Cigna Medical Coverage Policies – Musculoskeletal Spinal Cord and Dorsal Root Ganglion Stimulation

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Instructions for use

The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer's particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer's benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by eviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

CMM-211: Spinal Cord Stimulators and Dorsal Root Ganglion Stimulation

Definitions

- **Spinal cord stimulation**, also known as dorsal column stimulation or neuromodulation, is a reversible therapy applied for neuropathic pain with techniques that include multi-output implanted pulse generators and a choice of electrodes, some of which can be placed percutaneously. The technical goal of this therapy is to achieve stimulation of paresthesia from the dorsal horn of the spinal cord at a subjectively comfortable level, overlapping an individual's topography of pain. The procedure initially involves a short-term trial (i.e., greater than 48 hours) of percutaneous (temporary) spinal cord stimulation, prior to the subcutaneous (permanent) implantation of the spinal cord stimulation device, to determine whether the spinal cord stimulator device will induce sufficient pain relief to render it medically necessary. Although it may vary depending on the specific device, a traditional dorsal column stimulator (i.e., non high-frequency) generally produces a pulse width between 20-1000 µs and frequencies between 2 and 1200 Hz. Some devices allow adjustment of the settings, including burst and/or continuous mode stimulation.
- **High frequency spinal cord stimulation**, also referred to as kilohertz frequency spinal cord stimulation or HF10, is a type of spinal cord stimulation (SCS) providing a higher frequency than traditional spinal cord stimulator systems. The HF10 SCS uses low amplitude, high frequency, and short duration pulses. HF10 SCS does not generate paresthesia and operates at a frequency of 10,000 Hz to provide pain relief in comparison to traditional spinal cord stimulation systems which operate at a lower frequency and do generate paresthesia. As an alternative to traditional dorsal spinal column stimulation HF10 SCS is proven safe and effective for treatment of chronic, intractable low back and leg pain in individuals with failed back surgery syndrome (FBSS).
- **Dorsal root ganglion (DRG) stimulation** is an emerging method of treatment for neuropathic pain. With DRG stimulation leads are placed percutaneously into the epidural space under fluoroscopic guidance directly over the targeted dorsal root ganglion within the lumbar or sacral region of the spine. Similar to spinal cord stimulation a short-term trial (i.e., greater than 48 hours) is recommended using an external pulse generator; upon success of the trial a permanent pulse generator may then be implanted. At this time, the evidence in the peer-reviewed scientific literature is insufficient to support long-term safety and efficacy. The use of this technology for treatment of pain conditions remains under investigation.
- **Failed back surgery syndrome (FBSS)** is lumbar spinal pain of unknown origin despite surgical intervention or appearing after surgical intervention for spinal pain originally in the same spinal region.

Indications

- The determination of medical necessity for implantation of a dorsal column spinal cord stimulator is always made on a case-by-case basis.
- A dorsal column stimulator capable of **using either high-frequency or non high-frequency stimulation** (e.g., Senza) is considered an equally effective alternative for the treatment of any of the medically necessary indications listed below, when the device uses non high frequency stimulation.
- A dorsal column stimulator **using high frequency** is considered an equally effective alternative to non-high frequency stimulation **only** for the treatment of chronic intractable pain, secondary to failed back surgery syndrome as noted below.

Chronic Intractable Pain Secondary to Failed Back Surgery Syndrome

- A short-term trial (i.e., greater than 48 hours) spinal cord stimulation (i.e., non high-frequency, high-frequency [HF10 SCS]), is considered **medically necessary** for the treatment of chronic intractable pain secondary to failed back surgery syndrome (FBSS) with intractable neuropathic leg pain when **ALL** of the following criteria are met:
  - Failure of at least six consecutive months of physician-supervised conservative medical management (e.g., pharmacotherapy, physical therapy, cognitive therapy, and activity lifestyle modification)
  - Surgical intervention is not indicated or the individual does not wish to proceed with spinal surgery
  - An evaluation by a mental health provider (e.g., a face-to-face assessment with or without psychological questionnaires and/or psychological testing) reveals no evidence of an inadequately controlled mental health problem (e.g., alcohol or drug dependence, depression, psychosis) that would impact perception of pain and/or negatively impact the success of a SCS or contraindicate placement of the device.
- Permanent implantation of a spinal cord stimulator (i.e., non high-frequency, HF10 SCS), is considered **medically necessary** for the treatment of chronic intractable pain secondary to failed back surgery syndrome (FBSS) with intractable neuropathic leg pain when at least 50% reduction in pain has been demonstrated during a short-term trial of SCS.

