

Peripheral Nerve Stimulation for the Treatment of Anterior Cutaneous Nerve Entrapment Syndrome: A Case Report and Literature Review

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Introduction

Anterior Cutaneous Nerve Entrapment Syndrome (ACNES)

- Entrapment of thoracic intercostal branches (T7–T12) causing focal abdominal wall pain.
- Often mistaken for visceral pain → delayed diagnosis.
- Key diagnostic clues: **localized tenderness, positive Carnett’s sign, normal imaging.**

Conventional management

- Meds (NSAIDs, TCAs, gabapentinoids) → limited relief.
- Injections or neurectomy → temporary or invasive.

Why Peripheral nerve stimulation (PNS)?

- Targets the pain source directly.
- Minimally invasive, reversible, and effective for focal neuropathic syndromes.

Case Summary

Patient:

- 38 year-old female, post-abdominal surgeries (cholecystectomy, G-tube, pyloroplasty, GI pacemaker).
- Symptoms:** LUQ burning and pressure pain above G-tube.
- Exam:** Positive Carnett’s sign.
- Imaging:** Normal CT abdomen/pelvis.
- Blocks:** 2 × diagnostic rectus-sheath blocks → ~80 % relief × 2 months each → confirmed ACNES.

Procedure:

- Temporary Sprint PNS** targeting left anterior cutaneous nerve.
- Ultrasound-guided, in-plane lateral-to-medial approach.
- Paresthesia overlap confirmed.

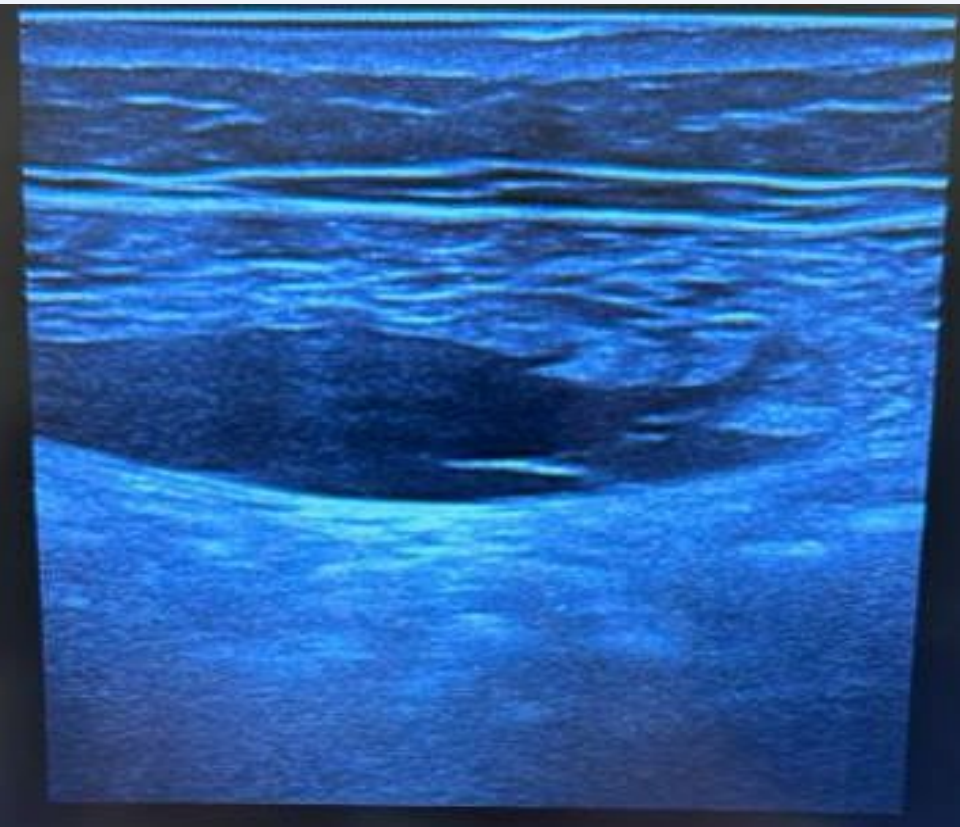


Figure 1: Diagnostic ultrasound- guided left upper rectus sheath nerve block.

