for approximately 60 days, followed by lead removal. Outcomes were assessed at baseline, end of treatment (~60 days), and 12 months after device removal.
- Pain intensity was measured using the 11-point Numeric Rating Scale (NRS), with responder thresholds defined as ≥30%, ≥50%, and ≥80% reduction.
- Functional disability was assessed using the Neck Disability Index (NDI), and headache-related disability using the Headache Impact Test-6 (HIT-6), with a minimum clinically important difference (MCID) defined as ≥8-point reduction.
- Patient Global Impression of Change (PGIC) was used to assess overall improvement, with a clinically meaningful response defined as PGIC ≥6.
- Descriptive statistics were reported as mean ± SD or n (%), and responder proportions were presented with 95% Wilson confidence intervals.

Results

- Forty-two patients were included (mean age 63.4±17.5 years; 66.7% female), with a mean baseline pain duration of 5.3±3.0 years.
- At 60 days, 76.2% of patients achieved ≥30% pain reduction and 54.8% achieved ≥50% reduction, with a smaller proportion achieving ≥80% reduction (Figure 1A).
- At 12 months following device removal, responder rates increased, with 97.6% achieving ≥30% improvement and 92.9% achieving ≥50% reduction (Figure 1B).
- Patient-reported global improvement increased over time, with a higher proportion of patients reporting PGIC ≥6 at 12 months compared to end of treatment, suggesting sustained perceived benefit after device removal (Figure 2).
- Functional disability scores improved substantially, with all patients with baseline moderate disability improving to mild disability by 12 months, and 97.1% of those with severe or complete disability improving to moderate or better (Figure 3).
- Mean HIT-6 scores decreased from 50.2±10.2 at baseline to 40.8±5.3 at 12 months, with 64.3% achieving the MCID threshold (Figure 4).

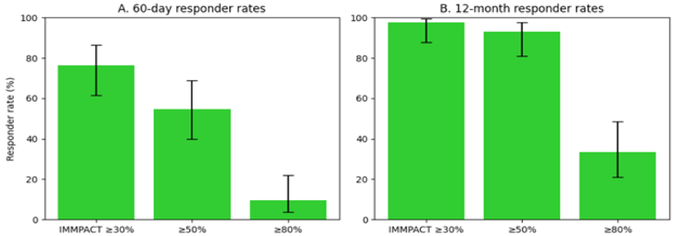


Figure 1. Pain responder rates at 60 days and 12 months after occipital peripheral nerve stimulation.
Bars represent the proportion of patients achieving clinically meaningful pain reduction based on Numeric Rating Scale (NRS) scores. Response thresholds include IMMPACT ≥30% improvement, ≥50% pain reduction (standard responder definition), and ≥80% reduction (high responder), with observed rates being 76%, 55% and 9.5%, respectively at 60-days. Panel A (left) reflects 60-day responder rates and Panel B (right) reflects 12-month responder rates. Error bars represent 95% Wilson confidence intervals. Percentages are calculated from the full analytic cohort (n=42).

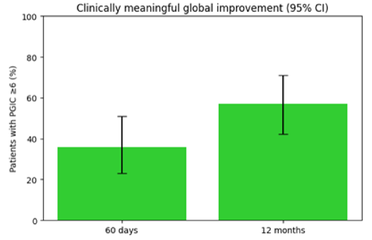


Figure 2. Clinically meaningful global improvement and patient satisfaction following occipital peripheral nerve stimulation.
Bars show the proportion of patients reporting clinically meaningful improvement defined as Patient Global Impression of Change (PGIC) ≥6 ("much improved" or "very much improved") at 60 days and 12 months after treatment. Error bars represent 95% Wilson confidence intervals. Results demonstrate increased patient-perceived benefit over time following PNS therapy.

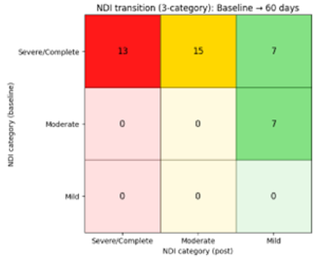


Figure 3A. Transition in Neck Disability Index (NDI) categories from baseline to 60 days after occipital peripheral nerve stimulation.
Heatmap illustrates patient-level transitions between disability categories using a three-level classification: mild, moderate, and severe/complete disability. Color gradients represent post-treatment severity (green = mild, yellow = moderate, red = severe/complete). Axes are ordered from worse to better disability to emphasize directional improvement. Numbers within each cell represent patient counts.

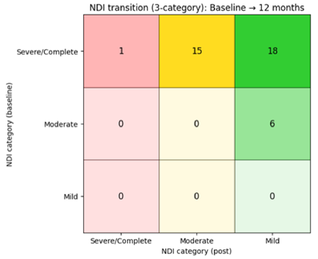


Figure 3B. Transition in Neck Disability Index (NDI) categories from baseline to 12 months after occipital peripheral nerve stimulation.
Heatmap displays longitudinal changes in functional disability across the same three-level classification (mild, moderate, severe/complete). The orientation of the heatmap highlights the shift from higher baseline disability toward lower disability categories at long-term follow-up. Cell values represent the number of patients transitioning between categories.

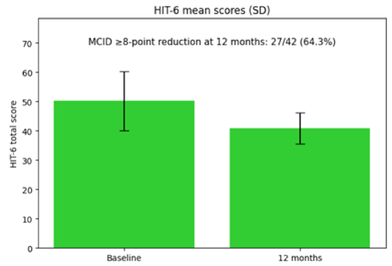


Figure 4. Headache-related disability measured by HIT-6 before and after occipital peripheral nerve stimulation.
Bars represent mean HIT-6 total scores at baseline and 12 months following treatment, with error bars showing standard deviation. Text annotation above the bars indicates the proportion of patients achieving the minimum clinically important difference (MCID), defined as ≥8-point reduction in HIT-6 score at 12 months. Lower scores indicate reduced headache impact on daily functioning.

Conclusion

- In this prospective cohort, 60-day percutaneous occipital PNS was associated with substantial improvements in pain, disability, and patient-reported outcomes that were sustained through 12 months following treatment.
- These findings suggest that temporary PNS may provide durable clinical benefit beyond the active stimulation period.
- Further controlled studies are warranted to confirm these findings and to better define patient selection, mechanisms of sustained response, and comparative effectiveness relative to alternative neuromodulation strategies.

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References

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