Complex Regional Pain Syndrome (CRPS)/Reflex Sympathetic Dystrophy (RSD)

- A short-term trial (i.e., greater than 48 hours) of a non high-frequency dorsal column spinal cord stimulator (SCS) is considered **medically necessary** for the treatment of chronic, intractable pain secondary to complex regional pain syndrome (CRPS)/reflex sympathetic dystrophy (RSD) when **ALL** of the following criteria are met:
  - Failure of at least six consecutive months of physician-supervised conservative medical management (e.g., pharmacotherapy, physical therapy, cognitive therapy, and activity lifestyle modification)
  - Surgical intervention is not indicated
  - An evaluation by a mental health provider (e.g., a face-to-face assessment with or without psychological questionnaires and/or psychological testing reveals no evidence of an inadequately controlled mental health problem (e.g., alcohol or drug dependence, depression, psychosis) that would impact perception of pain and/or negatively impact the success of SCS or contraindicate placement of the device.
- Permanent implantation of a non high-frequency dorsal column spinal cord stimulator is considered **medically necessary** for the treatment of chronic, intractable pain secondary to complex regional pain syndrome (CRPS)/reflex sympathetic dystrophy (RSD) when at least a 50% reduction in pain has been demonstrated during a short-term trial of SCS.

Chronic Critical Limb Ischemia (CLI)

- A short-term trial (i.e., greater than 48 hours) of a non high-frequency dorsal column spinal cord stimulator (SCS) is considered **medically necessary** for the treatment of chronic, intractable pain secondary to chronic critical limb ischemia (CLI) when **BOTH** of the following criteria are met:
  - Failure of available conventional multidisciplinary medical (e.g., pharmacological, physical therapy) and surgical management (e.g., revascularization)
  - An evaluation by a mental health provider (e.g., a face-to-face assessment with or without psychological questionnaires and/or psychological testing reveals no evidence of an inadequately controlled mental health problem (e.g., alcohol or drug dependence, depression, psychosis) that would impact perception of pain and/or negatively impact the success of a SCS or contraindicate placement of the device.
- Permanent implantation of a non high-frequency dorsal column spinal cord stimulator is considered **medically necessary** for the treatment of chronic, intractable pain secondary to chronic critical limb ischemia (CLI) when beneficial clinical response from a temporarily implanted electrode has been demonstrated prior to consideration of permanent implantation.

Chronic Stable Angina Pectoris

- A short-term trial (i.e., greater than 48 hours) of a non high-frequency dorsal column spinal cord stimulator (SCS) is considered **medically necessary** for the treatment of chronic, intractable pain secondary to chronic stable angina pectoris/myocardial ischemia when **ALL** of the following criteria are met:
  - Angina pectoris is Canadian Cardiovascular Society (CCS) functional class III or class IV (see Appendix A)
  - Attestation the individual's treating cardiologist confirms significant coronary artery disease (CAD) and the individual is not a suitable candidate for a revascularization procedure
  - Optimal pharmacological treatment using anti-anginal medications (e.g., long-acting nitrates, beta-adrenergic blockers, or calcium-channel antagonists) has failed to adequately improve anginal symptoms
  - An evaluation by a mental health provider (e.g., a face-to-face assessment with or without psychological questionnaires and/or psychological testing reveals no evidence of an inadequately controlled mental health problem (e.g., alcohol or drug dependence, depression, psychosis) that would impact perception of pain and/or negatively impact the success of SCS or contraindicate placement of the device.
- Permanent implantation of a non high-frequency spinal cord stimulator (SCS) is considered **medically necessary** for the treatment of chronic, intractable pain secondary to chronic stable angina pectoris/myocardial ischemia when a beneficial clinical response from a temporarily implanted electrode has been demonstrated prior to consideration of permanent implantation.