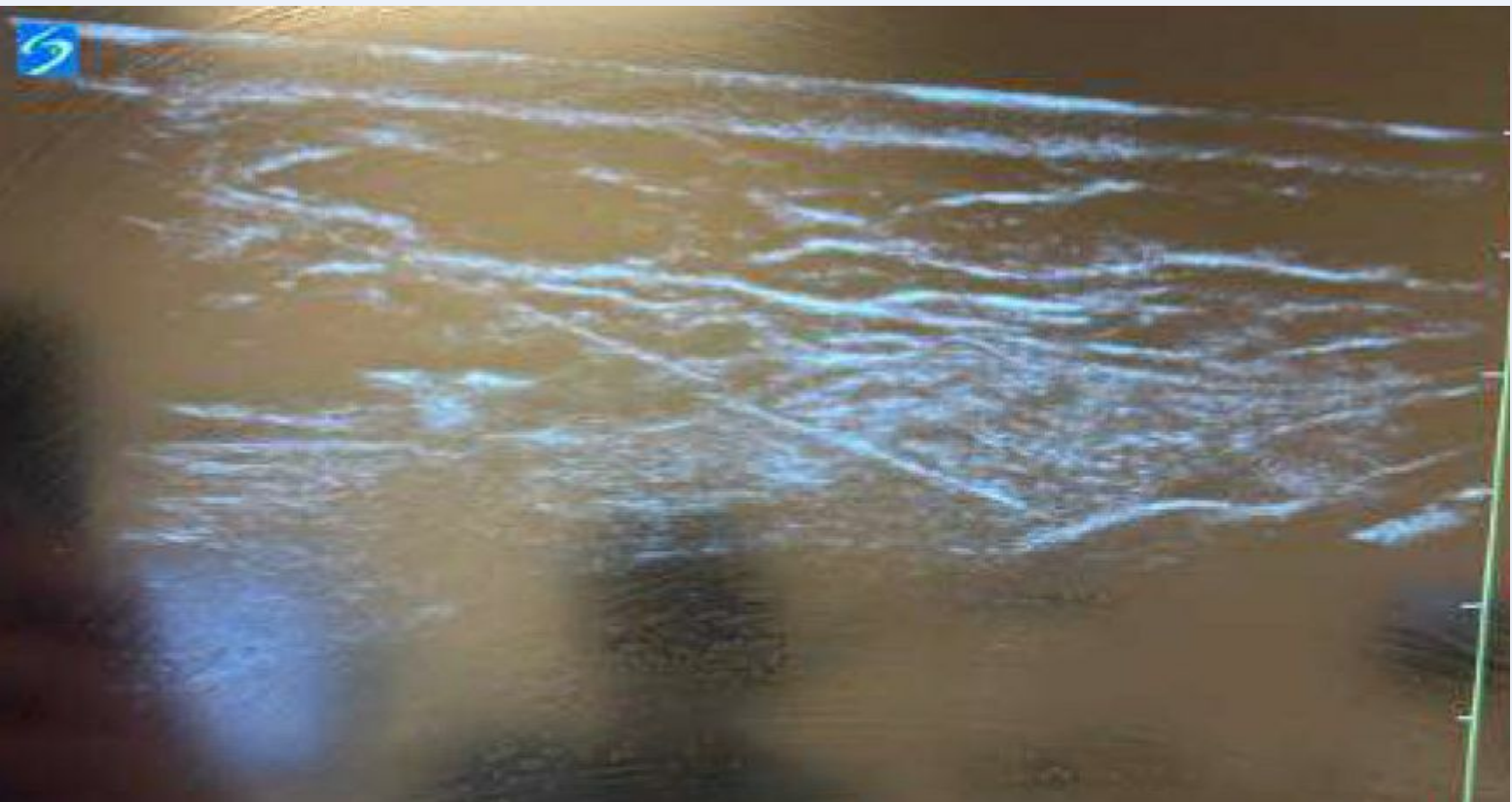


Figure 2: PNS lead placement superficial to the posterior rectus sheath.

Procedures and Results

Intervention

- Temporary PNS lead (Sprint System) placed under ultrasound guidance.
- Lead advanced from lateral to medial in-plane until paresthesia matched pain distribution.
- Local anesthetic: 1% lidocaine; antibiotic prophylaxis: cefazolin.
- Electrical stimulation confirmed target capture before fixation and external connection.
- No adverse events or lead migration.
- Quality-of-life improvement was substantial.

