NEWSLETTER #138 April 2025 See ABOUT WIKISTIM

Pro Quo Quid

The Glossary we maintain on this website represents our commitment to clear and unambiguous communication in the multidisciplinary field of neuromodulation. We were reminded of the need for continued vigilance by the publication last month in *Regional Anesthesia & Pain Medicine* of an otherwise well-written, thoughtful review with the awkward title "Spinal cord stimulation trial-to-implant ratios: relic or requisite?" (citation available upon request).

When we express a ratio, the first word is normally the numerator and the second the denominator, e.g., signal-to-noise, price-to-earnings, miles per hour. For many years, however, the phrase "trial to implant ratio" has, on occasion, been used in error when "implant to trial ratio," its reciprocal (i.e., opposite) was intended. When trials are required, the number of implants can, of course, never exceed the number of trials, but a careless choice of words can nevertheless indicate (absurdly) that that was the case.

A Google Scholar search for "trial to implant ratio" AND "spinal cord stimulation" reveals that this terminology has been used 44 times altogether, 5 times in 2024-5. Nearly all of these publications used it incorrectly, with values imponderable less than 1, indicating fewer trials than implants.

Several unambiguous alternative phrases have also been used, among which "trial success rate" has been the most popular (we found this 104 times in our Google Scholar search). This might introduce imprecision, however, as not all successful trials are followed by implantation. Less popular but more precise are "implant-to-trial ratio" (12 times) and "trial-to-implant conversion rate" (5 times).

Even when less ambiguous terminology is used, however, subsequent publications might reference it incorrectly: for example, "trial-to-permanent conversion rates" (Murphy et al., 2017) has been later misquoted as "trial-to-implant ratio" (citation available upon request).

Some of our readers will recall discussion of the phrase "trial-to-implant ratio" in decades past. Each time the flaws of this phrase have been pointed out, they have been acknowledged as obvious, and the language has been reversed or revised; but authors, peer reviewers, and editors have repeatedly reverted. Flawed terminology in health care remains all too common and deserves our diligent attention (Sarwani et al., 2019).

References

- Murphy KR, Han JL, Hussaini SM, Yang S, Parente B, Xie J, Lad SP. The volume-outcome effect: impact on trial-to-permanent conversion rates in spinal cord stimulation. Neuromodulation 20(3):256-262, 2017
- Sarwani NAL, Fatima A, James H, AlMehzaa HEAA, Chakravarty M. Exploring use of incorrect terminology used in medical sciences: quest for scientific and academic verity. J Education and Practice 10(6):149-160, 2019.

Strange Coincidence

Last month, we experienced one of life's little ironies. As we have repeatedly reported, the continued existence of WIKISTIM depends upon donations from individuals and grants from organizations interested in neuromodulation. (A list of all of our donors over time is available here--recent donors are listed below.) In February, we sent in two grant applications to large companies that sell neurostimulation equipment, and we got a flat-out rejection from one (the other is pending). Right on the heels of that rejection, we received a very nice email from a "senior scientist" who works for the company that refused our request for support. This scientist said that this newsletter is "a great resource for us" and asked me to add a few people to the email list (of course, people have to add themselves, which is an easy process). I had received a similar email from another scientist working at the same company, also describing WIKISTIM as a "great resource," last June when a hitch in our computer program inadvertently unsubscribed a host of people. So, a major neurostimulation company that employs at least two scientists who definitely don't want to see this newsletter disappear (among 35 who used that company's email server when they subscribed to WIKISTIM) has not been able to see its way clear to supporting our work. If YOU value WIKISTIM and find this newsletter a "great resource," PLEASE support us with a donation and by telling the decision makers at your company that we deserve to have our grant applications considered favorably. We want to be able to continue this work without charging for subscriptions and without the intrusion of advertisements.

One Person to Thank this Month!

Our donor hero this month is SuEarl McReynolds, who is a repeat donor and first used WIKISTIM to successfully convince an insurance company to cover cervical spinal cord stimulation for her daughter. We thank Ms. McReynolds for her loyal support!

Donate Now

WIKISTIM Now Has 1,908 Subscribers

Thank you for telling your colleagues about our free resource.

Citations Added From Search on April 7, 2025

Whenever possible, we provide free full-text links. In most cases, we link directly to a PDF. In a few cases, our Free Full Text link points instead to a link leading to the PDF because clicking the PDF link causes an immediate download. We also do this in cases where the URL has a “watermark” or is ridiculously long.

We remind our readers that it might be necessary to click “View Entire Message" in our email to see all of the citation lists in this newsletter.

We list correction citations only if the error was substantial. For small changes, such as a missing initial in an author's name, we simply update the WIKISTIM database.

Deep Brain Stimulation (now 8941 citations)