Replacement

- The replacement of an existing high frequency or non high-frequency dorsal column spinal cord stimulator (SCS) and/or battery/generator is considered **medically necessary** for an individual when the existing stimulator and/or battery/generator is malfunctioning, cannot be repaired, and is no longer under warranty.
- Replacement of a functioning non high-frequency dorsal column spinal cord stimulator with a high frequency spinal cord stimulator is considered **not medically necessary**.

Non-Indications

- A high frequency spinal cord stimulator is considered **experimental, investigational or unproven** for **ANY** other indication, including CRPS / RSD.
- A non high-frequency spinal cord stimulator (SCS) is considered **experimental, investigational or unproven** for any other indication including but not limited to:
  - Post-amputation pain (phantom limb pain)
  - Post-herpetic neuralgia
  - Peripheral neuropathy
  - Dysesthesias involving the lower extremities secondary to spinal cord injury
- Dorsal root ganglion stimulation is considered **experimental, investigational or unproven** for **ALL** indications.

Appendix A

New York Heart Association and Canadian Cardiovascular Society Functional Classifications

Class	New York Heart Association Functional Classification	Canadian Cardiovascular Society Functional Classification
I	Patients with cardiac disease but without resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.	Ordinary physical activity does not cause angina, such as walking and climbing stairs. Angina occurs with strenuous or rapid or prolonged exertion at work or recreation.
II	Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.	Slight limitation of ordinary activity. Walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, in cold, in wind, or under emotional stress, or only during the few hours after awakening. Walking more than two blocks on the level and climbing more than one flight of ordinary stairs at a normal pace and in normal conditions.
III	Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity causes fatigue, palpitation, dyspnea, or anginal pain.	Marked limitation of ordinary physical activity. Walking one to two blocks on the level and climbing one flight in normal conditions and at a normal pace.

Class	New York Heart Association Functional Classification	Canadian Cardiovascular Society Functional Classification
IV	Patient with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.	Inability to carry on any physical activity without discomfort—anginal syndrome may be present at rest.

(Heart Failure Society of America [HFSA], 2006; Gibbons, et al., 2002; American Heart Association [AHA], 1994; Canadian Cardiovascular Society [CCS], 1976).

Procedure (CPT®) Codes

This guideline relates to the CPT® code set below. Codes are displayed for informational purposes only.

CPT®	Code Description/Definition
63650	Percutaneous implantation of neurostimulator electrode array, epidural
63655	Laminectomy for implantation of neurostimulator electrodes, plate/paddle,
63685	Insertion or replacement of spinal neurostimulator pulse generator or receiver, direct or inductive coupling

This list may not be all inclusive and is not intended to be used for coding/billing purposes. The final determination of reimbursement for services is the decision of the health plan and is based on the individual's policy or benefit entitlement structure as well as claims processing rules.

References

1. Al-Kaisy A, Van Buyten JP, Smet I, et al. Sustained effectiveness of 10 kHz high-frequency spinal cord stimulation for patients with chronic, low back pain: 24-month results of a prospective multicenter study. Pain Med. 2014;15(3):347-354.
2. Amann W, Berg P, Gersbach P, et al; European Peripheral Vascular Disease Outcome Study SCS-EPOS. Spinal cord stimulation in the treatment of non-reconstructable stable critical leg ischaemia: results of the European Peripheral Vascular Disease Outcome Study (SCS-EPOS). Eur J Vasc Endovasc Surg. 2003;26(3):280-286.
3. American College of Occupational and Environmental Medicine. Occupational Medicine Practice Guideline, 2nd Ed. 2008.
4. American Medical Association. Current Procedural Terminology – 2016 Professional Edition.
5. Baber, Z and Erdeck. Failed back surgery syndrome: current perspectives. J Pain Res 2016; 9: 979 – 987.
6. Bicket MC, Dunn RY, Ahmed SU. High-frequency spinal cord stimulation for chronic pain: Pre-clinical overview and systematic review of controlled trials. Pain Med 2016; 17(12): 2326-36.
7. Burns B, Watkins L, Goadsby PJ. Treatment of intractable chronic cluster headache by occipital nerve stimulation in 14 patients. Neurology 2009; 72: 341-345.

