



June 2020

**North American Neuromodulation Society**  
**Educational Resources for Neuromodulation Therapies**  
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**I. DEEP BRAIN STIMULATION (DBS)**

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Deep Brain Stimulation: Techniques and Practices	Anderson, W.S. & The Society for Innovative Neuroscience in Neurosurgery	2019	Covers DBS for movement disorders, epilepsy, psychiatric conditions + interventional MRI approaches + pediatric applications
Deep Brain Stimulation Management 2nd Edition	Marks Jr, WJ	2015	Covers DBS for movement disorders, epilepsy, psychiatric conditions + interventional MRI approaches
Deep Brain Stimulation Programming: Mechanisms, Principles and Practice 2nd Ed	Montgomery Jr, EB	2016	Focuses on postop programming + new techniques of programming based on stimulation frequency, closed-loop DBS, role of oscillators in DBS
Brain Stimulation Therapies for Clinicians: 2nd Ed	Higgins ES, George MS	2019	Covers DBS, VNS, CS, ECT, TDCS, TMS, LIFUP, TI
<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Deep Brain Stimulation: Clinical Applications. Psychiatr Clin North Am. 2018; 41: 385-394.	Dougherty DD	2018	



Deep brain stimulation: foundations and future trends. <i>Front Biosci (Landmark Ed)</i> . 2018; 23:162-182.	Aum DJ, Tierney TS	2018
Innovations in deep brain stimulation methodology. <i>Mov Disord</i> . 2017;32:11–19.	Kühn AA, Volkman J	2017
Deep brain stimulation: current challenges and future directions. <i>Nat Rev Neurol</i> . 2019;15:148–160.	Lozano AM, Lipsman N, Bergman H, et al	2019
Mechanisms of deep brain stimulation. <i>Journal of Neurophysiology</i> . 2016;115:19-38.	Herrington TM, Cheng JJ, Eskandar EN	2016
Insights into the mechanisms of deep brain stimulation. <i>Nature Reviews Neurology</i> . 2017;13:548.	Ashkan K, Rogers P, Bergman H et al	2017
Deep brain stimulation for obsessive-compulsive disorder and treatment-resistant depression: systematic review. <i>BMC Res Notes</i> 2010;3:60.	Lakhan, S.E., Callaway, E	2010

**GUIDELINES**

<i>Citation</i>	<i>Medical Society or Panel</i>	<i>Publication year</i>	<i>Notes</i>
Vitek JL, Lyons KE, Bakay R, et al. Standard guidelines for publication of deep brain stimulation studies in Parkinson's disease (Guide4DBS-PD). <i>Movement disorders</i> . 2010; 25:1530-1537.	National Institute of Neurological Disorders and Stroke at the National Institutes of Health	2010	Specific for Parkinson's Disease
Rughani A, Schwalb JM, Sidiropoulos C, et al. Congress of neurological surgeons systematic review and evidence-based guideline on subthalamic nucleus and globus pallidus internus deep brain stimulation for the treatment of	Congress of Neurological Surgeons (CNS) and the American Society for Stereotactic and	2018	Specific for Parkinson's Disease



patients with Parkinson's disease: executive summary. Neurosurgery. 2018;82:753-6.	Functional Neurosurgery		
Silberstein P, Bittar RG, Boyle R, et al. Deep brain stimulation for Parkinson's disease: Australian referral guidelines. Journal of Clinical Neuroscience. 2009; 16:1001-8.	Australian DBS Referral Guidelines Working Group	2019	Specific for Parkinson's Disease

***MOST CITED PUBLICATIONS***

<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Deep brain stimulation for treatment-resistant depression. Neuron 2005; 45: 651-660.	Mayberg HS, Lozano AM, Voon V, et al.	2005	
Deep brain stimulation. Annu. Rev. Neurosci. 2006; 29: 229-257	Perlmutter JS, Mink JW	2006	
Deep brain stimulation for Parkinson's disease. Current opinion in neurobiology 2003;13:696-706	Benabid AL	2003	
Translational principles of deep brain stimulation. Nature Reviews Neuroscience 2007; 8: 623-635.	Kringelbach, Morten L., et al	2007	
A randomized trial of deep-brain stimulation for Parkinson's disease. New England Journal of Medicine 2006; 355: 896-908.	Deuschl, Günther, et al	2006	
Deep-brain stimulation of the subthalamic nucleus or the pars interna of the globus pallidus in Parkinson's disease. New England Journal of Medicine 2001; 345: 956-963	Deep-Brain Stimulation for Parkinson's Disease Study Group	2001	
Responsive cortical stimulation for the treatment of medically intractable partial epilepsy. Neurology. 2011;77:1295-1304	Morrell MJ & RNS System in Epilepsy Study Group	2011	Pivotal trial on RNS for epilepsy



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Deep brain stimulation of the centromedian thalamic nucleus for the treatment of generalized and frontal epilepsies. <i>Epilepsia</i> . 2013; 54: 1823-1833.	Valentín A, García Navarrete E, et al	2013	Important RCT on CM stimulation
Electrical stimulation of the anterior nucleus of thalamus for treatment of refractory epilepsy. <i>Epilepsia</i> 2010;51:899–908	Fisher R, Salanova V, Witt T, et al	2010	Pivotal trial on DBS for epilepsy



