In this review, our goal is to document and critique the history and assess the development of SCS as a treatment of lower limb spasticity. SCS has been tested in over 25 different conditions since a potentially beneficial effect was first reported in 1973. However, the lack of a fully formed understanding of the pathophysiology of spasticity, archaic study methodology, and the early technological limitations of implantable hardware limit the validity of many studies. SCS offers a measure of control for spasticity that cannot be duplicated with other interventions. With improved energy-source miniaturization, tailored control algorithms, novel implant design, and a clearer picture of the pathophysiology of spasticity, we are poised to reintroduce and test SCS in this population.

This prospective, feasibility study enrolled 12 refractory FBSS patients with predominant back pain (70% of overall pain) suitable for Burst SCS. Back and leg pain intensity (back pain [VAS_b]/leg pain [VAS_l]), functional capacity (sleep quality [PSQI]), depressive symptoms (BDI), body weight, stimulation parameters, and plasma levels of pro-inflammatory (Il-1b; TNF; HMGB1)/anti-inflammatory (Il-10) cytokines were collected at baseline and after three months of Burst SCS and compared to healthy controls. Burst SCS increased systemic circulating anti-inflammatory IL-10, improved FBSS back pain and back pain associated co-morbidities like disrupted sleep architecture and depressive symptoms in FBSS patients, suggesting a possible relationship between burst SCS and burst-evoked modulation of peripheral anti-inflammatory cytokine IL-10 in chronic back pain.
Editor’s Choice

331 Explantation Rates and Healthcare Resource Utilization in Spinal Cord Stimulation
Jing L. Han, BA; Kelly R. Murphy, BS; Syed Mohammed Qasim Hussaini, MS; Siyun Yang, MS; Beth Parente, MHS; Jichun Xie, PhD; Promila Pagadala, PhD; Shivanand P. Lad, MD, PhD

Understanding the predictors and rates of SCS explantation has important implications for healthcare resource utilization (HCRU) and pain management. We designed a large, retrospective analysis using the Truven MarketScan Database. We included all adult patients who underwent a SCS trial from 2007 to 2012. Patients were grouped into cohorts that remained explant-free or underwent explantation over a three-year period, and multivariate models evaluated differences in healthcare resource utilization. In this nationwide analysis, we identified that SCS device explantation is correlated with patients who have higher baseline costs, higher total cost post-SCS implantation, and increased use of procedures to control pain. The higher rates of explantation at three-years postimplant among low volume providers suggest that variations in provider experience and approach also contributes to differences in explantation rates.

Editor’s Choice

340 Specialty-Based Variations in Spinal Cord Stimulation Success Rates for Treatment of Chronic Pain
Syed Mohammed Qasim Hussaini, MS; Kelly Ryan Murphy, BS; Jing L. Han, BA; Aladine A. Elsamadicy, BE; Siyun Yang, MS; Alykhan Premji, BS; Beth Parente, MHS; Jichun Xie, PhD; Promila Pagadala, PhD; Shivanand P. Lad, MD, PhD

We designed a large, retrospective analysis using the Truven MarketScan data base analyzing adult SCS patients with provider information available, with or without IPG implantation from the years 2007 to 2012. Patients were categorized based on provider type performing the implantation including anesthesiologists, neurosurgeons, orthopedic surgeons, and physical medicine and rehabilitation (PM&R). Univariate and multivariate models identified factors associated with successful conversion. A total of 7667 unique instances of SCS implants were identified across five provider types. Overall, 4842 (63.2%) of those receiving trials underwent permanent SCS system implantation. Our results suggest that over a recent five-year period, conversion rates are highest when SCS trials are performed by neurosurgeons and orthopedic surgeons. The study has important implications for establishing uniform guidelines for training, patient selection, and education of physicians across multiple disciplines.
Editor’s Choice

348 High-Frequency Spinal Cord Stimulation in Surgery-Naïve Patients—A Prospective Single-Center Study
Sebastian A. Ahmadi, MD; Jan Vesper, MD, PhD; Stefan Schu, MD; Philipp J. Slotty, MD

From June 2014 to April 2015, we prospectively enrolled patients suffering from LBP alone or in conjunction with leg pain in a trial of HF-SCS. None of the patients had undergone surgical procedures of the lumbar spine. Patients suffered medically intractable LBP and were deemed ineligible for spine surgery. All patients underwent trial stimulation for at least one week. Pain levels were assessed daily during initial stay, 4 weeks later and then every 3 months. Eight patients (four male, four female) underwent HF-SCS trials. All patients achieved meaningful reductions in pain intensities and underwent IPG implantation at a mean interval of 13 days. Mean follow-up was 306 days. In this prospective cohort of surgery naïve patients, we were able to show good efficacy of HF-SCS with mean NRS reductions of 4.1 and 6.2 for back and leg pain, respectively, after a mean follow-up of 10 months.

354 Impact of Insurance Provider on Overall Costs in Failed Back Surgery Syndrome: A Cost Study of 122,827 Patients
Aladine A. Elsamadicy, BE; Samuel Harrison Farber, BS; Siyun Yang, MS; Syed Mohammed Qasim Hussaini, MS; Kelly R. Murphy, BS; Amanda Sergesketter, BS; Carter M. Suryadevara, BS; Promila Pagadala, PhD; Beth Parente, PA-C; Jichun Xie, PhD; Shivanand P. Lad, MD, PhD

Peripheral Nerve Stimulation

361 Positional Relations of the Cervical Vagus Nerve Revisited
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369 Peripheral Nerve Stimulation in the Treatment of Chronic Pain Syndromes From Nerve Injury: A Multicenter Observational Study
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392  Baclofen Solution for Low-Volume Therapeutic Delivery
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397  Solubility and Stability of Baclofen 3 mg/mL Intrathecal Formulation and Its Compatibility With Implantable Programmable Intrathecal Infusion Systems
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405  The Polyanalgesic Consensus Conference (PACC): Recommendations on Intrathecal Drug Infusion Systems Best Practices and Guidelines

407  The Neurostimulation Appropriateness Consensus Committee (NACC): Recommendations on Bleeding and Coagulation Management in Neurostimulation Devices

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