8. Burns B, Watkins L, Goadsby PJ. Treatment of hemicrania continua by occipital nerve stimulation with a bion device: long-term follow-up of a crossover study. Lancet Neurol 2008;7:1001-12.
9. Claeys L, Berg W, Jonas S. Spinal cord stimulation in the treatment of chronic critical limb ischemia. Acta Neurochir Suppl. 2007;97(Pt 1):259-265.
10. Cruccu G, Aziz T, Garcia-Larrea L, et al. EFNS guidelines on neurostimulation therapy for neuropathic pain. Eur J Neurol. 2007;14(9):952-970.
11. Daousi C, Benbow SJ, MacFarlane IA. Electrical spinal cord stimulation in the long-term treatment of chronic painful diabetic neuropathy. Diabet Med 2005;22:393-398.
12. Deer T, Pope J, Hayek S, et al. Neurostimulation for the treatment of axial back pain: A review of mechanisms, techniques, outcomes, and future advances. Neuromodulation 2014; 17(suppl 2): 52-68.
13. de Vos CC, Meier K, Zaalberg PB, et al. Spinal cord stimulation in patients with painful diabetic neuropathy: a multicenter randomized clinical trial. Pain 2014;155:2426-2431.
14. Fontaine D, Christophe Sol J, Raoul S, Fabre N, Geraud G, Magne C et al. Treatment of refractory chronic cluster headache by chronic occipital nerve stimulation. Cephalalgia 2011;31:1101-5.
15. Forouzanfar T, Kemler M, Weber W, et al. Spinal cord stimulation in complex regional pain syndrome: cervical and lumbar devices are comparably effective. Br J Anaesth. 2004;92(3):348-53.
16. Gersbach P, Argitis V, Gardaz Jpet al. Late outcome of spinal cord stimulation for unreconstructable and limb-threatening lower limb ischemia. Eur J Vasc Endovasc Surg. 2007;33(6):717-724.
17. Grider JS, Manchikanti L, Carayannopoulos A, et al. Effectiveness of spinal cord stimulation in chronic spinal pain: A systemic review. Pain Physician 2016; 19(1):E33-54.
18. Harden R, Bruehl S, Perez R, et al. Validation of proposed diagnostic criteria (the “Budapest criteria”) for complex regional pain syndrome. PAIN 2010:150:268 – 74.
19. Harke H, Gretenkort P, Ladleif H, Rahman S. Spinal cord stimulation in sympathetically maintained complex regional pain syndrome type I with severe disability. A prospective clinical study. Eur J Pain. 2005;9(4):363-373.
20. Harvey AM. Classification of chronic pain – descriptions of chronic pain syndromes and definitions of pain terms. Clin J Pain 1995; 11(2); 179.
21. Huang KT, Martin J, Marky A, et al. A national survey of spinal cord stimulation trial-to-permanent conversion rates. Neuro-modulation 2015; 18:133-9.
22. Jose De Andres, MD, PhD, FIPP, EDRA, Vicente Monsalve-Dolz, PhD, Gustavo Fabregat-Cid, MD, PhD, Vicente Villanueva-Perez, MD, PhD, Anushik Harutyunyan, Juan Marcos Asensio- Samper, M.D, Nerea Sanchis-Lopex, MD. Prospective, Randomized Blind Effect-on-Outcome Study of Conventional vs High-Frequency Spinal Cord Stimulation in Patients with Pain and Disability Due to Failed Back Surgery Syndrome. Pain Medicine 2017; 18: 2401-2421.
23. Jivegård L, Augustinsson L, Holm J, et al. Effects of spinal cord stimulation (SCS) in patients with inoperable severe lower limb ischaemia: a prospective randomised controlled study. Eur J Vasc Endovasc Surg. 1995;9(4):421-425.
24. Kapural L, Peterson E, Provenzano D, Staats P. Clinical Evidence for Spinal Cord Stimulation for Failed Back Surgery Syndrome (FBSS). SPINE 2017: 42;14S, S61–S66.
25. Kapural L, Narouze S, Janicki TI, Mekhail N. Spinal cord stimulation is an effective treatment for the chronic intractable visceral pelvic pain. Pain Med. 2006;;7(5):440-443.
26. Kapural L, Yu C, Doust MW, et al. 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. Anesthesiology. 2015;123(4):851-860.
27. Kapural L, Yu C, Doust MW, et al. 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. Neurosurgery. 2016 Sep 6.
28. Kemler M, Barendse GA van Kleef M, et al. Spinal cord stimulation in patients with chronic reflex sympathetic dystrophy. N Engl J Med. 2000;343(9):618-624.
29. Kemler M, de Vet H, Barendse G, et al. Effect of spinal cord stimulation for chronic complex regional pain syndrome Type I: five-year final follow-up of patients in a randomized controlled trial. J Neurosurg. 2008;108(2):292-298.
30. Kemler M, de Vet H, Barendse G, et al. Spinal cord stimulation for chronic reflex sympathetic dystrophy – five year follow-up. N Engl J Med. 2006;354(22):2394-2396.
31. Kemler M, de Vet H, Barendse G, et al. The effect of spinal cord stimulation in patients with chronic