1. Abdelnaim MA, Hebel T, Lang-Hambauer V, Schlaier J, Langguth B, Reissmann A. **Deep brain stimulation for obsessive compulsive disorder leads to symptom changes of comorbid irritable bowel syndrome.** Front Psychiatry 2025 16:1545318 PubMed Free Full Text
2. Algethami HJ, Alkhrisi MH, Alanazi SA, Abdelmoaty R. **Knowledge and practice of deep brain stimulation among pediatric neurology residents in Saudi Arabia.** J Med Life 2025 18(2):140-146 PubMed Free Full Text
3. Alijanpourotaghsara A, Mirpour K, Choi JW, Chitta KK, Shalaby A, Boswell M, Chilukuri S, Cohen SL, Byon R, Benam M, Kariv S, Lee J, Duncan D, Pouratian N. **B(RAIN)^2-BRAIN integrated resource for anatomy and intracranial neurophysiology.** Sci Data 2025 12(1):442 PubMed Free Full Text
4. Almeida-Souza T, Campos ACP, Rabelo TK, Emtyazi D, McCann E, Brandão-Lima P, Diwan M, Lipsman N, Hamani C. **Sex differences in long-term fear and anxiety-like responses to deep brain stimulation in a preclinical model of PTSD.** J Psychiatr Res 2025 184:198-209 PubMed
5. Bayman E, Anigbogu C, Razmara A, Ojemann SG, Thompson JA, Kramer DR. **Comparison of deep brain stimulation and responsive**

neurostimulation wound complication rates and risk factors: a single-center retrospective study. Stereotact Funct Neurosurg 2025 epub 1-14PubMed
6. Behnke JK, Peach RL, Habets JGV, Busch JL, Kaplan J, Roediger J, Mathiopoulou V, Feldmann LK, Gerster M, Vivien J, Schneider GH, Faust K, Krause P, Kühn AA. **Long-term stability of spatial distribution and peak dynamics of subthalamic beta power in Parkinson's disease patients.** Mov Disord 2025 epub PubMed Free Full Text
7. Bisht A, Badenhorst C, Kiss Z, Murari K, Whelan P. **Deep brain stimulation of A13 region evokes robust locomotory response in rats.** J Neurophysiol 2025 epub PubMed Free Full Text
8. Braun A, Basson D, Moosa S, Carr J, Bardien S, van Coller R. **Deep brain stimulation improves symptoms in an individual with alpha-synuclein-gene-associated Parkinson's disease.** Mov Disord Clin Pract 2025 epub PubMed Free Full Text
9. Cheng Y, Wang D, Zhang X, Jin G, Wu D, Wang Q, Du J, Qi L, Xu C, Qiao Z, Wang X, Ge J, Wang S, Yan H, Wang X, Zhang H, Yu T, Wang Y, Yeh FC, Zhao G, Ren L. **Structural network-specific effect of extreme capsule stimulation for drug-resistant focal epilepsy.** Brain 2025 epub awaf097PubMed
10. Coenen VA, Polosan M, Schläpfer TE, Chabardes S, Meyer-Doll DM, Czornik M, Sürücü O, Baldermann JC, Endres D, Urbach H, Reinacher PC, Rau A, Döbrössy MD, Sajonz BEA, Reisert M. **Deconstructing a common pathway concept for deep brain stimulation in the case of obsessive-compulsive disorder.** Mol Psychiatry 2025 epub PubMed Free Full Text
11. Colombo A, Bernasconi E, Alva L, Sousa M, Debove I, Nowacki A, Serquet C, Petermann K, Nguyen TAK, Magalhães AD, Lachenmayer L, Waskönig J, Nef T, Schuepbach M, Pollo C, Krack P, Averna A, Tinkhauser G. **Finely tuned γ tracks medication cycles in Parkinson's disease: an ambulatory brain-sense study.** Mov Disord 2025 epub PubMed Free Full Text
12. Currie AD, Burke RM, Nunez AEM, McKay A, Hess CW, Hilliard JD, Okun MS. **The role of a social worker in the deep brain stimulation preoperative evaluation: the DBS-FACTS screening tool.** Mov Disord Clin Pract 2025 epub PubMed
13. Daghi M, Serhier Z, Lakhdar A, El Otmani H. **Advanced Parkinson's disease and eligibility for device-aided therapies in Morocco: a multicenter cross-sectional study.** Neurodegener Dis Manag 2025 epub 1-12 PubMed
14. Damiani L, Albares M, Laviron P, Le Douget JE, Boulinguez P, Karachi C, Welter ML, Munuera J, Lau B. **Subthalamic activity is associated with proactive inhibition in Parkinson's disease patients.** Eur J Neurosci 2025 61(5):e70055 PubMed Free Full Text
15. Di Luca DG, Ramirez-Gomez C, Santyr B, Fumagalli M, Germann J, Kalia SK, Lozano AM, Fasano A. **Clinical and imaging correlates of medication reduction in globus pallidus stimulation for Parkinson's disease.** Mov Disord Clin Pract 2025 epub PubMed Free Full Text
16. Dong J, Peschke S, Kirchner A, Palleis C, Mehrkens JH, Scherer M, Kaufmann E, Koeglsperger T. **Subjective patient rating as a novel feedback signal for**

