



**Medical Services Review Board
July 19, 2007
Minutes**

Members Present:

Philip Bachman, M.D.
Sharon Ellis, R.N.
Michael Goertz, M.D.
Rose Hatmaker
Charles Hipp, M.D.
Elizabeth Mangold, R.N.
Robert Meisterling, M.D.
Reed Pollack
Elizabeth Shogren, R.N.
Jon Talsness, M.D.

Members Excused:

Beth Baker, M.D.
Barbara Baum, MS PT
Jeffrey Bonsell, D.C.
Robin Peterson, PT
Andrea Trimble Hart

Members Absent:

Gregory Hynan, D.C.
Andrew Schmidt, M.D.

Staff:

Kate Berger
Penny Grev
William Lohman, M.D.
Julie Marquardt
Phil Moosbrugger
Patricia Todd

Visitors:

Chuck Cochrane; MNAJ
William Fehrenbach; Medtronic
Natalie Haefner; WCRA
Kathleen Picard; MN APTA
David C. Wulff; MNAJ

The meeting was called to order at 4:09 p.m. by William Lohman. Chairperson Beth Baker was not present. *Jon Talsness made a motion to suspend the meeting rules of order and asked Lohman to chair the meeting. The motion was seconded by Philip Bachman. All voted in favor of the motion and it passed.*

Announcements

Patricia Todd informed the Medical Services Review Board (MSRB) that the Workers' Compensation Advisory Council (WCAC) bill did not move forward this year. The department will have meetings with health-care providers and insurers to talk about operational issues regarding how bills are managed and policy questions over the summer. The recommendation that comes out of these meetings will go to the WCAC.

Todd announced that the department has a new commissioner, Steve Sviggum. Sviggum is a former legislator and has expressed interest in outreach to committees such as the MSRB. He was unable to attend this meeting but intends to attend in the future.

Charles Hipp made a motion to approve the minutes from the April 19, 2007, meeting as presented. Rose Hatmaker seconded the motion. All voted in favor of the motion and it passed.

Treatment Parameters
Draft Rules on Drugs

Lohman pointed out that the Department of Labor and Industry (DLI) had made changes to the draft rules on NSAIDs, muscle relaxants, and opioid analgesics pursuant to the recommendations made by the board at its last meetings. Those drafts are available online; he noted the web link was emailed to members. Copies are also in members' packets for this meeting. Members are asked to contact the Department of Labor and Industry (DLI) with any concerns regarding the changes.

Treatment Parameters
Long-term use of Opiates

Lohman pointed out that DLI had also made changes to the draft rules on the long-term use of opioid analgesics, again pursuant to the recommendations made by the board at its last meetings. This draft is also available online; and, copies were in members' packets for this meeting. There is still one outstanding issue to resolve. Discussion occurred regarding the length of time that a patient could receive opioid analgesics prior to triggering the requirements of the draft rule. Four favored six months and five favored three months. The legislature has directed the Board of Medical Practice to evaluate the long-term use of opiates. DLI has informed the Board of Medical Practice that we are in the process of drafting rules and has asked to have a representative on the task force. Lohman suggested that the MSRB delay final action on the rule in order to consider what the Board of Medical Practice does. The Board of Medical Practice report is due to the legislature by the end of this year or January.

Treatment Parameters
Spinal Cord Stimulators and Morphine Pumps

Lohman distributed a handout about draft rules for spinal cord stimulators and morphine pumps. Lohman noted that other states have seriously looked at Minnesota's Treatment Parameters as templates and that they have become a standard other states refer to. Medtronic has suggested changes in the current rules based on their experience working in other jurisdictions.

Lohman pointed out that so far he has only completed the background research needed on spinal cord stimulators. He will present information on morphine pumps at a later meeting. Lohman reviewed the comments made by Medtronic and the recommendations made by DLI for the proposed rules for spinal cord stimulators. The preliminary results of the literature review were distributed. The completed review will be available online as soon as it is completed and members will be e-mailed the web link. In preparation for the next meeting, the board opened a debate about whether these devices are an acceptable option when the patient is a candidate for palliative treatment for pain. The vote will not occur until the next meeting.

Lohman presented two more recommendations from the department for the MSRB's consideration:

- Should there be a definition of what constitutes an appropriate trial period?
- When is a trial judged to be successful?