reflex sympathetic dystrophy: two years' follow-up of the randomized controlled trial. Ann Neurol. 2004;55:13-18.
32. Kemler M, Furnee C. Economic evaluation of spinal cord stimulation for chronic reflex sympathetic dystrophy. Neurology. 2002;59(8):1203-1209.
33. Klomp H, Spincemaille G, Steyerberg E, et al. Spinal-cord stimulation in critical limb ischaemia: a randomised trial. ESES Study Group. Lancet. 1999;353(9158):1040-1044.
34. Kumar K, Hunter G, Demeria D. Spinal cord stimulation in treatment of chronic benign pain: challenges in treatment planning and present status, a 22-year experience. Neurosurgery. 2006;58(3):481-496; discussion 481-96.
35. Kumar K, Taylor RS, Jacques L, et al. Spinal cord stimulation versus conventional medical management for neuropathic pain: A multicenter randomized controlled trial in patients with failed back surgery syndrome. Pain 2007; 132(1-2): 179-88.
36. Latif O, Nedeljkovic S, Stevenson L. Spinal cord stimulation for chronic intractable angina pectoris: a unified theory on its mechanism. Clin Cardiol. 2001;24:533-541.
37. Lambru G, Matharu M. Occipital nerve stimulation in primary headache syndromes. Ther Adv Neurol Disord 2012;5(1):57-67.
38. Lipton R, Goadsby P, Cady R, Aurora SK, Grosberg B, Freitag F et al. PRISM study: occipital nerve stimulation for treatment-refractory migraine. Cephalalgia 2009;29:30.
39. Magis D, Allena M, Bolla M, De Pasqua V, Remacle JM, Schoenen J. Occipital nerve stimulation for drug-resistant chronic cluster headache: a prospective pilot study. Lancet Neurol 2007; 6: 314-321.
40. Magis D, Gerardy PY, Remacle JM, Schoenen J. Sustained effectiveness of occipital nerve stimulation in drug-resistant chronic cluster headache. Headache 2011;51:1191-201.
41. Magis D, Schoenen J. Advances and challenges in neurostimulation for headaches. Lancet Neurol 2012;11:708-19.
42. Mailis-Gagnon A, Furlan A, Sandoval J, Taylor R, Spinal cord stimulation for chronic pain, Cochrane Database Syst Rev. 2004;3:CD003783.
43. Mannheimer C, Eliasson T, Augustinsson LE, et al. Electrical stimulation versus coronary artery bypass surgery in severe angina pectoris: the ESBY study. Circulation. 1998;97:1157-1163.
44. Marin JC, Goadsby P. Response of SUNCT (short-lasting unilateral neuralgiform headaches with conjunctival injection and tearing), SUNA (short--lasting unilateral neuralgifom headaches with autonomic symptoms) and primary stabbing headaches to occipital nerve stimulation (ONS). Neurology 2010;74:P04.006.
45. McGreevy K, Williams K. Contemporary insights into painful diabetic neuropathy and treatment with spinal cord stimulation. Curr Pain Headache Rep 2012;16:43-49.
46. Mekhail NA, Mathews M, Nageeb F, et al. Retrospective review of 707 cases of spinal cord stimulation: indications and complications. Pain Pract 2011; 11:148-53.
47. National Institute for Health and Care Excellence (NICE). Pain (chronic neuropathic or ischaemic) - spinal cord stimulation: final appraisal determination. September 2008.
48. North R, Calkins S, Campbell D, et al. Automated, patient-interactive, spinal cord stimulator adjustment: a randomized controlled trial. Neurosurgery. 2003;52(3):572-580.
49. North RB, Campbell JN, James CS, et al. Failed back surgery syndrome: Five year followup in 102 patients undergoing repeated operation. Neurosurgery 1991; 28; 28: 685-91.
50. North R, Kidd D, Farrokhi F, Piantadosi S. Spinal cord stimulation versus repeated lumbosacral spine surgery for chronic pain: a randomized, controlled trial. Neurosurgery. 2005;56(1):98-106.
51. North R, Kidd D, Lee M, et al. A prospective, randomized study of spinal cord stimulation versus reoperation for failed back surgery syndrome: initial results. Stereotact Funct Neurosurg. 1994;62:267-272.
52. North R, Kidd H, Piantadosi S. Spinal cord stimulation versus reoperation for failed back surgery syndrome: a prospective, randomized study design. Acta Neurochir. 1995;64(Suppl):106-8.
53. North R, Kidd D, Shipley J, Taylor R. Spinal cord stimulation versus reoperation for failed back surgery syndrome: a cost effectiveness and cost utility analysis based on a randomized, controlled trial. Neurosurgery. 2007;61(2):361-368.
54. Pedrini L, Magnoni F. Spinal cord stimulation for lower limb ischemic pain treatment. Interact Cardiovasc Thorac Surg. 2007;6(4):495-500.
55. Perruchoud C, Eldabe S, Batterham AM, et al. Analgesic efficacy of high-frequency spinal cord stimulation: A randomized double-blind placebo controlled study. Neuromodulation 2013; 16(4): 363-