DBS programming in Parkinson's disease. Brain Stimul 2025 epub PubMed Free Full Text
17. Donlon E, O'Keeffe C, Horan J, Ruggieri F, Fitzpatrick J, O'Neill M, Alexander M, Fearon C, Moran C, Walsh RA. **Clinical outcomes with prospective brain sensing data following bilateral globus pallidus deep brain stimulation in x-linked dystonia parkinsonism.** Mov Disord Clin Pract 2025 epubPubMed Free Full Text
18. Du D, Fu W, Su S, Mao X, Yang L, Xu M, Yuan Y, Gao Y, Geng Z, Chen Y, Zhao M, Fu Y, Yin F, Han H. **Remote regulation of molecular diffusion in extracellular space of Parkinson's disease rat model by subthalamic nucleus deep brain stimulation.** Cyborg Bionic Syst 2025 6:0218 PubMedFree Full Text
19. Duriez P, Simboli GA, Domenech P, Buot A, Halpern C, Fadigas M, Mongin Y, Guy-Rubin A, Carron R, Oppenheim C, Gorwood P, Pallud J, Zanello M.**Nucleus accumbens deep brain stimulation in adult patients suffering from severe and enduring anorexia nervosa (STIMARS): protocol for a pilot study.** Front Psychiatry 2025 16:1554346 PubMed Free Full Text
20. Feng Z, Liu B, Xu J, Zhang Y, Ling Z, Xu X, Ma Z, Yu X, Mao Z. **Clinical outcomes and prognostic factors in patients with primary Meige syndrome undergoing subthalamic nucleus deep brain stimulation: a retrospective study of 65 cases.** J Neurosurg 2025 epub 1-11 PubMed
21. Ferros CES, Aguiar RR, Casal M. **Anaesthetic management of deep brain stimulation in obesity treatment: a case report.** J Perioper Pract 2025 epub PubMed
22. Filyushkina V, Nezvinskiy A, Belova E, Asriyants S, Usova S, Tomskiy A, Sedov A. **Heterogeneity of subthalamic nucleus neuronal responses to voluntary movements in parkinsonian patients.** Eur J Neurosci 2025 61(6):e70080 PubMed
23. Franco RM, Soares C, Oliveira A, Vaz R, Rosas MJ. **Rethinking age barriers in Parkinson's disease for deep brain stimulation.** Neurochirurgie 2025 epub 101665 PubMed
24. Fukuda M, Ota T. **Utilization of intraoperative navigation in stereotactic neurosurgery.** Japanese. No Shinkei Geka 2025 53(2):349-356 PubMed
25. Garcia-Orellana M, Maldonado F, Hurtado P, Pujol-Fontrodona G, Roldán P, Mosteiro A, Rumià J, Sánchez-Gómez A, De Riva N, Fàbregas N, Gracia I, Tercero FJ, Pujol-Ayach E, Valero R. **Deep brain stimulation under general anaesthesia for Parkinson's disease: a retrospective evaluation of perioperative events and anaesthetic management after switching away from conscious sedation.** Acta Anaesthesiol Scand 2025 69(4):e70017PubMed
26. Gaudiano G, Boogers A, Grippe T, Cilia R, Eleopra R, Chen R, Fasano A. **Rhythmic eyelid closure responsive to STN-DBS: blepharoclonus, blepharospasm, eyelid opening apraxia, or eyelid tremor?** Mov Disord Clin Pract 2025 epub PubMed Free Full Text
27. Hong SW, Park SH, Phuong DD, Chang KW, Jung HH, Chang JW. **Deep brain stimulation generator replacement surgeries: safety and efficacy of PEAK**

PlasmaBlade TMX and analysis of wound healing complications. J Korean Neurosurg Soc 2025 epub PubMed Free Full Text
28. Howard SD, Potluri VS, Hejazi-Garcia C, Davis P, Heuer GG, Punchak MA, Malhotra NR, Hsu JY, Cajigas I. **The social deprivation index and deep brain stimulation: a cohort study.** Clin Neurol Neurosurg 2025 252:108860 PubMed
29. Huang PH, Chen SY, Wang JH, Pan YS, Lin SH. **Remifentanil stabilizes hemodynamics with modulating subthalamic beta oscillation during deep brain stimulation.** Brain Res Bull 2025 224:111310 PubMed Free Full Text
30. Ikezawa J, Isoo A, Yokochi F, Okiyama R, Kamiyama T, Yugeta A, Agari T, Kumada S, Takahashi K. **Deep brain stimulation withdrawal without relapse in chorea-acanthocytosis: two case reports.** Mov Disord Clin Pract 2025 epub PubMed
31. Ji GJ, Fox MD, Morton-Dutton M, Wang Y, Sun J, Hu P, Chen X, Jiang Y, Zhu C, Tian Y, Zhang Z, Akkad H, Nordberg J, Joutsa J, Torres Diaz CV, Groppa S, Gonzalez-Escamilla G, Toledo M, Dalic LJ, Archer JS, Selway R, Stavropoulos I, Valentin A, Yang J, Isbaine F, Gross RE, Park S, Gregg NM, Cukiert A, Middlebrooks EH, Dosenbach NUF, Turner J, Warren AEL, Chua MMJ, Cohen AL, Larivière S, Neudorfer C, Horn A, Sarkis RA, Bubrick EJ, Fisher RS, Rolston JD, Wang K, Schaper FLWVJ. **A generalized epilepsy network derived from brain abnormalities and deep brain stimulation.** Nat Commun 2025 16(1):2783 PubMed Free Full Text
32. Kahwagi GJ, Hubsch C, Burglen L, Brandel JP, Sangla S, Desjardins C. **Bi-pallidal deep brain stimulation as an effective therapy in atypical two-stage evolution adult-onset *KMT2B*-related dystonia.** Clin Park Relat Disord 2025 12:100314 PubMed Free Full Text
33. Kamada H, Yoshimoto I, Enokizono K, Ninomiya Y, Iriki Y, Takumi T, Ohishi M. **Subcutaneous implantable cardioverter-defibrillator implantation in a hereditary dystonia patient with bilateral deep brain stimulation.** JACC Case Rep 2025 30(5):103108 PubMed Free Full Text
34. Kaymak A, Romito LM, Colucci F, Andreasi NG, Telese R, Rinaldo S, Levi V, Zorzi G, Israel Z, Arkadir D, Bergman H, Carecchio M, Prokisch H, Zech M, Garavaglia B, Mazzoni A, Eleopra R. **Genetic etiology influences the low-frequency components of globus pallidus internus electrophysiology in dystonia.** Eur J Neurol 2025 32(3):e70098 PubMed Free Full Text
35. Keba M, Bachmann M, Lass J, Rätsep T. **Assessing Parkinson's rest tremor from the wrist with accelerometry and gyroscope signals in patients with deep brain stimulation: an observational study.** J Clin Med 2025 14(6):2073 PubMed Free Full Text
36. Keller Sarmiento IJ, Bovenzi R, Kinsinger M, Kinsley L, Bustos BI, Krainc D, Mencacci NE. **Novel in-frame *FGF14* deletion causes spinocerebellar ataxia type 27A: clinical response to deep brain stimulation and 4-aminopyridine.** Mov Disord 2025 epub PubMed Free Full Text
37. Kipiani EE, Burjanadze MA, Dashniani MG, Chkhikvishvili NC, Naneishvili TL, Chighladze MR, Nozadze BG, Beselia GV. **Medial septum deep brain stimulation enhances memory and hippocampal neurogenesis in the D-**