The department did not have a recommendation at this time but asked members to review the information forthcoming from the literature review and be prepared to decide if it wants to make recommendations in these two areas at the next meeting.

Hipp asked if there were standards of practice or protocols out there at clinics that do interventional pain work that could make these determinations. Lohman noted that William Fehrenbach, the Director of Government Affairs for Medtronic Neuromodulation, was present at the meeting and introduced him to provide information. Fehrenbach noted others are using Minnesota as a model so they decided to request an update of Minnesota's Treatment Parameters. Medtronic believes that a spinal cord stimulator should be inserted only after more conservative treatments have been tried. In his experience, most physicians use a three to five day trial period, with some variations, and he suspected the literature would support that time period. The longer you do a trial, the higher the infection rate, so you need to strike a balance. In other states, he has not typically seen time frames prescribed because there really is not a right answer. He also noted that most states do not set the criteria used to judge if the trial is successful, although there are national official disability guidelines that are used in seventeen states. These guidelines define success as pain relief of 50% or more. There is new data in pain literature, unrelated to these devices that imply the medical standard of care is to consider it clinically significant to lower someone's pain 30%. Medtronic is fine with whatever the MSRB decides to use as a standard. Fehrenbach offered to poll the clinics they deal with to get information on their current practices.

Fehrenbach noted that Medtronic will be releasing a new study in the next 30 days. It is a Canadian and European study, a randomized control trial on spinal cord. He thinks it will demonstrate not only significant pain relief but also functional improvement in patients who have stimulators. He noted the population in their study is not related to workers' compensation specifically. Fehrenbach will send the study to Lohman to forward to the MSRB members. He noted that, because of these debates in other states, the issue of cost effectiveness was raised and insurance carriers are very interested in that information. He offered to provide an executive summary of an unpublished analysis they had an actuary perform that shows intrathecal drug delivery systems, with a seven-year reimplant when the battery dies, save \$15,000 every year and dramatically reduces PT, medication and other therapy costs. The analysis showed a savings of \$500 a year for spinal cord stimulators.

When asked for information about infection rates Fehrenbach responded that he did not know of anyone who has looked at infection rates but he offered to get anecdotal information.

Lohman stated that this data will be available online at DLI's website. A review of the ranges of trial periods will follow along with the criteria for success. The Medtronic information from

clinics regarding current practices will be available. This will be the major topic for discussion at the next meeting and Lohman hopes to wrap up the discussion at that time.

Old Business

Lohman stated that the commissioner has asked the MSRB to consider whether it would recommend any changes to the rating of permanent partial disability (PPD) for back injuries in the PPD schedule. The board developed a lot of PPD schedule changes several years ago. All the changes were to correct typos or misrepresentations except for two issues. One was the rating for radicular pain syndromes with an objective neurologic finding, such as a lost reflex, a nerve-root specific muscle weakness or a positive EMG, and a correlating abnormality on CT or MRI scan or myelogram. This gets the 9% rating if the abnormality is a herniated disc rating. Or, if it was spinal stenosis it gets 10%. The Statement of Need and Reasonableness (SONAR) was written to indicate that rating applied no matter when those factors were true, even if they were not true anymore at maximum medical improvement (MMI.). There is case law supporting that interpretation. There continues to be a feeling among some constituents that if a person gets non-surgical treatment, and the pain has resolved and function is normal, there should not be any permanency. Before DLI can go forward with the rules, it would like the MSRB to make a recommendation on the appropriate rating in these cases. Lohman asked if members would like any background research in preparation for that discussion. Goertz asked for the basis of the original recommendation. Lohman responded that in 1993 there was a statutory requirement that any revision to the schedule pay out, in aggregate, about the same amount of permanency benefits as the previous schedule. When DLI did the actuarial study for the 1993 schedule changes, it became clear that in order to deliver the same aggregate amount of benefits you would have to give this rating. The statutory requirement has been removed so the commissioner's question to the board is: If you had to do it over again, would you do the same thing or is the medical thinking on how to rate permanency for the back different now than what it was then?

Discussion followed. Lohman was asked to provide literature on the risk of recurrence of disc herniation and information about what the American Medical Association has recommended for the rating of impairment due to back injuries. Members also asked for literature about the degeneration of the back related to a prior disc herniation.