## II. VAGUS NERVE STIMULATION (VNS)

<b>BOOKS</b>			
<b>Title</b>	<b>Author(s)</b>	<b>Publication year</b>	<b>Notes</b>
Vagus Nerve Stimulation: 2nd Edition	Schmidt D, Schachter SC	2007	Covers VNS for intractable seizures and depression
<b>REVIEW ARTICLES</b>			
<b>Title and Journal</b>	<b>Author(s)</b>	<b>Publication year</b>	<b>Notes</b>
Vagus Nerve and Vagus Nerve Stimulation, a Comprehensive Review: Part I. Headache. 2016;56:71–78	Yuan H, Silberstein SD	2016	Specific for Headaches
Vagus Nerve and Vagus Nerve Stimulation, a Comprehensive Review: Part II. Headache. 2016;56:259–266	Yuan H, Silberstein SD	2016	Specific for Headaches
Vagus Nerve and Vagus Nerve Stimulation, a Comprehensive Review: Part III. Headache. 2016;56(3):479–490	Yuan H, Silberstein SD	2016	Specific for Headaches
Vagus Nerve Stimulation (VNS) and Other Augmentation Strategies for Therapy-Resistant Depression (TRD): Review of the Evidence and Clinical Advice for Use. Front Neurosci. 2018;12:239	Müller HHO, Moeller S, Lücke C, et al	2018	Specific for Depression
Vagus Nerve Stimulation: Changing the Paradigm for Chronic Severe Depression? Psychiatr Clin North Am. 2018;41:409–418	Aaronson ST, Conway CR	2018	Specific for Depression
Vagus Nerve Stimulation for the Treatment of Epilepsy. Neurosurg Clin N Am. 2019;30:219–230	González HFJ, Yengo-Kahn A, Englot DJ	2019	Specific for Epilepsy



Vagus nerve stimulation (VNS) therapy update. Epilepsy Behav. 2018;88S:2–10	Wheless JW, Gienapp AJ, Ryvlin P	2018	Specific for Epilepsy
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**GUIDELINES**

<i>Citation</i>	<i>Medical Society or Panel</i>	<i>Publication year</i>	<i>Notes</i>
<a href="https://www.nice.org.uk/guidance/IPG330">https://www.nice.org.uk/guidance/IPG330</a>	National Institute for Health and Care Excellence (NICE) in United Kingdom	2009	Specific for Depression
Milev RV, Giacobbe P, Kennedy SH, et al. 2016 Clinical Guidelines for the Management of Adults with Major Depressive Disorder: Section 4. Neurostimulation Treatments. Can J Psychiatry 61:561–575.	Canadian Network for Mood and Anxiety Treatments (CANMAT)	2016	Specific for Depression
Morris GL, Gloss D, Buchhalter J, et al. Evidence-based guideline update: vagus nerve stimulation for the treatment of epilepsy: report of the Guideline Development Subcommittee of the American Academy of Neurology. Neurology. 2013; 81: 1453–1459.	American Academy of Neurology (AAN)	2013	Specific for Epilepsy

**MOST CITED PUBLICATIONS**

<i>Title and Journal</i>	<i>Author(s)</i>	<i>Publication year</i>	<i>Notes</i>
Vagal nerve stimulation markedly improves long-term survival after chronic heart failure in rats." Circulation 2004; 109: 120-124.	Li Meihua, et al.	2004	
Vagal nerve stimulation: a review of its applications and potential mechanisms that	Groves, Duncan A., Verity J. Brown	2005	



mediate its clinical effects. *Neuroscience & Biobehavioral Reviews* 2005; 29: 493-500.

Left vagal nerve stimulation in children with medically refractory epilepsy. *The Journal of pediatrics* 1999; 134: 563-566

New technique for vagal nerve stimulation. *Journal of Neuroscience Methods* 1999; 91: 109-114.

Vagal nerve stimulation in epileptic encephalopathies. *Pediatrics* 1999; 103: 778-782

Vagal nerve stimulation in tuberous sclerosis complex patients. *Pediatric neurology* 2001; 25: 213-21

Murphy, Jerome V., 1999  
and Pediatric VNS  
Study Group

Goldberger, Jeffrey J., 1999  
et al

Parker, Alasdair PJ, et 1999  
al

Parain, Dominique, et 2001  
al



### III. SACRAL NERVE STIMULATION (SNS)

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
New Perspectives in Sacral Nerve Stimulation: For Control of Lower Urinary Tract Dysfunction	Jonas U, Grunewald V	2002	
Urogenital Pain: A Clinicians Guide to Diagnosis and Interventional Treatments	Sabia M, Sehdev J, Bentley W	2017	
Electrical Stimulation for Pelvic Floor Disorders	Martellucci J	2015	All Italian authors but covers neuromodulation for urinary incontinence or retention, fecal incontinence, constipation, pelvic pain, sexual dysfunction and neurological diseases involving the pelvic floor
Adult and Pediatric Neuromodulation	Jason P. Gilleran and Seth A. Alpert	2018	Emphasis on sacral neuromodulation for bladder and bowel dysfunction in the adult and pediatric populations
<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Sacral nerve stimulation versus percutaneous tibial nerve stimulation for faecal incontinence: a systematic review and meta-analysis. Int J Colorectal Dis. 2018;33:645–648	Simillis C, Lal N, Qiu S, et al	2018	Specific for Fecal incontinence



Sacral Nerve Stimulation as a Therapy for Patients With Refractory Voiding and Bowel Dysfunction. <i>Obstet Gynecol.</i> 2018;132:1337–1345	Noblett KL, Buono K	2018	Specific for Refractory Voiding and Bowel Dysfunction
Sacral Nerve Stimulation for Neurogenic Bladder. <i>World Neurosurg.</i> 2016; 90:236–243	Li LF, Ka-Kit Leung G, Lui WM	2016	Specific for Neurogenic Bladder
Sacral nerve stimulation for faecal incontinence and constipation in adults. <i>Tech Coloproctol.</i> 2018;22:125–127	Falsetto E, Brown S, Gagliardi G	2018	Specific for Constipation and Fecal incontinence