galactose induced rat model of aging: behavioral and immunohistochemical study. Exp Brain Res 2025 243(4):95 PubMed
38. Lawson McLean A, Nemir J. **Quantifying insertional effects in deep brain stimulation: clinical outcomes and neurophysiological mechanisms.**Expert Rev Med Devices 2025 epub 1-7 PubMed Free Full Text
39. Li Z, Sun J, Lin H, Wu Q, Jia J, Guo X, Li W. **Predicting motor function improvement following deep brain stimulation of the subthalamic nucleus for Parkinson's disease based on STN-T2MRI radiomics.** J Parkinsons Dis 2025 epub PubMed Free Full Text
40. Lu G, Liu J, Wei X, Yan J, Sun J, Dong W, Zhao L, Qiu C, Luo B, Zhang W. **The conservative treatment of a rare postoperative complication of DBS-brain abscess: case series.** Infect Drug Resist 2025 18:1485-1490 PubMed Free Full Text
41. Maass F, Biskup S, Malinova V, Weinrich C, van Riesen C. **Rare GNAO1 variant presenting with deep brain stimulation-responsive jaw-opening dystonia.** Mov Disord Clin Pract 2025 epub PubMed Free Full Text
42. Mathiopoulou V, Habets J, Feldmann LK, Busch JL, Roediger J, Behnke JK, Schneider GH, Faust K, Kühn AA. **Gamma entrainment induced by deep brain stimulation as a biomarker for motor improvement with neuromodulation.** Nat Commun 2025 16(1):2956 PubMed Free Full Text
43. Meyer GM, Sahin IA, Hollunder B, Butenko K, Rajamani N, Neudorfer C, Hart LA, Petry-Schmelzer JN, Dafsari HS, Barbe MT, Visser-Vandewalle V, Mosley PE, Horn A. **Subthalamic deep brain stimulation: mapping non-motor outcomes to structural connections.** Hum Brain Mapp 2025 46(5):e70207 PubMed Free Full Text
44. Mithani K, Niazi F, Suresh H, Alrumayyan Y, Rayco ER, Ochi A, Otsubo H, Kerr E, Breitbart S, LeBlanc-Millar A, Gadgil N, Raskin JS, Weil AG, Hadjinicolaou A, Iorio-Morin C, Weiss S, Jain P, Sham L, Donner E, Fasano A, Gorodetsky C, Ibrahim GM. **Deep brain stimulation of the centromedian nucleus for drug-resistant epilepsy in children: quality-of-life and functional outcomes from the CHILD-DBS registry.** Epilepsia 2025 epubPubMed Free Full Text
45. Moses Lee A, Kist A, Alvarez J, Sellers KK, Khambhati AN, Sugrue LP, Reid LB, Kadlec K, Fan JM, Allawala AB, Racine CA, Norbu T, Astudillo D, Tremblay-McGaw AG, Becker N, Alhourani A, Starr PA, Chang EF, Krystal AD. **Invasive brain mapping identifies personalized therapeutic neuromodulation targets for obsessive-compulsive disorder.** medRxiv [preprint before peer review] 2025 epub PubMed Free Full Text
46. Nyholm D, Eggington S, Holm A. **Therapies for advanced Parkinson's disease in Sweden: a cost-effectiveness analysis using real-world data.**Neurol Ther 2025 epub PubMed Free Full Text
47. Okusa S, Tezuka T, Kosugi K, Yamamoto Y, Takahata K, Higuchi M, Akiyama T, Kobayashi M, Toda M, Ito D, Nakahara J, Seki M. **A cautionary note on the indication for deep brain stimulation in parkinsonism patients with SLC9A6 gene mutations.** J Mov Disord 2025 epub PubMed Free Full Text
48. Oliveira Filho FM, Dos Santos Silva EF, de Freitas Santos SE, Bandeira Santos AÁ, Zebende GF. **Study of autocorrelations and uncertainties applied to**