Talsness asked for a review of the literature dealing with the prevalence of herniated discs in asymptomatic populations. Talsness also asked for information about the risk of future low back pain in a person who is completely recovered versus someone with similar anatomy who has never had an acute episode.

Lohman will gather information for neck and low back because the issues are the same. He noted the department initiated a number of studies of disputes including disputes about PPD so it will be able to give more quantitative as well as qualitative answers to what kind of PPD issues are argued.

Lohman also asked members to consider arthroplasty of the CMC joint. One can argue that there are two ratings available. There is one specifically for thumb arthroplasty which indicates that it

would be 100% of the value of the joint. The value of the CMC joint of the thumb is 17%. That rating is found in the part of the schedule dealing with impairment to the hand. In the part of the schedule dealing with impairment to the wrist, there is a rating for excision for a carpal bone, which is 3%. Thumb arthroplasty of the CMC joint is done by excising the carpal bone and then replacing it with a rolled tendon. This potential conflict is the other question the commissioner would like the MSRB to address. When the schedule was written, the arthroplasty techniques may not have been as good as they are now. The 100% of the value of the joint was taken from the AMA recommendations at the time, the board thought that was an appropriate value and the Minnesota Orthopedic Society endorsed it as an appropriate value. Some orthopedists are now arguing that 3% is the appropriate rating because this procedure works so well and you have a completely functional thumb. Lohman asked members if the 17% rating is still the appropriate rating and what information they would need to decide if 17% is excessive. The members asked to hear about functional improvements following surgery and whether there are other surgeries such as joint replacement. Lohman will also check what the AMA is recommending now.

Lohman opened a discussion of the schedule for what the MSRB will review and asked if the board had any issues to take up. Members asked if they would be looking at treatment parameters for pain injections. He said the schedule was pushed back to review spinal cord stimulators and intrathecal drug delivery systems.

Hipp made a motion to adjourn the meeting at 5:20 p.m. Sharon Ellis seconded the motion. All voted in favor of the motion and it passed.

Respectfully submitted,

A handwritten signature in cursive script that reads "Debbie Caswell". The signature is written in dark ink and is positioned above the typed name and title.

Debbie Caswell
Executive Secretary

Spinal Cord Stimulators and Intrathecal Drug Delivery Systems
DRAFT RULES – FOR DISCUSSION PURPOSES ONLY: 07/19/07

1 **5221.6200 Low Back Pain**
2

3 Subp. 6. Surgery, including decompression procedures and arthrodesis. Surgery may only be
4 performed if it also meets the specific parameters specified in subparts 11 to 13 and part
5 5221.6500. The health care provider must provide prior notification of nonemergency inpatient
6 surgery according to part 5221.6050, subpart 9.
7

8 A. In order to optimize the beneficial effect of surgery, postoperative therapy with active and
9 passive treatment modalities may be provided, even if these modalities had been used in the
10 preoperative treatment of the condition. In the postoperative period the maximum treatment
11 duration with passive treatment modalities in a clinical setting from the initiation of the first
12 passive modality used, except bedrest or bracing, is as follows:
13

- 14 (1) eight weeks following lumbar decompression or implantation of a dorsal column
15 stimulator or morphine pump spinal cord stimulator or intrathecal drug delivery system;
16 or
17 (2) 12 weeks following arthrodesis.
18

19 B. Repeat surgery must also meet the parameters of subparts 11 to 13 and part 5221.6500 and is
20 not indicated unless the need for the repeat surgery is confirmed by a second opinion obtained
21 before surgery, if a second opinion is requested by the insurer.
22

23 C. ~~The following surgical therapies~~ Spinal cord stimulators and intrathecal drug delivery systems
24 have very limited application in patients with intractable pain who are not candidates for any
25 other surgical therapy, and require a second opinion that confirms that the treatment is indicated
26 and within the parameters listed, and a personality or psychosocial evaluation that indicates that
27 the patient is likely to benefit from the treatment. Use of these devices is indicated only if there
28 has been a favorable response to a trial screening period done after
29

- 30 (1) a second opinion has confirmed that this treatment is indicated; and
31 (2) a psychological evaluation has determined that the patient has no psychological
32 contraindications to this treatment.
33