### **GUIDELINES**

<b><i>Citation</i></b>	<b><i>Medical Society or Panel</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Pilkington SA, Emmett C, Knowles CH, et al. Surgery for constipation: systematic review and practice recommendations: Results V: Sacral Nerve Stimulation. <i>Colorectal Dis.</i> 2017; 19 Suppl 3:92–100.	NIHR CapaCiTY and Pelvic Floor Society	2017	
Maeda Y, O'Connell PR, Lehur PA, Matzel KE, Laurberg S; European SNS Bowel Study Group. Sacral nerve stimulation for faecal incontinence and constipation: a European consensus statement. <i>Colorectal Dis.</i> 2015; 17: O74–O87.	European SNS Bowel Study Group	2015	
Gormley EA, Lightner DJ, Faraday M, Vasavada SP; American Urological Association; Society of Urodynamics, Female Pelvic Medicine. Diagnosis and treatment of overactive bladder (non-neurogenic) in adults: AUA/SUFU guideline amendment. <i>J Urol.</i> 2015;193:1572–1580	American Urological Association, Society of Urodynamics	2015	
<a href="https://www.nice.org.uk/Guidance/IPG64">https://www.nice.org.uk/Guidance/IPG64</a>	National Institute for Health and Care Excellence (NICE) in United Kingdom	2004	



<b><i>MOST CITED PUBLICATIONS</i></b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Sacral nerve stimulation for treatment of refractory urinary urge incontinence. The Journal of urology 1999; 162: 352-357	Schmidt, Richard A., et al	1999	
Permanent sacral nerve stimulation for fecal incontinence. Annals of surgery 2000; 232: 143	Malouf, Andrew J., et al	2000	
Sacral nerve stimulation for intractable constipation. Gut 2010; 59: 333-340.	Kamm, Michael A., et al	2010	
Sacral nerve stimulation as a treatment for fecal incontinence. Gastroenterology 2001; 121: 536-541.	Rosen, Harald R., et al	2001	
Effect of sacral nerve stimulation in patients with fecal and urinary incontinence. Diseases of the colon & rectum 2001; 44: 779-789	Leroi, Anne-Marie, et al	2001	
How sacral nerve stimulation neuromodulation works. Urologic Clinics 2005; 32: 11-18.	Leng, Wendy W., Chancellor MB	2005	
Sacral nerve stimulation for treatment of fecal incontinence. Diseases of the colon & rectum 2001; 44: 619-629	Ganio, Ezio, et al	2001	
Medium-term results of permanent sacral nerve stimulation for faecal incontinence. British journal of surgery 2002; 89: 896-901	Kenefick, NJ, et al	2002	
Sacral nerve stimulation for fecal incontinence: results of a 120-patient prospective multicenter study." Annals of surgery 2010; 251: 441-449.	Wexner, Steven D, et al	2010	



#### IV. INTRATHECAL DRUG DELIVERY SYSTEMS (IDDS)

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Atlas of Implantable Therapies for Pain Management: 2nd Edition	Deer TR, Pope JE	2016	Good pictures and figures
Intrathecal Drug Delivery for Pain and Spasticity E-Book: A Volume in the Interventional and Neuromodulatory Techniques for Pain Management Series (Interventional Techniques in Pain Management Book 2)	Buvanendran A, Dewan S, Deer TR	2011	Covers IDD for chronic non-cancer pain, caancer pain, spasticity
Intrathecal Drug Therapy for Spasticity and Pain: Practical Patient Management	Gianino JM, Paice JA, York JM	1996	A practical manual for nurses and physician assistants
<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Intrathecal Drug Delivery and Spinal Cord Stimulation for the Treatment of Cancer Pain. Curr Pain Headache Rep. 2018;22:11	Xing F, Yong RJ, Kaye AD, Urman RD	2018	Cancer pain
Intrathecal Therapy for Cancer-Related Pain. Pain Med. 2016; 17: 2404–2421	Bruel BM, Burton AW	2016	Cancer pain



Choice of intrathecal drug in the treatment of neuropathic pain - new research and opinion. <i>Expert Rev Clin Pharmacol.</i> 2019;12:1003–1007	Deer TR, Malinowski M, Varshney V, Pope J	2019	Neuropathic pain
Intrathecal Therapies. <i>Phys Med Rehabil Clin N Am.</i> 2018;29:537–551	Saulino M	2018	Comprehensive - pain and spasticity
Intrathecal Pain Therapy for the Management of Chronic Noncancer Pain. <i>Neurosurg Clin N Am.</i> 2019;30:195–201	Sukul VV	2019	Chronic non-cancer pain
Intrathecal Therapy for Chronic Pain: A Review of Morphine and Ziconotide as Firstline Options. <i>Pain Med.</i> 2019;20:784–798	Deer TR, Pope JE, Hanes MC, McDowell GC	2019	Morphine and Ziconotide
Intrathecal Baclofen Therapy-Practical Approach: Clinical Benefits and Complication Management. <i>J Child Neurol.</i> 2018;33:734–741	Winter G, Beni-Adani L, Ben-Pazi H	2018	Spasticity in Cerebral Palsy

**GUIDELINES**

<i>Citation</i>	<i>Medical Society or Panel</i>	<i>Publication year</i>	<i>Notes</i>
Deer TR, Pope JE, Hayek SM, Bux A, Buchser E, Eldabe S, De Andrés JA, Erdek M, Patin D, Grider JS, Doleys DM. The Polyanalgesic Consensus Conference (PACC): recommendations on intrathecal drug infusion systems best practices and guidelines. <i>Neuromodulation: Technology at the Neural Interface.</i> 2017; 20: 96-132.	Polyanalgesic Consensus Conference (PACC)	2017	Best Practice Guidelines
Deer TR, Pope JE, Hayek SM, et al. The Polyanalgesic Consensus Conference (PACC): Recommendations for Intrathecal Drug Delivery: Guidance for Improving Safety and Mitigating Risks. <i>Neuromodulation.</i> 2017; 20:155–176	Polyanalgesic Consensus Conference (PACC)	2017	Improving Safety and Mitigating Risks