patients with Parkinson's disease. Sci Rep 2025 15(1):10068 PubMed Free Full Text
49. Oudijn MS, Sargent K, Lok A, Schuurman PR, van den Munckhof P, van Elburg AA, Mocking RJT, Smit DJA, Denys D. **Electrophysiological effects of deep brain stimulation in anorexia nervosa.** J Psychiatr Res 2025 185:57-66 PubMed Free Full Text
50. Pascual M, Bisarad P, Kelbert J, Chinander S, Gelineau-Morel R, Gorodetsky C, Hewitt AL, Larsh T, Lucente N, O'Malley J, Sanger TD, van der Werf L, Hauptman JS, Ponce FA, Kruer MC, Thompson JA. **Stimulation-related increases in power spectral density covary with clinical evidence of overstimulation during deep brain stimulation for pediatric dystonia.** medRxiv [preprint before peer review] 2025 epub PubMed Free Full Text
51. Platt JP, Radcliffe EM, Klimczak SL, Gliske SV, Kovach CK, Maroni D, Abosch A, Thompson JA. **Multi-day recordings and adaptive stimulation protocols for in-home collection of deep brain stimulation intracranial recordings.** J Neurosci Methods 2025 epub 110442 PubMed
52. Poulen G, Gélisse P, Crespel A, Chan-Seng E, Moser PO, Coubes P. **Does deep brain stimulation of the anterior nucleus of the thalamus represent the future of Lennox-Gastaut syndrome?** J Neurol 2025 272(4):312 PubMed Free Full Text
53. Pumford AD, Levy HA, Reed RR, Pinter ZW, Fogelson JL, Elder BD, Helgeson MD, Freedman BA, Sebastian AS. **Surgical management of tic-induced myelopathy and the importance of perioperative tic control: illustrative cases.** J Neurosurg Case Lessons 2025 9(11):CASE24751 PubMed Free Full Text
54. Rabelo SP, Rodrigues ES, Grewal S, Dutcher J, Barbosa MTP. **Face-to-face intubation during a deep brain stimulation surgery: a case report.** A A Pract 2025 19(4):e01940 PubMed Free Full Text
55. Ria N, Eladly A, Masvidal-Codina E, Illa X, Guimerà A, Hills K, Garcia-Cortadella R, Duvan FT, Flaherty SM, Prokop M, Wykes RC, Kostarelos K, Garrido JA. **Flexible graphene-based neurotechnology for high-precision deep brain mapping and neuromodulation in parkinsonian rats.** Nat Commun 2025 16(1):2891 PubMed Free Full Text
56. Ricciuti RA, Ottaviani MM, Mancini F, Marano M, Marruzzo D, Barbieri F, Paracino R, De Domenico P, Pagano S, Di Lazzaro V, Dobran M. **Deep brain stimulation in Parkinson's disease: a comparison of accuracy and clinical outcomes of frame-based, frameless and frameless fiducial-less techniques.** Neurol Sci 2025 epub PubMed Free Full Text
57. Rigon L, Bove F, Izzo A, Montano N, Brusa L, Cerroni R, De Biase A, di Biase L, D'Alessandris GQ, Genovese D, Pecoraro PM, Peppe A, Rizzo M, Stefani A, Suppa A, Bentivoglio AR, Calabresi P, Piano C; Lazio DBS Study Group. **Concordance between imaging and clinical based STN-DBS programming improves motor outcomes of directional stimulation in Parkinson's disease.** J Parkinsons Dis 2025 15(2):409-420 PubMed Free Full Text

58. Ryu J, Kao JC, Bari A. **Spontaneous pain dynamics characterized by stochasticity in neural recordings of awake humans with chronic pain.** Pain 2025 epub PubMed
59. Sanger ZT, Zhang X, Leppik IE, Lisko T, Netoff TI, McGovern RA. **Anterior nucleus of thalamus deep brain stimulation for medication refractory epilepsy modulates theta and low-frequency gamma activity: a case study.** Ther Adv Neurol Disord 2025 18:17562864251323052 PubMed Free Full Text
60. Schoenwald H, Bahners BH, Kannenberg S, Dembek TA, Barbe MT, Sylaj D, Spiewok A, Elben S, Muettel T, Vesper J, Slotty P, Schnitzler A, Groiss SJ.**Antero-lateral subthalamic nucleus theta stimulation improves verbal fluency in Parkinson's disease.** Mov Disord 2025 epub PubMed Free Full Text
61. Singh R, Bauman MMJ, Islam K, Kerezoudis P, Grewal SS, Parker JJ, Van Gompel JJ, Miller KJ, Lundstrom BN, Starnes K. **Intracranial stimulation for pediatric refractory epilepsy: a single institutional experience using evolving therapies.** Epilepsia Open 2025 epub PubMed Free Full Text
62. Spencer KA, Boogers A, Sumarac S, Crompton DBJ, Steiner LA, Zivkovic L, Buren Y, Boutet A, Lozano AM, Kalia SK, Hutchison WD, Fasano A, Milosevic L. **Modulating inhibitory synaptic plasticity to restore basal ganglia dynamics in Parkinson's disease.** Brain 2025 epub awaf103 PubMed Free Full Text
63. Srinivasan S, Suresh S, Chaitanya G, Saranathan M, Tandon N, Pati S. **Enhancing seizure control in ultra-refractory postencephalitic epilepsies using multinodal network neuromodulation.** Epilepsy Behav Rep 2025 30:100755 PubMed Free Full Text
64. Wang Y, Mao H, Kong X, Yu L, Nie J, Liu Y, Cheng H. **Effects of pneumocephalus on electrode location after deep brain stimulation of the subthalamic nucleus in Parkinson's disease.** World Neurosurg 2025 epub 123958 PubMed Free Full Text
65. Witzig VS, Pjontek R, Höllig A, Schiefer J, Wiesmann M, Clusmann H, Schulz JB, Holtbernd F. **An unusual presentation of peri-lead edema following deep brain stimulation for Parkinson's disease: a case report and review of the literature.** Clin Case Rep 2025 13(3):e70221 PubMed Free Full Text
66. Yu Z, Yang B, Wei P, Xu H, Shan Y, Fan X, Zhang H, Wang C, Wang J, Yu S, Zhao G. **Critical biomarkers for responsive deep brain stimulation and responsive focal cortex stimulation in epilepsy field.** Fundam Res 2024 5(1):103-114 PubMed Free Full Text
67. Zak JR, Chou KL, Patil PG, Malaga KA. **Enhancement of gait improvement in Parkinson disease with anterior subthalamic nucleus deep brain stimulation.** J Neurosurg 2025 epub 1-8 PubMed
68. Zhang Q, Eagleson R, Ribaupierre S. **A technology framework for distributed preoperative planning and medical training in deep brain stimulation.** Comput Med Imaging Graph 2025 123:102533 PubMed
69. Zhu Y, Li S, Wang Z, Zhou J, Zhou J, Wang C. **On-demand electrically controlled perampanel delivery from a PEDOT/SNP composite for seizure control.** J Mater Chem B 2025 epub PubMed