34 ~~(1) Dorsal column stimulator is indicated for a patient who has neuropathic pain, and is~~
35 ~~not a candidate for any other surgical therapy, and has had a favorable response to a trial~~
36 ~~screening period.~~

37 ~~(2) Morphine pump is indicated for a patient who has somatic pain, and is not a~~
38 ~~candidate for any other surgical therapy, and has had a favorable response to a trial~~
39 ~~screening period.~~

40
41 **Subp. 11. B**
42

43 (6) The only surgical procedures indicated for patients with regional low back pain only
44 are decompression of a lumbar nerve root or lumbar arthrodesis, with or without
45 instrumentation, which must meet the parameters of subpart 6 and part 5221.6500,

Spinal Cord Stimulators and Intrathecal Drug Delivery Systems
DRAFT RULES – FOR DISCUSSION PURPOSES ONLY: 07/19/07

1 subpart 2, items A and C. For patients with failed back surgery, dorsal column
2 ~~stimulators or morphine pumps~~ a spinal cord stimulator or an intrathecal drug delivery
3 system may be indicated; their use must meet the parameters of subpart 6, item C.

DRAFT

Comments Received and Actions Taken Re: Proposed Rules for Spinal Cord Stimulators

	Comment	Recommendation
p. 1 1. 15	Replace “dorsal column stimulator” with “spinal cord stimulation” and “morphine pump” with “intrathecal drug delivery system”. The terms “dorsal column stimulator” and “morphine pump” are obsolete.	Accept.
p. 1 1. 24	Replace references to somatic and neuropathic pain with “intractable” pain. These distinctions are no longer considered clinically significant.	Accept.
p. 1 1. 23-39	Change “and is not a candidate for any other surgical therapy” to “Recommended only for selected patients in cases when less invasive procedures have failed or are contraindicated”. Use of SCS should not be limited to cases in which <u>all</u> other therapies are no longer available.	
p. 1 1. 23-39	Change “personality or psychosocial” to “psychological”	Accept
p. 2 1. 23-39	Change “is likely to benefit from this treatment” to “has no psychological contraindications to this treatment.”	Accept
	Added by Department	
	What constitutes an appropriate trial period?	
	When is a trial judged to be successful?	