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Deer TR, Hayek SM, Pope JE, et al. The Polyanalgesic Consensus Conference (PACC): Recommendations for Trialing of Intrathecal Drug Delivery Infusion Therapy. <i>Neuromodulation</i> . 2017; 20:133–154	Polyanalgesic Consensus Conference (PACC)	2017	Trialing Recommendations
<a href="https://www.britishpainsociety.org/static/uploads/resources/files/itdd_2015_pro_v3.pdf">https://www.britishpainsociety.org/static/uploads/resources/files/itdd_2015_pro_v3.pdf</a>	British Pain Society	2015	For Pain and Spasticity
Francisco GE, Yablon SA, Schiess MC, Wiggs L, Cavalier S, Grissom S. Consensus panel guidelines for the use of intrathecal baclofen therapy in poststroke spastic hypertonia. <i>Top Stroke Rehabil</i> . 2006; 13:74–85	Unspecified group of experts consisting of "three physiatrists, two neurologists, and one physical therapist"	2006	For Spasticity
Boster AL, Bennett SE, Bilsky GS, et al. Best Practices for Intrathecal Baclofen Therapy: Screening Test. <i>Neuromodulation</i> . 2016; 19:616–622	ITB Therapy Best Practices Expert Consensus Panel	2016	For Spasticity (screening)
Saulino M, Ivanhoe CB, McGuire JR, Ridley B, Shilt JS, Boster AL. Best Practices for Intrathecal Baclofen Therapy: Patient Selection. <i>Neuromodulation</i> . 2016; 19:607–615	ITB Therapy Best Practices Expert Consensus Panel	2016	For Spasticity (patient selection)
Boster AL, Adair RL, Gooch JL, et al. Best Practices for Intrathecal Baclofen Therapy: Dosing and Long-Term Management. <i>Neuromodulation</i> . 2016;19:623–631	ITB therapy Best Practices Expert Consensus Panel	2016	For Spasticity (Dosing and Long-Term Management)
Saulino M, Anderson DJ, Doble J, et al. Best Practices for Intrathecal Baclofen Therapy: Troubleshooting. <i>Neuromodulation</i> . 2016;19:632–641	ITB Therapy Best Practices Expert Consensus Panel	2016	For Spasticity (troubleshooting)



**MOST CITED PUBLICATIONS**

<i>Title and Journal</i>	<i>Author(s)</i>	<i>Publication year</i>	<i>Notes</i>
Intrathecal drug delivery. Pain physician 2008; 11 Suppl: S89-S104.	Smith, Howard S, et al	2008	
Prevention and management of intrathecal drug delivery and spinal cord stimulation system infections. Anesthesiology: The Journal of the American Society of Anesthesiologists 2004; 100: 1582-1594	Follett, Kenneth A., et al	2004	
Current perspectives on intrathecal drug delivery. Journal of pain research 2014; 7: 615.	Bottros, MM, Christo PJ	2014	
Catheter systems for intrathecal drug delivery. Journal of neurosurgery 1995; 83: 215-217.	Penn RD, York MM, Paice JA	1995	
Intrathecal drug delivery for the management of cancer pain: a multidisciplinary consensus of best clinical practices. The journal of supportive oncology 2005; 3: 399-408	Stearns, Lisa, et al	2005	
A prospective study of catheter-related complications of intrathecal drug delivery systems. Journal of pain and symptom management 2000; 19: 209-215	Follett, Kenneth A., and Claus P. Naumann	2000	
Comprehensive consensus based guidelines on intrathecal drug delivery systems in the treatment of pain caused by cancer pain. Pain physician 2011; 14: E283-E312.	Deer TR, Smith HS, Burton AW, Pope JE, et al	2011	
Best practices for intrathecal drug delivery for pain. Neuromodulation: Technology at the Neural Interface 2014; 17: 354-372	Prager, Joshua, et al	2014	
Intrathecal drug delivery for treatment of chronic low back pain: report from the National Outcomes Registry for Low Back Pain. Pain medicine 2004; 5: 6-13.	Deer, Timothy, et al	2004	
Prevention of intrathecal drug delivery catheter-related complications. Neuromodulation: Technology at the Neural Interface 2003; 6: 32-41	Follett, Kenneth A., et al	2003	



**V. SPINAL CORD STIMULATION (SCS) AND DORSAL ROOT GANGLION (DRG) STIMULATION**

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Atlas of Implantable Therapies for Pain Management: 2nd edition	Deer TR, Pope JE	2016	Good pictures and figures
Spinal Cord Stimulation Implantation: Percutaneous Implantation Techniques	Kreis P, Fishman S	2009	Concise; good for folks new to SCS
Spinal Cord Stimulation: Principles and Practice	Mammis A	2015	Resource for decision-making when treating patients with chronic pain
<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Neurostimulation for Intractable Chronic Pain. Brain Sci. 2019; 9: 23	Deer TR, Jain S, Hunter C, Chakravarthy K	2019	
Conventional and Novel Spinal Stimulation Algorithms: Hypothetical Mechanisms of Action and Comments on Outcomes. Neuromodulation: Technology at the Neural Interface. 2017; 20: 525-533.	Linderoth B, Foreman R	2017	
Mechanisms of spinal cord stimulation for the treatment of pain: Still in the dark after 50 years. Eur J Pain. 2019; 23: 652-659.	Jensen MP, Brownstone RM	2019	
A review of clinical data on salvage therapy in spinal cord stimulation. Neuromodulation. 2019; 10: 1111	Reddy RD, Moheimani R, Yu GG, Chakravarthy KV	2019	