Dorsal Root Ganglion Stimulation (now 299 citations)

1. Tabatabaei P, Salomonsson J, Bredemo L, Wänman J. **Health economic evaluation and patient perspectives on a virtual clinic: advancing digital remote care in health care.** Neuromodulation 2025 epub PubMed Free Full Text

Gastric Electrical Stimulation (now 531 citations)

1. Guzman Rojas P, Naing LY, Mathur P, Stocker A, Mandzhieva B, Daniels MW, Abell TL. **Use of gastric electrical stimulation may predict hospital length of stay in patients with gastroparesis syndromes.** Foregut 2024 epub Abstract with Full Text (behind paywall)

Meta-Analysis Citations (now 53)

1. Abbas A, Abouelmagd M, El-Moslemani M, Diaa A, Samir A, Ellabban MH, Bakr A, Taha AM, Hefnawy MT, El Din Moawad MH, Abo-Elnour DE, Hussein A, Awad H, Rashad A, Negida A, Raslan AM. **Assessing the efficacy of spinal cord stimulation in managing painful diabetic neuropathy: a systematic review and meta-analysis.** Neuromodulation 2025 epub PubMed

Peripheral Nerve Stimulation (now 887 citations)

1. Cooper AN, Sen H, Kanjanapanang N, Saad K, Wahl G, Essman M, Fogarty AE, Burnham T, Conger AM, McCormick ZL, Glinka Przybysz A, Young C.**Adverse events associated with peripheral nerve stimulation: an analysis of the MAUDE data base and implications for pain and spine clinicians.** Neuromodulation 2025 epub PubMed
2. Fletcher KK, Horn GT. **Temporary peripheral occipital nerve stimulation in the treatment of cervicogenic headache: a case report.** Mil Med 2025 epub PubMed
3. Florian-Rodriguez ME, Richter HE, Carnes MU, Zyczynski H, Lukacz ES, Visco A, Arya L, Sung V, Mazloomdoost D, Gantz MG; Eunice Kennedy Shriver NICHD Pelvic Floor Disorders Network. **Association of catechol-O-methyltransferase genetic polymorphism with neuromodulation treatment response in women with fecal or urinary incontinence.** Am J Obstet Gynecol 2025 epub PubMed
4. Huang Z, Far SM, Aronov J, Harandi AA, Hwang K, Zhang X, Talanki V, Ruan H, Cohen TM, Weissbart S, Tam J, Kim J. **A randomized controlled trial of percutaneous tibial nerve stimulation in the treatment of female sexual dysfunction.** Neurourol Urodyn 2025 epub PubMed
5. Regnacq L, Thota AK, Sanabria AO, McPherson L, Renaud S, Romain O, Bornat Y, Abbas JJ, Jung R, Kölbl F. **Fascicle-selective kilohertz-frequency neural conduction block with longitudinal intrafascicular electrodes.** J Neural Eng 2025 22(2):026045 PubMed Free Full Text

6. Ruan QZ, Bellotti A, Gulati A, Gfrerer L, Pak D, Reece D, Li S, Ku JB, Robinson CL, Jotwani R. **Fluoroscopy-guided percutaneous placement of peripheral nerve stimulator of the cervical medial branches in patients with treatment-refractory occipital neuralgia: a case series.**Neuromodulation 2025 epub PubMed
7. Sartori F, Puig-Diví A, Picañol J. **Ultrasound-guided percutaneous nerve stimulation in post-stroke spasticity: a case report.** Neurol Int 2025 17(3):34 PubMed Free Full Text
8. Shang D, Sun H, Deng H, Liu G, Liao L, Li X. **Effects of different pulse widths on acute tibial nerve stimulation for overactive bladder in cats.** Eur J Med Res 2025 30(1):186 PubMed Free Full Text
9. Sławińska U, Hammar I, Jankowska E. **Modulation of sensory input to the spinal cord by peripheral afferent fibres via GABAergic astrocytes.** Eur J Neurosci 2025 61(6):e70057 PubMed Free Full Text
10. Steele AG, Taccola G, Dietz V, Frazier AM, Horner PJ, Faraji AH, Sayenko DG. **Spatiotemporal activation of lumbar sensorimotor networks.** Exp Neurol 2025 388:115206 PubMed

Sacral Nerve Stimulation (now 1293 citations)