ID	authors	article	reference	type	relevance	availability	efficacy	safety	subgroups
22	Grabow TS, Tella PK, Raja SN	Spinal cord stimulation for complex regional pain syndrome: an evidence-based medicine review of the literature	Clin J Pain. 2003 Nov-Dec;19(6):371-83	SysRev	A-high	full text	x	x	CRPS
20	Mailis-Gagnon A, Furlan AD, Sandoval JA, Taylor R	Spinal cord stimulation for chronic pain	Cochrane Database Syst Rev. 2004;(3):CD003783	SysRev	A-high	full text	x	x	mixed
2	Taylor RS	Spinal cord stimulation in complex regional pain syndrome and refractory neuropathic back and leg pain/failed back surgery syndrome: results of a systematic review and meta-analysis	J Pain Symptom Manage. 2006 Apr;31(4 Suppl):S13-9	SysRev	A-high	full text	x	x	mixed
6	Taylor RS, Van Buyten JP, Buchser E	Spinal cord stimulation for chronic back and leg pain and failed back surgery syndromes: a systematic review and analysis of prognostic factors	Spine. 2005 Jan 1;30(1):152-60	SysRev	A-high	full text	x	x	FBSS
42	Taylor RS, Van Buyten J-P, 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	SysRev	A-high	full text	x		CRPS
35	Turner JA, Loeser JD, Bell KG	Spinal cord stimulation for chronic low back pain: a systematic literature synthesis	Neurosurgery. 1995 Dec;37(6):1088-95	SysRev	A-high	full text	x	x	FBSS
8	Turner JA, Loeser JD, Deyo RA, Sanders SB	Spinal cord stimulation for patients with failed back surgery syndrome or complex regional pain syndrome: a systematic review of effectiveness and complications	Pain. 2004 Mar;108(1-2):137-47	SysRev	A-high	full text	x	x	mixed
14	Kemler MA, De Vet HC, Barendse GA, Van Den Wildenberg FA, Van Kleef M	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 Jan;55(1):13-8	RCT	A-high	full text	x		CRPS
7	North RB, Kidd DH, Farroki F, Piantadosi SA	Spinal cord stimulation versus repeated lumbosacral spine surgery for chronic pain: a randomized, controlled trial	Neurosurgery. 2005;56(1):98-106	RCT	A-high	full text	x		FBSS
16	Kemler MA, Barendse GA, van Kleef M, de Vet HC, Rijkse CP, Furnee CA, van den Wildenberg FA	Spinal cord stimulation in patients with chronic reflex sympathetic dystrophy	N Engl J Med. 2000 Aug 31;343(9):618-24	CT	B-medium	full text	x	x	CRPS
19	Kemler MA, de Vet HC, Barendse GA, van den Wildenberg FA, van Kleef M	Spinal cord stimulation for chronic reflex sympathetic dystrophy—five year follow-up	N Engl J Med. 2006 Jun 1;354(22):2394-6	CT	B-medium	full text	x	x	CRPS
23	Kemler MA, Reulen JP, Barendse GA, van Kleef M, de Vet HC, van den Wildenberg FA	Impact of spinal cord stimulation on sensory characteristics in complex regional pain syndrome type I: a randomized trial	Anesthesiology. 2001 Jul;95(1):72-80	CT	B-medium	full text	x		CRPS
5	North RB, Kidd DH, Olin J, Straczek JM, Farroki F, Petrucci L, Cutchis PN	Spinal cord stimulation for axial low back pain: a prospective, controlled trial comparing dual with single percutaneous electrode	Spine. 2005 Jun 15;30(12):1412-8	CT	B-medium	full text	x		FBSS
13	Bell GK, Kidd D, North RB	Cost-effectiveness analysis of spinal cord stimulation in treatment of failed back surgery syndrome	J Pain Symptom Manage. 1997 May;13(5):286-95	CE	B-medium	full text	x		FBSS
44	de Lissovoy G, Brown RE, Halpern M, Hassenbusch SJ, Ross E	Cost-Effectiveness of Long-Term Intrathecal Morphine Therapy for Pain Associated with Failed Back Surgery Syndrome	CLIN THER 1997 19(1) 96-112	CE	B-medium	full text	x		FBSS
15	Kemler MA, Furnee CA	Economic evaluation of spinal cord stimulation for chronic reflex sympathetic dystrophy	Neurology. 2002 Oct 22;59(8):1203-9	CE	B-medium	full text	x		CRPS
38	Kumar K, Hunter G, Demeria DD	Treatment of Chronic Pain by Using Intrathecal Drug Therapy Compared with Conventional Pain Therapies: A Cost-Effectiveness Analysis	J Neurosurg 97:803-810, 2002	CE	B-medium	full text	x		FBSS
11	Kumar K, Malik S, Demeria D	Treatment of chronic pain with spinal cord stimulation versus alternative therapies: cost-effectiveness analysis	Neurosurgery. 2002 Jul;51(1):106-15	CE	B-medium	full text	x		FBSS
45	Mekhail NA, Aeschbach A, Stanton-Hicks M	Cost-Benefit Analysis of Neurostimulation for Chronic Pain	Clin J Pain 2004;20:462-468	CE	B-medium	full text	x		mixed
4	Taylor RJ, Taylor RS	Spinal cord stimulation for failed back surgery syndrome: a decision-analytic model and cost-effectiveness analysis	Int J Technol Assess Health Care. 2005 Summer;21(3):351-8	CE	B-medium	full text	x		FBSS
10	North RB, Wetzel FT	Spinal cord stimulation for chronic pain of spinal origin: a valuable long-term solution	Spine. 2002 Nov 15;27(22):2584-91	Review	C-low	full text	x	x	mixed
46	Stanton-Hicks M	Complex Regional Pain Syndromes: Manifestations and the Role of Neurostimulation in Its Management	J Pain Symptom Manage. 2006 31(4 Suppl) S20-24	Review	C-low	full text	x		CRPS
1	Van Buyten JP	Neurostimulation for chronic neuropathic back pain in failed back surgery syndrome	J Pain Symptom Manage. 2006 Apr;31(4 Suppl):S25-9	Review	C-low	full text	x		FBSS
43	Winkemuller W, Burchiel K, Van Buyten JP	Intrathecal opioid therapy for pain: efficacy and outcomes	Neuromodulation 1999 2(2) 67-76	Review	C-low	full text	x		mixed
40	Angel IE, Gould HJ, Carey ME	Intrathecal morphine pump as treatment option in chronic pain of nonmalignant origin	Surg Neurol. 1998 49 92-9	CaseSer	C-low	full text	x	x	mixed
33	Burchiel KJ, Anderson VC, Brown FD, Fessler RG, Friedman WA, Pelofsky S, Weiner RL, Oakley J, Shahin D	Prospective, multicenter study of spinal cord stimulation for relief of chronic back and extremity pain	Spine. 1996 Dec 1;21(23):2786-94	CaseSer	C-low	full text	x	x	FBSS
28	Calvillo O, Racz G, Didie J, Smith K	Neuroaugmentation in the treatment of complex regional pain syndrome of the upper extremity	Acta Orthop Belg. 1998 Mar;64(1):57-63	CaseSer	C-low	full text	x		CRPS
37	Deer T, Chapple I, Classen A, Javery K, Stoker V, Tonder L, Burchiel K	Intrathecal Drug Delivery for Treatment of Chronic Low Back Pain: Report from the National Outcomes Registry for Low Back Pain	Pain Med 2004 5(1) 6-13	CaseSer	C-low	full text	x		LBP
30	Harko H, Gretenkort P, Ladleif HU, 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 Aug;9(4):363-73	CaseSer	C-low	full text	x		CRPS
12	Kavar B, Rosenfeld IV, Hutchinson A	The efficacy of spinal cord stimulation for chronic pain	J Clin Neurosci. 2000 Sep;7(5):409-13	CaseSer	C-low	full text	x		
25	Kemler MA, Barendse GA, Van Kleef M, Van Den Wildenberg FA, Weber WE	Electrical spinal cord stimulation in reflex sympathetic dystrophy: retrospective analysis of 23 patients	J Neurosurg. 1999 Jan;90(1 Suppl):79-83	CaseSer	C-low	full text	x		CRPS
3	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 Mar;58(3):481-96	CaseSer	C-low	full text	x		mixed
39	Kumar K, Kelly M, Pirlot T	Continuous intrathecal morphine treatment for chronic pain of nonmalignant etiology: long-term benefits and efficacy	Surg Neurol 2001;55:79-88.	CaseSer	C-low	full text	x	x	mixed
36	Kumar K, Nath R, Wyant GM	Treatment of chronic pain by epidural spinal cord stimulation: a 10-year experience	J Neurosurg. 1991 Sep;75(3):402-7	CaseSer	C-low	full text	x		mixed
29	Kumar K, Nath RK, Toth C	Spinal cord stimulation is effective in the management of reflex sympathetic dystrophy	Neurosurgery. 1997 Mar;40(3):503-8	CaseSer	C-low	full text	x		CRPS
26	Kumar K, Toth C, Nath RK, Laing R	Epidural spinal cord stimulation for treatment of chronic pain—some predictors of success. A 15-year experience	Surg Neurol. 1998 Aug;50(2):110-20	CaseSer	C-low	full text	x		mixed
41	Roberts LJ, Finch PM, Gouckea CR, Pricec LM	Outcome of intrathecal opioids in chronic non-cancer pain	Eur J Pain (2001) 5: 353-361	CaseSer	C-low	full text	x	x	mixed
34	Van Buyten JP, Van Zundert J, Vusehs P, Vanduffel L	Efficacy of spinal cord stimulation: 10 years of experience in a pain centre in Belgium	Eur J Pain. 2001;5(3):299-307	CaseSer	C-low	full text	x	x	mixed