The effect of spinal cord stimulation on pain medication reduction in intractable spine and limb pain: a systematic review of randomized controlled trials and meta-analysis. J Pain Res. 2019; 12: 1311-1324.	Pollard EM, Lamer TJ, Moeschler SM, et al	2019	
Effectiveness of spinal cord stimulation in chronic spinal pain: A systemic review. Pain Physician 2016; 19: E33-54	Grider JS, Manchikanti L, Carayannopoulos A, et al	2016	
<b>GUIDELINES</b>			
<b><i>Citation</i></b>	<b><i>Medical Society or Panel</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Deer, T.R., Pope, J.E., Lamer, T.J., et al. The Neuromodulation Appropriateness Consensus Committee on Best Practices for Dorsal Root Ganglion Stimulation. Neuromodulation: Technology at the Neural Interface 2019; 22: 1-35	NACC	2019	DRG
Deer, T.R., Lamer, T.J., Pope, J.E., et al. The Neurostimulation Appropriateness Consensus Committee (NACC) Safety Guidelines for the Reduction of Severe Neurological Injury. Neuromodulation: Technology at the Neural Interface. 2017;20: 15-30	NACC	2017	Reduction of neurological injury
Deer, T.R., Provenzano, D.A., Hanes, M., et al. The Neurostimulation Appropriateness Consensus Committee (NACC) Recommendations for Infection Prevention and Management. Neuromodulation: Technology at the Neural Interface. 2017;20:31-50	NACC	2017	Infection prevention
Senza spinal cord stimulation system for delivering HF10 therapy to treat chronic	NICE	2019	HF 10





neuropathic pain. Medical technologies guidance [MTG41]			
Narouze S, Benzon HT, Provenzano DA, et al.(Second edition)Interventional Spine and Pain Procedures in Patients on Antiplatelet and Anticoagulant Medications: Guidelines From the American Society of Regional Anesthesia and Pain Medicine, the European Society of Regional Anaesthesia and Pain Therapy, the American Academy of Pain Medicine, the International Neuromodulation Society, the North American Neuromodulation Society, and the World Institute of Pain.Regional Anesthesia & Pain Medicine 2018;43:225-262.	ASRA,ESRA,INS,NANS, AAPM,WIP	2018	Anticoagulation
Deer, T.R., Narouze, S., Provenzano, D.A., et al. The Neurostimulation Appropriateness Consensus Committee (NACC): Recommendations on Bleeding and Coagulation Management in Neurostimulation Devices. Neuromodulation: Technology at the Neural Interface. 2017; 20: 51-62	NANS/INS	2017	Anticoagulation
Eldabe S, Baranidharan G, Fitzgerald J et al. Recommendations for the Management of Implanted Neurostimulation & Intrathecal Drug Delivery Devices During the COVID-19 Pandemic	NSUKI	2020	COVID-19 guidelines
Thomson S, Huygen F, Stoevelaar et al. Appropriate referral and selection of patients with chronic pain for spinal cord stimulation: European consensus recommendations and e-health tool. Eur J Pain. 2020 Mar 18. [Epub ahead of print]	European neuromodulation consensus	2020	SCS selection
10-kHz High-Frequency Spinal Cord Stimulation for Adults With Chronic Noncancer Pain: A	Ontario Health	2020	Tehnology guideline



Health Technology Assessment. Ont Health Technol Assess Ser. 2020; 20:1-109.

***MOST CITED PUBLICATIONS***

<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Spinal cord stimulation versus conventional medical management for neuropathic pain: a multicentre randomised controlled trial in patients with failed back surgery syndrome. Pain 2007; 132: 179–188	Kumar K, Taylor RS, Jacques L, et al	2007	
Compound action potentials recorded in the human spinal cord during neurostimulation for pain relief. Pain 2012; 153: 593–601	Parker JL, Karantonis DM, Single PS, Obradovic M, et al	2012	
Spinal cord stimulation versus repeated lumbosacral spine surgery for chronic pain: a randomized, controlled trial. Neurosurgery 2005; 56: 98–106.	North RB, Kidd DH, Farrokhi F, Piantadosi SA	2005	
Preferred frequencies and waveforms for spinal cord stimulation in patients with complex regional pain syndrome: a multicentre, double-blind, randomized and placebo-controlled crossover trial. Eur J Pain 2017; 21: 507–519.	Kriek N, Groeneweg JG, Stronks DL, de Ridder D, et al	2017	
Waves of pain relief: a systematic review of clinical trials in spinal cord stimulation waveforms for the treatment of chronic neuropathic low back and leg pain. World Neurosurg 2019; 131: 264–274.	Head J, Mazza J, Sabourin V, Turpin J, et al	2019	
Multicenter, randomized, double-blind study protocol using human spinal cord recording comparing safety, efficacy, and neurophysiological responses between patients being treated with evoked compound action	Levy R, Deer TR, Poree L, et al	2019	



potential-controlled closed-loop spinal cord stimulation or open-loop spinal cord stimulation (the Evoke Study). <i>Neuromodulation</i> . 2019; 22: 317–326.		
Success using neuromodulation with BURST (SUNBURST) study: results from a prospective, randomized controlled trial using a novel burst waveform. <i>Neuromodulation</i> 2018; 21: 56–66.	Deer T, Slavin KV, Amirdelfan K, et al	2018
Novel 10-kHz high-frequency therapy (HF10 therapy) is superior to traditional Low-frequency spinal cord stimulation for the treatment of chronic Back and leg pain: the SENZA-RCT randomized controlled trial. <i>Anesthesiology</i> 2015; 123: 851–860.	Kapur L, Yu C, Doust MW, et al	2015
The effect of pulse width and contact configuration on paresthesia coverage in spinal cord stimulation. <i>Neurosurgery</i> . 2011; 68:1452–1461	Holsheimer J, Buitenweg JR, Das J, de Sutter P, et al	2011
Pulse width programming in spinal cord stimulation: a clinical study. <i>Pain Physician</i> . 2010; 13:321–335	Yearwood TL, Hershey B, Bradley K, Lee D	2010
Factors affecting impedance of percutaneous leads in spinal cord stimulation. <i>Neuromodulation</i> . 2006; 9:128–135	Alo K, Varga C, Krames E, Prager J, et al	2006
Mechanism of action in burst spinal cord stimulation: review and recent advances. <i>Pain Med</i> . 2019; 20: S13–S22.	Chakravarthy K, Fishman MA, Zuidema X, Hunter CW, et al	2019
Spinal cord stimulation programming: a crash course. <i>Neurosurg Rev</i> 2020	Sheldon B, Staudt MD, Williams L et al	2020
Burst spinal cord stimulation: Toward paresthesia-free pain suppression. <i>Neurosurgery</i> . 2010; 66: 986–990	De Ridder D, Vanneste S, Plazier M, Van der Loo E, et al	2010