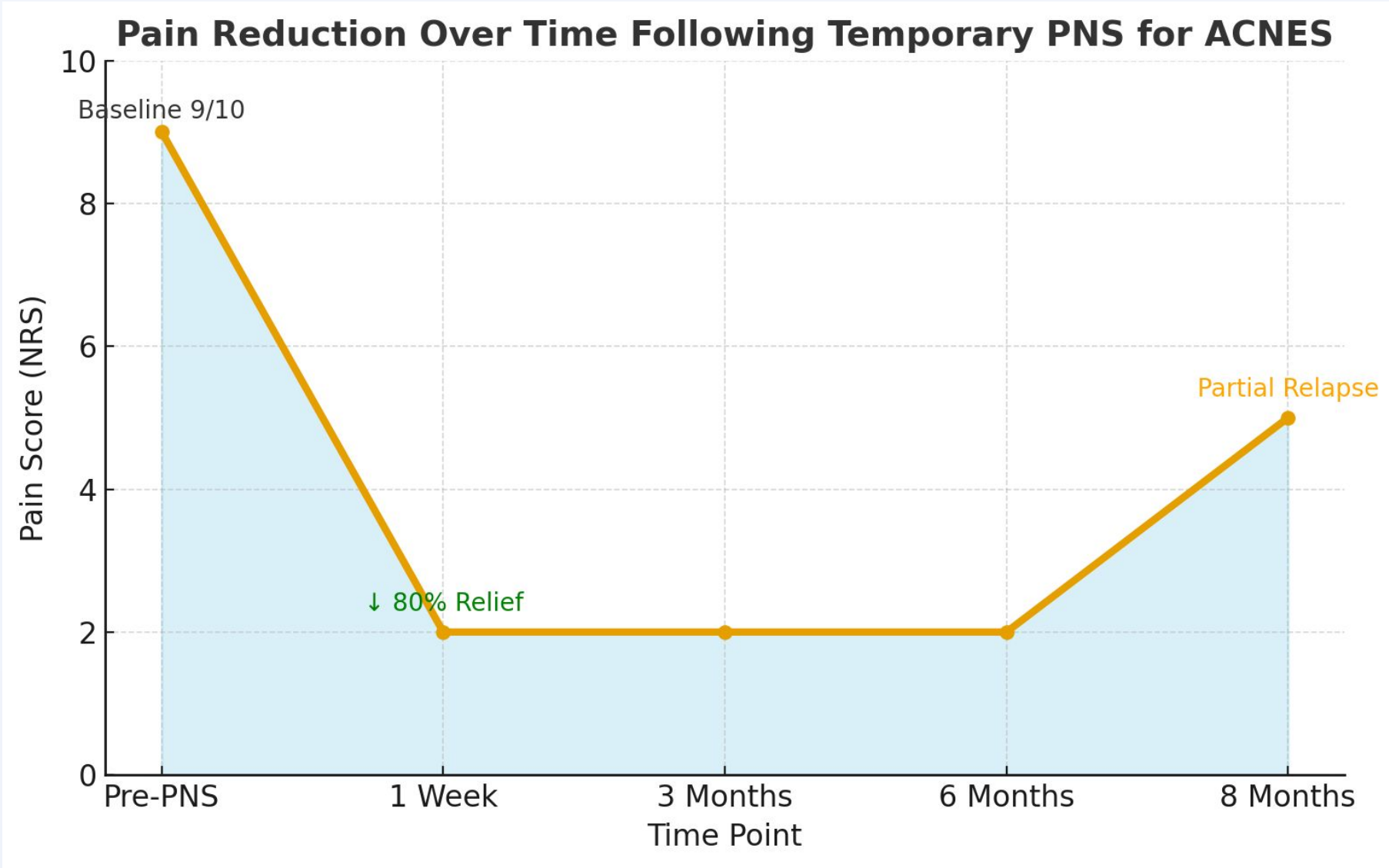


Figure 3: Pain reduction over time following temporary PNS for ACNES.

