



PERIPHERAL NERVE STIMULATION FOR ACUTE PAIN: A TARGETED, OPIOID-SPARING APPROACH IN MODERN PAIN MANAGEMENT

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- **Peripheral nerve stimulation (PNS):** studied and **validated treatment for chronic pain conditions** (neuropathic and complex regional pain syndromes) via targeted electrical stimulation to peripheral nerves.
- inhibition of nociceptive signaling and neuromodulation of the peripheral nervous system
- significant advantage: localized pain relief and **reduced reliance on systemic medications**
- role of PNS in acute pain (postoperative pain), **remains underexplored.**
- Acute pain (inadequately treated) can lead to:
 - delayed recovery
 - **prolonged hospitalization**
 - transition to chronic pain states.
- **Opioid epidemic:** prompted need for alternatives to traditional pharmacologic approaches.
 - Recent technological advancements in percutaneous PNS systems:
 - safer, less invasive placement of stimulators, **promising for acute pain management.**
- Highlights of the **emerging evidence** supporting the use of PNS for acute and postoperative pain as a **potential asset in multimodal analgesia strategies:**
 - A systematic review by Xu et al. (2021) assessed the efficacy of PNS in managing acute and chronic pain. The review included 227 studies and found **Level IV evidence supporting the use of PNS** in postsurgical pain management, indicating potential benefits in acute pain scenarios.
 - Ilfeld and Finneran (2020) conducted a narrative review focusing on cryoneurolysis and percutaneous PNS for acute pain. They reported that percutaneous PNS could provide **postoperative analgesia without the side effects associated with opioids** or local anesthetics, suggesting its utility in acute postoperative pain management.
 - A randomized controlled trial by Ilfeld et al. (2021) evaluated percutaneous PNS in patients undergoing ambulatory orthopedic surgery. The study demonstrated that active **PNS significantly reduced pain scores and opioid consumption** during the first postoperative week compared to sham treatment, highlighting its **effectiveness in acute postoperative pain control.**
- PNS application in acute and postoperative pain management represents an **important and innovative paradigm shift.**
- Mechanism by which PNS modulates pain makes it well-suited for acute pain scenarios.
- **Opioid-sparing techniques** are increasingly prioritized, where multimodal approaches to acute pain are essential for **improving outcomes and patient safety.**
- PNS may reduce the risk of **acute pain transitioning into chronic pain** (after surgery or trauma due to central sensitization).
- Percutaneous nature of modern PNS systems: **minimally invasive placement,** feasible intervention for postoperative patients/acute pain settings, including emergency departments and trauma centers.
- Despite promising results need for further high-quality RCTS to establish standardized parameters, refine patient selection criteria, and assess long-term outcomes.
- Growing body of evidence suggests PNS could play a transformative role in the acute pain management landscape, **filling a critical gap with a safe, effective, and opioid-sparing intervention.**