Randomized Placebo-/Sham-Controlled Trials of Spinal Cord Stimulation: A Systematic Review and Methodological Appraisal. <i>Neuromodulation</i> . 2020;23:10-18	Duarte RV, McNicol E, Colloca L, Taylor RS, et al	2020
10-kHz High-Frequency SCS Therapy: A Clinical Summary. <i>Pain Med</i> . 2015 ; 16: 934-942.	Russo M, Van Buyten JP	2015
Spinal Cord Stimulation for Treating Chronic Pain: Reviewing Preclinical and Clinical Data on Paresthesia-Free High-Frequency Therapy. <i>Neuromodulation: Technology at the Neural Interface</i> . 2017; 21:10-18.	Chakravarthy K, Richter H, Christo PJ, Williams K, et al	2017
Comparison of 10-kHz High-Frequency and Traditional Low-Frequency Spinal Cord Stimulation for the Treatment of Chronic Back and Leg Pain: 24-Month Results From a Multicenter, Randomized, Controlled Pivotal Trial. <i>Neurosurgery</i> . 2016;79: 667-677	Kapural L, Yu C, Doust MW, et al	2016
Treatment of Chronic Abdominal Pain With 10-kHz Spinal Cord Stimulation: Safety and Efficacy Results From a 12-Month Prospective, Multicenter, Feasibility Study. <i>Clin Transl Gastroenterol</i> . 2020;11	Kapural L, Gupta M, Paicius R, et al	2020
Spinal cord stimulation in patients with painful diabetic neuropathy: a multicenter randomized clinical trial. <i>Pain</i> 2014; 155: 2426–2431.	de Vos CC, Meier K, Zaalberg PB, et al	2014
Predictors of pain relief following spinal cord stimulation in chronic back and leg pain and failed back surgery syndrome: A systemic review and meta-regression analysis. <i>Pain Pract</i> 2014; 14: 489-505	Taylor RS, Desai MJ, Rigoard P, Taylor RJ	2014



## VI. PERIPHERAL NERVE STIMULATION (PNS)

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Peripheral Nerve Stimulation (Progress in Neurological Surgery Book 24)	Slavin KV	2011	Excellent resource
Stimulation of the Peripheral Nervous System: The Neuromodulation Frontier (Progress in Neurological Surgery Book 29)	Slavin KV	2015	Excellent resource
Atlas of Implantable Therapies for Pain Management	Deer TR, Pope JE	2016	Includes chapters on PNS
Neuromodulation in Headache and Facial Pain Management: Principles, Rationale and Clinical Data	Lambru G, Lanteri-Minet M	2019	Addresses various types of neuromodulation therapies for refractory headache and facial pain
<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Occipital Nerve Stimulation for the Treatment of Patients With Medically Refractory Occipital Neuralgia: Congress of Neurological Surgeons Systematic Review and Evidence-Based Guideline. Neurosurgery 2015; 77: 332–341	Sweet JA, Mitchell LS, Narouze S, et al	2015	
Intra- and extracranial neurostimulation. Neuromodulation: Technology at the Neural Interface. 2014;17:551-570	Deer TR, Mekhail N, Petersen E, et al	2014	



Review of Recent Advances in Peripheral Nerve Stimulation (PNS). Curr Pain Headache Rep. 2016 ;20:60	Chakravarthy K, Nava A, Christo PJ, Williams K	2016
Peripheral Nerve Stimulation for Pain in Extremities: An Update. Prog Neurol Surg. 2015;29:139-57	Pope JE, Carlson JD, Rosenberg WS, Slavin KV, et al	2015
Occipital Nerve Stimulation. Neurosurg Clin N Am. 2019; 30:211-217.	Slavin KV, Isagulyan ED, Gomez C, Yin D	2019
A review of the bioelectronic implications of stimulation of the peripheral nervous system for chronic pain conditions. Bioelectron Med. 2020; 6 :9. Published 2020 Apr 24	Deer TR, Naidu R, Strand N, et al	2020

**GUIDELINES**

<i>Citation</i>	<i>Medical Society or Panel</i>	<i>Publication year</i>	<i>Notes</i>
Sweet JA, Mitchell LS, Narouze S. Occipital Nerve Stimulation for the Treatment of Patients With Medically Refractory Occipital Neuralgia: Congress of Neurological Surgeons Systematic Review and Evidence-Based Guideline. Neurosurgery. 2015; 77: 332-41.	CNS	2015	ON
Implantation of a sphenopalatine ganglion stimulation device for chronic cluster headache. Interventional procedures guidance [IPG527]	NICE	2015	Cluster headache
Occipital nerve stimulation for intractable chronic migraine. Interventional procedures guidance [IPG452]	NICE	2013	ON
Peripheral nerve-field stimulation for chronic low back pain. Interventional procedures guidance [IPG451]	NICE	2013	LBP