1. Burkett LS, Strawn A, Ghatas MP, Mortemousque L, Dare J, McCormack BJ, Fogg R, Wilson BC, Klausner AP, Speich JE. **Acute cortical brain neuroexcitation can be detected with sacral neuromodulation.** Urogynecology (Phila) 2025 31(4):344-351 PubMed
2. Carolus B, Dequirez PL, Olivier L, Hafez S, Perrouin-Verbe MA, Beyronnet B, Capon G, Biardeau X. **Short- and mid-term efficacy of sacral neuromodulation in the treatment of neurogenic overactive bladder in patients with multiple sclerosis.** Mult Scler 2025 31(4):489-496 PubMed
3. Elterman D, Murphy M, Krlin R, Levine R, Yaklic J, Michaels J, Bleier J, Paquette I, Farmer R, Xavier K, Papi B, Wu M, Siproudhis L. **Post-market study evaluating performance of the rechargeable Interstim™ micro system in fecal incontinence patients.** Int Urogynecol J 2025 epub PubMed
4. Florian-Rodriguez ME, Richter HE, Carnes MU, Zyczynski H, Lukacz ES, Visco A, Arya L, Sung V, Mazloomdoost D, Gantz MG; Eunice Kennedy Shriver NICHD Pelvic Floor Disorders Network. **Association of catechol-O-methyltransferase genetic polymorphism with neuromodulation treatment response in women with fecal or urinary incontinence.** Am J Obstet Gynecol 2025 epub PubMed
5. Hafez S, Pere M, Olivier L, Carolus B, De Guerry ML, Rigaud J, Biardeau X, Perrouin-Verbe MA. **Development of a predictive tool for midterm success of sacral neuromodulation in non-neurogenic overactive bladder syndrome.** Neurourol Urodyn 2025 epub PubMed
6. Irwin MP, Yu Y, Turner CE, Ooi KC, Morgan MJ. **Patient experience with sacral neuromodulation for faecal incontinence - a multi-centre, longitudinal cohort study.** Int J Colorectal Dis 2025 40(1):84 PubMed
7. Malde S, Lavin V, Perrouin-Verbe MA, Elterman D, Peyronnet B, Smits M, Shah S, Xavier K, Krlin R, Bukkapatnam R, Papi B, Champs M, Goudelocke C, Sahai

A. **Clinical performance and safety for the rechargeable interstim micro system in non-obstructive urinary retention subjects: 6-month results from the global post-market ELITE study.** Urology 2025 epub PubMed

8. Rodrigues RF Sr, Antonini M, Toledo ML, Silva EK, Silva HF. **Case report of management of Fowler's syndrome during pregnancy: challenges and outcomes.** Cureus 2025 17(2):e79523 PubMed
9. Whalen S, Vuthiwong J, Qu LG, Gani J. **Urodynamic changes following a staged trial of sacral neuromodulation in patients with detrusor underactivity.** Neurourol Urodyn 2025 epub PubMed
10. Xiao Y, Zhang H, Yuan H, Lin X, Yang C, Gao J. **Differential effects of low- and high-frequency sacral neuromodulation on urinary symptoms: high-frequency improves Qmax, low-frequency enhances bladder capacity.** Am J Transl Res 2025 17(2):1114-1124 PubMed
11. Zegrea A, Ojala E, Kirss J, Suvitie P, Varpe P, Mäkelä-Kaikkonen J, Rautio T, Seikkula J, Ukkonen M, Lavonius M, Pinta T. **Good long-term results of sacral neuromodulation for endometriosis related chronic pelvic pain.** BMC Womens Health 2025 25(1):162 PubMed

Spinal Cord Stimulation (now 3518 citations)

1. Carra RB, Garcia LÁL, Menezes JR, Capato T, Santos F, Barbosa ER, Duarte KP, Godinho F, Teixeira MJ, de Andrade DC, Cury RG. **Spinal cord stimulation failed to improve parkinson's disease symptoms in randomized crossover double-blinded evaluation.** Mov Disord 2025 epub PubMed
2. Chua RHB, Loo GH, Hl N, Muthkumaran G, Ritza Kosai N. **Bariatric surgery as an adjunctive treatment for failed back surgery syndrome: a case report highlighting a multidisciplinary approach.** Cureus 2025 17(2):e79331 PubMed Free Full Text
3. Gao S, Hu Y, Li S, Li W, Sheng W. **Global trends and hotspots of neuromodulation in spinal cord injury: a study based on bibliometric analysis.** J Orthop Surg Res 2025 20(1):275 PubMed Free Full Text
4. Gazzeri R, Galarza M, Occhigrossi F, Viswanath O, Varrassi G, Leoni MLG. **Prophylactic fibrin glue application for immediate management of dural puncture during spinal cord stimulation lead placement: a simple and effective technique.** Curr Pain Headache Rep 2025 29(1):70 PubMed
5. Gopal J, Bao J, Harland T, Pilitsis JG, Paniccioli S, Grey R, Briotte M, McCarthy K, Telkes I. **Machine learning predicts spinal cord stimulation surgery outcomes and reveals novel neural markers for chronic pain.** Sci Rep 2025 15(1):9279 PubMed Free Full Text
6. Klassen ABT, Potvin CD, Flynn PA, Gaonkar V, Hong M, Morris SH, Christie SD, Weise LM. **Feasibility and long-term outcomes of minimally invasive tubular spinal cord stimulation lead placement.** Neuromodulation 2025 epub PubMed
7. König SD, Ramadan A, Sullivan D, Goel V, Stayner S, Schultz D, Herman AB, Netoff TI, Darrow DP. **Feature extraction and prediction of spinal cord stimulation evoked compound action potentials in humans.** J Neural Eng 2025 epub PubMed Free Full Text