9.
56. Rapcan R, Mlaka J, Venglarcik M, et al. High-frequency - spinal cord stimulation. Bratisl Lek Listy. 2015;116(6):354-356.
57. Reed K. Peripheral neuromodulation and headaches: history, clinical approach, and considerations on underlying mechanisms. Curr pain Headache Rep 2013;17:305.
58. Reed KL, Black SB, Banta CJ 2nd, Will KR. Combined occipital and supraorbital neurostimulation for the treatment of chronic migraine headaches: initial experience. Cephalalgia 2010;30:260-71.
59. Russo M, Van Buyten JP. 10-kHz high-frequency SCS therapy: A clinical summary. Pain Med. 2015;16(5):934-942.
60. Saper JR, Dodick DW, Silberstein SD, McCarville S, Sun M, Goadsby PJ. Occipital nerve stimulation for the treatment of intractable chronic migraine headache: ONSTIM feasibility study. Cephalalgia 2011; 31:271-85.
61. Schwedt TJ, Dodick DW, Trentman TL, Zimmerman RS. Response to occipital nerve block is not useful in predicting efficacy of occipital nerve stimulation. Cephalalgia 2007; 27: 271-274.
62. Shanahan P, Watkins L, Matharu M. Treatment of medically intractable short- lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing (SUNCT) and short-lasting unilateral neuralgiform headache attacks with autonomic symptoms (SUNA) with occipital nerve stimulation (ONS) in 6 patients. Cephalalgia 2009;29:150.
63. Silberstein S, Dodick D, Saper J, Huh B, Slavin KV, Sharan A, et al. Safety and efficacy of peripheral nerve stimulation of the occipital nerves for the management of chronic migraine: Results from a randomized, multicenter, double-blinded, controlled study. Cephalalgia 2012;32(16):1165-79.
64. Sitzman B, Provenzano D. Best Practices in Spinal Cord Stimulation. SPINE 2017: 42; 14S, S67–S71.
65. Skaribas I, Calvillo O, Delikanaki, Skaribas E. Occipital peripheral nerve stimulation in the management of chronic intractable occipital neuralgia in a patient with neurofibromatosis type 1: a case report. Journal of Medical Case Reports 2011;5:174.
66. Slangen R, Pluijms WA, Faber CG, Dirksen CD, Kessels AG, van Kleef M. Sustained effect of spinal cord stimulation on pain and quality of life in painful diabetic peripheral neuropathy. Br J Anaesth 2013;111:1030-1031.
67. Slangen R, Schaper NC, Faber CG, et al. Spinal cord stimulation and pain relief in painful diabetic peripheral neuropathy: a prospective two-center randomized controlled trial. Diabetes Care 2014;37:3016-3024.
68. Stancák A, Kozák J, Vrba I, et al. Functional magnetic resonance imaging of cerebral activation during spinal cord stimulation in failed back surgery syndrome patients. Eur J Pain. 2008;12(2):137-48.