<b>MOST CITED PUBLICATIONS</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Peripheral Nerve Stimulation for Pain in Extremities: An Update. <i>Prog Neurol Surg.</i> 2015;29:139-57	Pope JE, Carlson JD, Rosenberg WS, Slavin KV, et al	2015	
Occipital nerve stimulator systems: review of complications and surgical techniques. <i>Neuromodulation.</i> 2010 13:121–125	Falowski S, Wang D, Sabesan A, Sharan A	2010	
Burst occipital nerve stimulation for chronic migraine and chronic cluster headache. <i>Neuromodulation.</i> 2019; 22:638–644	Garcia-Ortega R, Edwards T, Moir L, Aziz TZ, et al	2019	
High-frequency (10 kHz) electrical stimulation of peripheral nerves for treating chronic pain: a double-blind trial of presence vs absence of stimulation. <i>Neuromodulation.</i> 2019; 22: 529–536.	Finch P, Price L, Drummond P	2019	
A review of the bioelectronic implications of stimulation of the peripheral nervous system for chronic pain conditions. <i>Bioelectron Med.</i> 2020; 6: 9. Published 2020 Apr 24	Deer TR, Naidu R, Strand N, et al	2020	
Occipital nerve stimulation for the treatment of intractable chronic migraine headache: ONSTIM feasibility study. <i>Cephalalgia.</i> 2011; 31: 271-285.	Saper JR, Dodick DW, Silberstein SD, et al	2011	
Percutaneous Peripheral Nerve Stimulation for Chronic Low Back Pain: Prospective Case Series With 1 Year of Sustained Relief Following Short-Term Implant. <i>Pain Pract.</i> 2020; 20: 310-320.	Gilmore CA, Kapural L, McGee MJ, Boggs JW	2020	
Infection Rates of Electrical Leads Used for Percutaneous Neurostimulation of the Peripheral Nervous System. <i>Pain Pract.</i> 2017; 17: 753-762.	Ilfeld BM, Gabriel RA, Saulino MF, et al	2017	



Percutaneous Peripheral Nerve Stimulation for the Treatment of Chronic Pain Following Amputation. <i>Mil Med.</i> 2019; 184: e267-e274.	Cohen SP, Gilmore CA, Rauck RL, et al	2019
Peripheral nerve stimulation: definition. <i>Prog Neurol Surg.</i> 2011; 24: 203–209.	Abejon D, Perez-Cajaraville J	2011
Neurostimulation for the treatment of chronic head and facial pain: a literature review. <i>Pain Physician.</i> 2019;22(5):447–477.	Antony AB, Mazzola AJ, Dhaliwal GS, Hunter CW	2019
New therapy for refractory chronic mechanical low Back pain-restorative Neurostimulation to activate the lumbar Multifidus: one year results of a prospective multicenter clinical trial. <i>Neuromodulation.</i> 2018; 21: 48–55.	Deckers K, De Smedt K, Mitchell B, et al	2018
A novel method of neurostimulation of the peripheral nervous system: the StimRouter implantable device. <i>Tech Reg Anesth Pain Manag.</i> 2012; 16:113–117.	Deer TR, Pope JE, Kaplan M.	2012
Percutaneous 60-day peripheral nerve stimulation implant provides sustained relief of chronic pain following amputation: 12-month follow-up of a randomized, double-blind, placebo-controlled trial. <i>Reg Anesth Pain Med.</i> 2019. 10.1136/rapm-2019-100937.	Gilmore CA, Ilfeld BM, Rosenow JM, et al	2019





## VII. NON-INVASIVE THERAPIES: Transcranial Magnetic (TMS) and Transcranial Direct Current (tDCS) Stimulation

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Transcranial Magnetic Stimulation: Clinical Applications for Psychiatric Practice	Bermudes RA, Lanocha K, Janicak PG	2017	Guides the general psychiatrist on how to integrate TMS into their practice
Repetitive Transcranial Magnetic Stimulation Treatment for Depressive Disorders: A Practical Guide	Fitzgerald PB, Daskalakis ZJ	2013	A concise clinical guide: reference and practical tool for clinicians working with or learning about rTMS
Transcranial Magnetic Stimulation	Rotenberg A, Horvath JC, Pascual-Leone A	2014	Describes methods for single and multiple pulse TMS as well as methods for TMS coupled with associated techniques, from electromyography to neuroimaging
Practical Guide to Transcranial Direct Current Stimulation: Principles, Procedures and Applications	Knotkova H, Nitsche MA, Bikson M, Woods AJ	2019	Comprehensive overview of tDCS
Transcranial Direct Current Stimulation in Neuropsychiatric Disorders: Clinical Principles and Management	Brunoni A, Nitsche M, Loo C	2016	Reviews tDCS clinical studies (from single-session tDCS studies to RCTs) as well as studies evaluating the impact of tDCS in neurophysiological, behavioral and brain imaging outcomes
Non Invasive Brain Stimulation in Psychiatry and Clinical Neurosciences	Dell'Osso B, Lorenzo GD	2020	Covers tDCS and TMS



<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Is There a Future for Non-invasive Brain Stimulation as a Therapeutic Tool? Front Neurol 2019; 9: 1146	Terranova C, et al	2019	
Non-invasive neuromodulation for migraine and cluster headache: a systematic review of clinical trials. J Neurol Neurosurg Psychiatry. 2019; 90: 796-804.	Reuter U, McClure C, Liebler E, Pozo-Rosich P	2019	
<b>GUIDELINES</b>			
<b><i>Citation</i></b>	<b><i>Medical Society or Panel</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Transcranial magnetic stimulation for obsessive-compulsive disorder. In development [GID-IPG10134]	NICE	In progress	NICE guideline
Martelletti P, Jensen RH, Antal A, et al. Neuromodulation of chronic headaches: position statement from the European Headache Federation. J Headache Pain. 2013; 14: 86.	European Headache Federation (EHF)	2013	European Headache consensus on NM for HA
Baptista AF, Fernandes AMBL, Sá KN, et al. Latin American and Caribbean consensus on noninvasive central nervous system neuromodulation for chronic pain management (LAC2-NIN-CP). Pain Rep. 2019; 4: e692.	LAC <sub>2</sub> -NIN-CP	2019	Latin American and Caribbean consensus on noninvasive central nervous system neuromodulation for chronic pain management (LAC <sub>2</sub> -NIN-CP)
Repetitive transcranial magnetic stimulation for depression Interventional procedures guidance [IPG542]	NICE	2015	NICE guideline