<u>ID</u>	<u>authors</u>	<u>article</u>	<u>reference</u>	<u>type</u>	<u>relevance</u>	<u>availability</u>	<u>efficacy</u>	<u>safety</u>	<u>subgroups</u>
24	Barolat G	Spinal cord stimulation for chronic pain management	Arch Med Res. 2000 May-Jun;31(3):258-62	Review	n/a	abstract only			
9	Cartar ML	Spinal cord stimulation in chronic pain: a review of the evidence	Anaesth Intensive Care. 2004 Feb;32(1):11-21	Review	n/a	abstract only			
18	North RB, Kidd DH, Lee MS, Piantadosi S	A prospective, randomized study of spinal cord stimulation versus reoperation for failed back surgery syndrome: initial results	Stereotact Funct Neurosurg. 1994;62(1-4):267-72	RCT	n/a	abstract only			
17	North RB, Kidd DH, Piantadosi S	Spinal cord stimulation versus reoperation for failed back surgery syndrome: a prospective, randomized study design	Acta Neurochir Suppl. 1995;64:106-8	CT	n/a	abstract only			
27	Segal R, Stacey BR, Rudy TE, Baser S, Markham J	Spinal cord stimulation revisited	Neurol Res. 1998 Jul;20(5):391-6	CaseSer	n/a	abstract only			