8. Lo Bianco G, Cascella M, Li S, Day M, Kapural L, Robinson CL, Sinagra E. **Reliability, accuracy, and comprehensibility of AI-based responses to common patient questions regarding spinal cord stimulation.** J Clin Med 2025 14(5):1453 PubMed Free Full Text
9. Parker SR, Calvert JS, Darie R, Jang J, Govindarajan LN, Angelino K, Chitnis G, Iyassu Y, Shaaya E, Fridley JS, Serre T, Borton DA, McLaughlin BL. **An active electronic, high-density epidural paddle array for chronic spinal cord neuromodulation.** J Neural Eng 2025 22(2):026023 PubMed Free Full Text
10. Pritzlaff SG, Desai M, Li S, Murphy MZ, Orhurhu V, Provenzano DA, Vucetic HE, Robertson K, Archila L, Johanek LM, Franke A, Gulve A. **Patient experience with open-loop spinal cord stimulation devices across manufacturers and waveforms: results of a double-blind survey.** Pain Physician 2025 28(2):E205-E214 PubMed Free Full Text
11. Ramakrishna S, Moore M, Davies E, Merry AF, Sleigh J, Jowsey T. **Long-term lived experiences of patients with chronic pain or angina pectoris treated with spinal cord stimulation: a qualitative study.** BMJ Open 2025 15(3):e082840 PubMed Free Full Text
12. Reining M, Winkler D, Kirchhof K, Boettcher J, Kretzschmar M. **Effects of an extended MRI approval of an implantable spinal cord stimulation device on compliance with manufacturer's recommendations.** Pain Pract 2025 25(4):e70022 PubMed
13. Rocha-Flores PE, Chitrakar C, Rodriguez-Lopez O, Ren Y, Joshi-Imre A, Parikh AR, Asan AS, McIntosh JR, Garcia-Sandoval A, Pancrazio JJ, Ecker M, Lu H, Carmel JB, Voit WE. **Softening, conformable, and stretchable conductors for implantable bioelectronics interfaces.** Adv Mater Technol 2025 10(6):2401047 PubMed
14. Shi CY, Wu C, Fang X, Gao XZ, Hua M, Wang R, Cao Y, Zhang PX, Xu CJ. **Efficacy of spinal cord stimulation in the treatment of lower extremity peripheral arterial disease.** Chinese. Zhonghua Yi Xue Za Zhi 2025 105(14):1101-1106 PubMed
15. Tabatabaei P, Salomonsson J, Bredemo L, Wänman J. **Health economic evaluation and patient perspectives on a virtual clinic: advancing digital remote care in health care.** Neuromodulation 2025 epub PubMed Free Full Text
16. Vo N, Shah J. **Uncharted territory: evaluating high cervical closed-loop spinal cord stimulation for chronic multisite, non-contiguous pain.** Pain Med 2025 epub pnaf033 PubMed
17. Widman AJ, Bashar T, Burton A, Clausen DM, Gupta P, Wolf DK, Folarin-Hines J, Payne M, Rogers JA, Meacham KW, Gereau RW, Gutruf P. **Chronic, battery-free, fully implantable multimodal spinal cord stimulator for pain modulation in small animal models.** Adv Sci (Weinh) 2025 epub e2415963 PubMed Free Full Text
18. Yoshino Y, Iwamoto T, Matsumoto T, Kitaura A, Nakajima Y. **A case of spinal cord stimulation therapy for lower limb pain due to conus medullaris syndrome.** Cureus 2025 17(2):e79469 PubMed Free Full Text

19. Zannou AL, Koochesfahani MB, Gaugain G, Nikolayev D, Russo M, Bikson M. **Computational optimization of spinal cord stimulation for dorsal horn interneuron polarization.** Neuromodulation 2025 epub PubMed

THANK YOU TO OUR SUPPORTERS!

A full list of financial donors over time is available here.

Individual supporters in 2025:
Richard B. North, MD
Sean Slee, PhD
SuEarl McReynolds
Terry Daglow

Nonprofit support in 2025:
The Neuromodulation Foundation, Inc. (WIKISTIM's parent organization)

Industry support in 2024:
BIOTRONIK NRO (matching)
Boston Scientific
Enterra Medical

EDITORIAL BOARD

Editor-in-chief
Richard B. North, MD

Section editors
Thomas Abell, MD, Gastric Electrical Stimulation
Tracy Cameron, PhD, Peripheral Nerve Stimulation
Roger Dmochowski, MD, Sacral Nerve Stimulation
Robert Foreman, MD, PhD, Experimental Studies
Elliot Krames, MD, Dorsal Root Ganglion Stimulation
Bengt Linderoth, MD, PhD, Experimental Studies
Richard B. North, MD, Spinal Cord Stimulation
B. Todd Sitzman, MD, MPH, At Large
Konstantin Slavin, MD, PhD, Deep Brain Stimulation
Kristl Vonck, MD, PhD, Deep Brain Stimulation for Epilepsy
Richard Weiner, MD, Peripheral Nerve Stimulation
Jonathan Young, MD, Noninvasive Brain Stimulation
To be determined, Vagus Nerve Stimulation

Managing editor
Jane Shipley

Disclosure
WIKISTIM includes citations for indications that are or might be considered off-label in the United States.

A reminder about personal information
We never share our registrants' personal information or email addresses.

Contact
The Neuromodulation Foundation, Inc.
822 Guilford Avenue #102
Baltimore, MD 21202

wikistim@gmail.com