Transcranial direct current stimulation (tDCS) for depression Interventional procedures guidance [IPG530]	NICE	2015	NICE guideline
Transcranial magnetic stimulation for treating and preventing migraine Interventional procedures guidance [IPG477]	NICE	2014	NICE guideline

***MOST CITED PUBLICATIONS***

<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Transcranial magnetic stimulation for the treatment of anxiety disorder. <i>Neuropsychiatr Dis Treat.</i> 2019; 15: 2743-2761.	Rodrigues PA, Zaninotto AL, Neville IS, et al.	2019	
Assessment and treatment of pain with non-invasive cortical stimulation. <i>Restor Neurol Neurosci.</i> 2011; 29: 439–51	Zaghi S, Thiele B, Pimentel D.	2011	
Safety and efficacy of cervical 10 kHz spinal cord stimulation in chronic refractory primary headaches: a retrospective case series. <i>J Headache Pain.</i> 2016; 17:66.	Lambru G, Trimboli M, Palmisani S, Smith T, et al	2016	
A six year retrospective review of occipital nerve stimulation practice--controversies and challenges of an emerging technique for treating refractory headache syndromes. <i>J Headache Pain.</i> 2013; 14: 67	Palmisani S, Al-Kaisy A, Arcioni R, et al	2013	
Non-invasive neuromodulation to improve gait in chronic multiple sclerosis: a randomized double blind controlled pilot trial. <i>J Neuroeng Rehabil.</i> 2014; 11: 79.	Tyler ME, Kaczmarek KA, Rust KL, Subbotin AM, Skinner KL, Danilov YP	2014	
Transcranial magnetic stimulation for the treatment of anxiety disorder. <i>Neuropsychiatr Dis Treat.</i> 2019; 15: 2743-2761.	Rodrigues PA, Zaninotto AL, Neville IS, et al	2019	



## VIII. RESOURCES ADDRESSING MULTIPLE NEUROMODULATION (NM) MODALITIES

<b>BOOKS</b>			
<b><i>Title</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
Neuromodulation: Comprehensive Textbook of Principles, Technologies, and Therapies	Krames E, Peckham PH, Rezai A	2018	Covers SCS, DBS, PNS and also advances like optogenetics and bioelectronics medicine
The Neuromodulation casebook	Arle J	2020	Case based discussion of SCS, DBS, PNS and VNS
Neurostimulation: Principles and Practice	Eljamel S, Slavin K	2013	Covers DBS, MCS, VNS, SCS, PNS
Textbook of Neuromodulation: Principles, Methods and Clinical Applications	Knotkova H, Rasche D	2014	Covers (in brief) background of all aspects of invasive and non-invasive NM
<b>REVIEW ARTICLES</b>			
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
The evolution of neuromodulation in the treatment of chronic pain: forward-looking perspectives. Pain Med 2019; 20:S58–S68	Fishman MA, Antony A, Esposito M, Deer T, et al	2019	
<b>GUIDELINES</b>			
<b><i>Citation</i></b>	<b><i>Medical Society or Panel</i></b>	<b><i>Publication year</i></b>	<b><i>Notes</i></b>
NANS Covid-19 Resource Guide for Practitioners. <a href="https://neuromodulation.org/NANSWorkingforYou/Newsroom/COVID-19Resources.aspx">https://neuromodulation.org/NANSWorkingforYou/Newsroom/COVID-19Resources.aspx</a>	NANS	2020	COVID guidelines



WIKISTIM		Excellent source of all neuromodulation related resources
<b><i>MOST CITED PUBLICATIONS</i></b>		
<b><i>Title and Journal</i></b>	<b><i>Author(s)</i></b>	<b><i>Publication year</i></b>
Spinal cord stimulator implant infection rates and risk factors: a multicenter retrospective study. <i>Neuromodulation</i> . 2017; 20:558–562	Hoelzer BC, Bendel MA, Deer TR, Eldrige JS, et al	2017
Acute vs. prolonged screening for spinal cord stimulation in chronic pain. <i>Neuromodulation</i> 2003. 6:15–19	Weinand ME, Madhusudan H, Davis B, Melgar M	2003
Safety and efficacy of spinal cord stimulation for the treatment of chronic pain: a 20-year literature review. <i>J Neurosurg</i> . 2004; 100: 254–267	Cameron T	2004
Spinal cord stimulation for chronic, intractable pain: superiority of “multi-channel” devices. <i>Pain</i> . 1991; 44:119–130	North RB, Ewend MG, Lawton MT, Piantadosi S	1991
A prospective study of the intra- and postoperative efficacy of intraoperative neuromonitoring in spinal cord stimulation. <i>Stereotact Funct Neurosurg</i> . 2015; 93:348–354	Roth SG, Lange S, Haller J, De La Cruz P, et al	2015
Neural mechanisms of spinal cord stimulation. <i>Int. Rev. Neurobiol</i> . 2012; 107: 87–119.	Foreman R.D., Linderth B	2012
Effectiveness of Spinal Cord Stimulation in Chronic Spinal Pain: A Systematic Review. <i>Pain Physician</i> . 2016; 19: E33–E54.	Grider JS, Manchikanti L, Carayannopoulos A, Sharma ML, et al	2016
Neuromodulation and the role of electrodiagnostic techniques. <i>Int Urogynecol J</i> . 2010; 21 Suppl 2:S461-S466	Noblett KL.	2010
The Current State of Deep Brain Stimulation for Chronic Pain and Its Context in Other Forms of Neuromodulation. <i>Brain Sci</i> . 2018; 8: 158	Farrell SM, Green A, Aziz T	2018