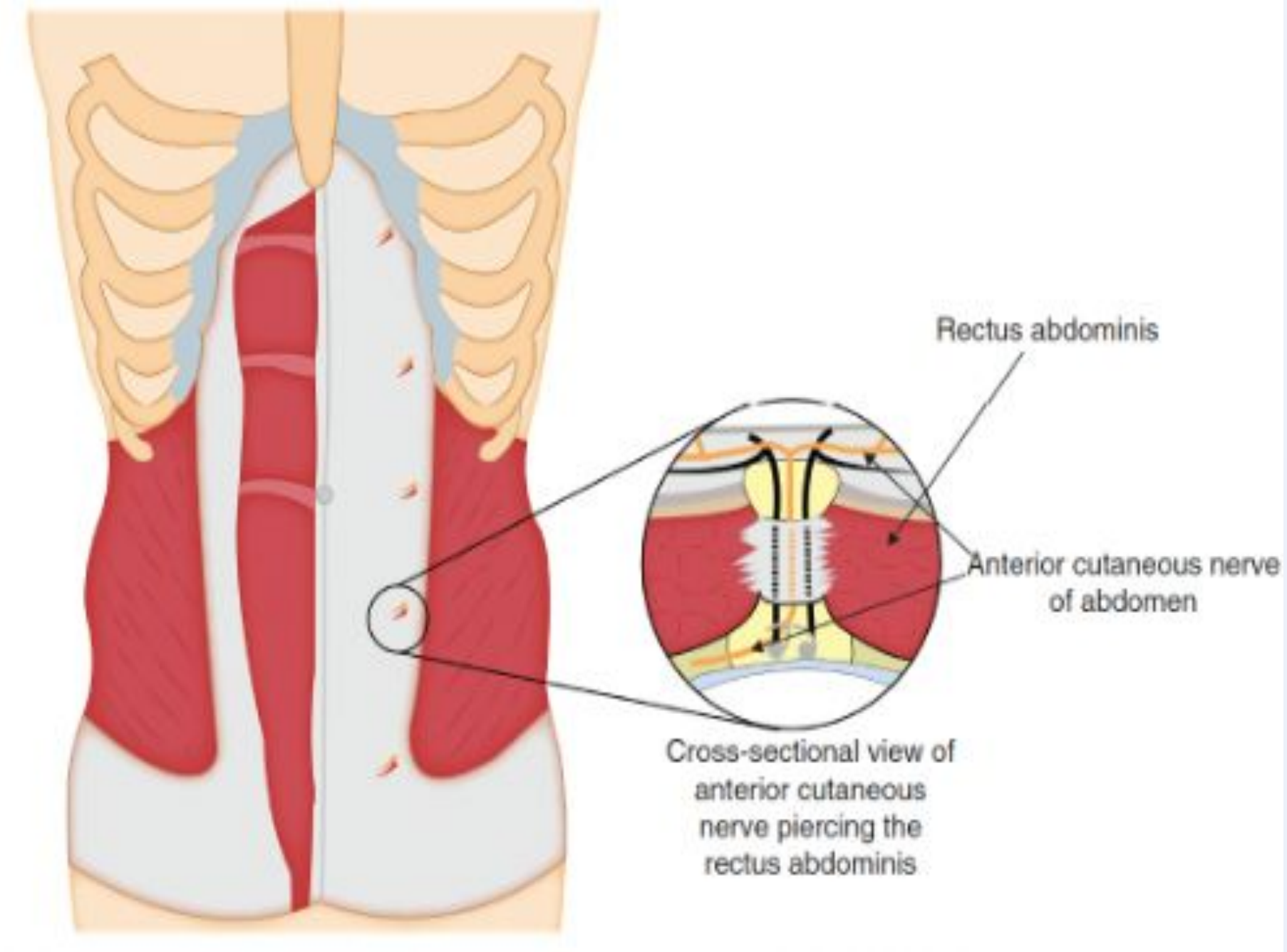


Figure 4: Anatomical illustration of the trajectory of the anterior cutaneous nerves of the abdomen.

Discussion

- ACNES is often misattributed to visceral pain; in one series 47% of patients reported pseudovisceral symptoms (Mol et al 2021).
- When standard blocks and medications fail, neuromodulation offers a minimally invasive alternative.

Mechanism of PNS Analgesia

- Stimulation of large-diameter Aβ fibers inhibits nociceptive Aδ/C transmission in the dorsal horn (“gate-control” effect), reducing central sensitization and pain perception.

Study (Year)	Device / System	Pain Reduction	Follow-Up Duration	Notes / Outcome
Ferreira-Silva et al., 2022	StimRouter (permanent)	9 → 4 /10 (≈55%)	6 months	Bilateral placement; improved function
Amorizzo et al., 2024	StimRouter (permanent)	Not reported	2 years	‘Back to normal health’
Eden et al., 2024 (Case 1)	Nalu (permanent)	≈75% ↓	2 years	Jejunostomy; multiple surgeries
Eden et al., 2024 (Case 2)	Nalu (permanent)	≈80% ↓	1.5 years	Abdominal debridements
Eden et al., 2024 (Case 3)	Nalu (permanent)	100% ↓ (10 → 0 /10)	1 year	Pain-free at follow-up
Eden et al., 2024 (Case 4)	Nalu (temporary)	Removed (2 days)	2 days	Removed due to discomfort
Copeland et al., 2025 (Current Case)	Sprint (temporary)	9 →2 /10 (≈78%)	6 months	Durable relief; partial recurrence at 8mo

Table 1: Reported Outcomes of Peripheral Nerve Stimulation in ACNES: Evidence from Seven Published Cases

Conclusion

- This case demonstrates substantial and sustained pain relief with temporary PNS for ACNES refractory to blocks and pharmacologic therapy.
- Neuromodulation targeting the anterior cutaneous nerve is safe, minimally invasive, and restores function without surgery.

Key Points/ Take Away

- Consider ACNES early in chronic abdominal wall pain.
- Diagnostic nerve block > 50 % relief = confirmation.
- Temporary PNS is effective, safe, and may prevent chronicity.
- Prospective studies needed for long-term outcomes.

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