ID	articles
8	Alo KM, Redko V, Charnov J. Four year follow-up of dual electrode spinal cord stimulation for chronic pain. <i>Neuromodulation</i> 2002;5:79-88.
6, 22	Borotat G, Oakley JG, Law JD, et al. Epidural spinal cord stimulation with a multiple electrode paddle lead is effective in treating intractable low back pain. <i>Neuromodulation</i> 2001;4:59-66.
22, 42	Borotat G, Schwartzman R, Woo R. Epidural spinal cord stimulation in the management of reflex sympathetic dystrophy. <i>Stereotact Funct Neurosurg</i> 1989;53:29-39.
6	Borotat G. A prospective multicenter study to assess the efficacy of spinal cord stimulation using a multichannel radio-frequency system for the treatment of intractable low and low extremity back pain. Initial considerations and methodology. <i>Neuromodulation</i> 1999;2:179-83.
6, 35	Batler C, Fretcheau P, Kong A, et al. Neurostimulation cordonale posterieure dans les lombo-radicalalgies. <i>Aggressologie</i> 1989;30:137-8.
6, 35	Bal S, Bauer BL. Dorsal column stimulation (DCS): cost to benefit analysis. <i>Acta Neurochir Suppl</i> 1991;52:121-3.
8, 22, 42	Bannett D, Alo K, Oakley J, et al. Spinal cord stimulation for complex regional pain syndrome I (rsd). <i>Neuromodulation</i> 1999; 2:202-210.
6, 35	Blond S, Armignies P, Parker F, Dupard J, Genu J, Duquesnoy B, Christiaens J. Staalige chroniques par deslateralisation sensitive apres chirurgie de la hernie discale lombaire. Aspects cliniques et therapeutiques a propos de 110 patients. <i>Neurochirurgie</i> 37:86-95, 1991.
6	Blond S, Armignies P, Veys B, et al. Postoperative neuropathic pain. <i>Douleur et Analgesie</i> 1998;11:120-30.
6	Blume H, Richardson R, Rojas C. Epidural nerve stimulation of the lower spinal cord and cauda equina for the relief of intractable pain in failed low back surgery. <i>Neurosurgery</i> 1992;45:456-60.
22	Broggi G, Servello D, Dones I, et al. Italian multicentre study on pain treatment with epidural spinal cord stimulation. <i>Stereotact Funct Neurosurg</i> 1994;62:273-278.
22	Broggi G, Servello D, Franzini A, et al. Spinal cord stimulation for treatment of peripheral vascular disease. <i>Appl Neurophysiol</i> 1987; 50:439-441.
22, 42	Brosset J, Roldan P, Gonzalez-Darder J, Bordes V, Barcia-Salorio JL. Chronic epidural dorsal column stimulation in the treatment of caudalgia pain. <i>Appl Neurophysiol</i> 1982;45: 190-94.
8	Burd K. Spinal cord stimulation: cost-benefit study. <i>Neuromodulation</i> 2002;5:75-8.
6, 35	Burchiel KJ, Brown HD, Erickson RK, et al. Correlates of pain relief in spinal cord stimulator recipients. Abstract 1335. IASP Seventh World Congress on Pain, August 27, 1993.
8, 22, 42	Calvillo O, Raaz G, Dridle J, et al. Neuroaugmentation in the treatment of complex regional pain syndrome of the upper extremity. <i>Acta Orthop Belg</i> 1998;64:57-63.
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