69. Stanton-Hicks M, Burton A, Bruehl S, et al. An updated interdisciplinary clinical pathway for CRPS: report of an expert panel. Pain Pract. 2005; 84(3):S4-S16.
70. Sundaraj S, Johnstone C, Noore F, et al. Spinal cord stimulation: a seven-year audit. J Clin Neurosci 2005 Apr;12(3):264-270.
71. Taylor R, Buyten J, Buchser E. Spinal cord stimulation for complex regional pain syndrome: A systematic review of the clinical and cost-effectiveness literature and assessment of prognostic factors. Eur J Pain. 2006;10(2):91-101.
72. Taylor R, Taylor R. Spinal cord stimulation for failed back surgery syndrome: a decision-analytic model and cost-effectiveness analysis. Int J Technol Assess Health Care. 2005;21(3):351-358.
73. Taylor RS, Desai MJ, Rigoard P, Taylor RJ. 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. Pain Pract 2014; 14(6): 489-505.
74. TenVaarwerk I, Jessurun G, DeJongste M, et al. Clinical outcome of patients treated with spinal cord stimulation for therapeutically refractory angina pectoris. The Working Group on Neurocardiology. Heart. 1999;82(1):82-88.
75. Tesfaye S, Watt J, Benbow S, et al. Electrical spinal-cord stimulation for painful diabetic peripheral neuropathy. Lancet. 1996;348:1698-1701.
76. Tiede J, Brown L, Gekht G, et al. Novel spinal cord stimulation parameters in patients with predominant back pain. Neuromodulation. 2013;16(4):370-375.
77. Ubbink D, Vermeulen H. Spinal cord stimulation for critical leg ischemia: a review of effectiveness and optimal patient selection. J Pain Symptom Manage. 2006;31:S30-S35.

78. Ubbink D, Vermeulen H. Spinal cord stimulation for non-reconstructable chronic critical leg ischaemia. Cochrane Database Syst Rev. 2005;CD004001.
79. van Beek M, Slangen R, Schaper N, Faber C, Joosten E, Dirksen C, van Dongen R, Kessels A, van Kleef M. Sustained treatment effect of spinal cord stimulation in painful diabetic peripheral neuropathy: 24-month follow-up of a prospective two-center randomized controlled trial. Diabetes Care 2015;38:e132-e134.
80. VanBuyten JP, Al-Kaisy A, Smet I, Palmisani S, Smith T. High-frequency spinal cord stimulation for the treatment of chronic back pain patients: Results of a prospective multicenter European clinical study. Neuromodulation 2013; 16(1): 59-65.
81. Weiner RL, Reed KL (1999) Peripheral neurostimulation for control of intractable occipital neuralgia. Neuromodulation 2:217-22.
82. Workloss Data Institute. Official Disability Guidelines 2008.