Chronic Pain Treatments: What is the Evidence?

WorkSafeBC Evidence-Based Practice Group

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Treatment Modality	The Bottom Line	Source of Evidence (Literature search date)	WorkSafeBC Coverage
Pharmacological Management			
Topical treatments			
Topical capsaicin	Conflicting evidence on its effectiveness from two high quality systematic reviews (SR) examining partly different primary randomized/controlled trials (R/CT). One systematic review concluded that in neuropathic pain, evidence from six R/CTs showed that topical capsaicin (0.075%) was better than placebo with a number needed to treat (NNT) of 5.7. In musculoskeletal conditions in three trials, topical capsaicin (0.025% or plaster) was better than placebo with an NNT of 8.1. Another systematic review, based on four R/CTs, concluded that the number of patients reporting either at least 40% pain reduction or at least 50% pain reduction and global improvement were not different from placebo. Both systematic reviews reported that patients were significantly more likely to withdraw from treatment (e.g. due to burning sensations) than placebo.	1 (2004), 2 (2009)	Not recommended
Topical rubefacients (c.q. salycilate-based)	There are conflicting conclusions from two high quality systematic reviews. A Cochrane-based SR, more recent and including more primary studies, concluded that even though it is well tolerated, there is no evidence on the effectiveness of salicylate-based topical rubefacients for acute injuries. In chronic conditions their efficacy is less than topical non-steroidal antiinflammatory drugs (NSAIDs). There is no evidence at all for topical rubefacients with other components. Another older SR, including fewer primary studies, concluded that in acute conditions, topical salicylate was significantly better than placebo with an NNT of 2.1. There was conflicting evidence in chronic conditions.	3 (Dec 2008), 4 (2003)	Not recommended
Topical lidocaine	For post herpetic neuralgia, there is insufficient evidence to recommend topical lidocaine as a first-line agent. There is also no evidence on its effectiveness in reducing pain intensity and pain relief scores in patients with other neuropathic conditions.	5 (July 2008)	Not recommended
Topical or oral ibuprofen for chronic knee pain in older people	Advice to use either oral or topical preparations has an equivalent effect on knee pain, but oral NSAIDs appear to produce more minor adverse effects than topical NSAIDs. Generally, these results support advising older people with knee pain to use topical rather than oral NSAIDs.	6 (2006)	Not recommended
Anticonvulsants for neuropathic pain			
1. Carbamazepine	Strong evidence it is effective for the treatment of trigeminal neuralgia. Some evidence it is effective for diabetic neuropathy and may be effective for pain related to Guillain-Barré syndrome. Patients on carbamazepine were significantly more likely to report adverse effects.	2 (2009), 7 (Aug 2007)	Not recommended
2. Clonazepam	Limited evidence it is effective for pain reduction in temporomandibular joint dysfunction and in stomatodynia.	7 (Aug 2007)	Not recommended

3. Lamotrigine	Some evidence for pain reduction in painful diabetic neuropathy but unlikely to be of benefit for the treatment of neuropathic pain in HIV related neuropathy, intractable neuropathic pain, spinal cord injury related pain, or trigeminal neuralgia. Patients on lamotrigine were significantly more likely to withdraw from treatment because of adverse effects.	2 (2009), 7 (Aug 2007), 8 (Aug 2006)	Not recommended
4. Lorazepam	No more efficacious than placebo in painful postherpetic neuralgia.	7 (Aug 2007)	Not recommended
5. Oxcarbazepine	May not be effective in painful diabetic neuropathy. Patients on oxcarbazepine were more likely to leave treatment because of adverse effects including dizziness and somnolence.	2 (2009), 7 (Aug 2007)	Not recommended
6. Phenytoin	Limited evidence IV phenytoin may reduce pain in acute flare-ups of neuropathic pain.	7 (Aug 2007)	Not recommended
7. Sodium valproate	Some evidence it may be effective to treat diabetic neuropathy and postherpetic neuralgia. Not effective in treating spinal cord injury related pain.	7 (Aug 2007)	Not recommended
8. Topiramate	No evidence for trigeminal neuralgia. Inconclusive evidence in treating diabetic neuropathy. Patients receiving topiramate were significantly more likely to report somnolence, fatigue and sedation.	2 (2009), 7 (Aug 2007)	Not recommended
9. Gabapentin	No benefit for gabapentin compared to placebo for acute post operative pain at rest. In chronic pain, including postherpetic neuralgia, diabetic neuropathy, cancer related neuropathic pain, phantom limb pain, Guillain-Barré syndrome, and spinal cord injury, the NNT for improvement was 4.3. However, gabapentin only reduced neuropathic pain by less than 1 point on a 0-10 point pain scale. Patients were significantly more likely to withdraw from treatment because of adverse effects including dizziness, somnolence, confusion, ataxia, edema, and fatigue. The number needed to harm (NNH) for minor harm was 3.7. The NNT for effective pain relief in diabetic neuropathy was 2.9 and for postherpetic neuralgia was 3.9.	2 (2009), 7 (Aug 2007), 9 (2007), 10 (Jan 2004), 11 (2009)	Not recommended
10. Pregabalin	No beneficial evidence in established acute postoperative pain. No studies in chronic nociceptive pain, like arthritis. Pregabalin at doses of 300mg, 450mg, and 600mg daily was effective in patients with postherpetic neuralgia, painful diabetic neuropathy, central neuropathic pain, and fibromyalgia. However, Pregabalin at 150mg daily was ineffective. The best NNT for each condition for at least 50% pain relief over baseline for 600mg pregabalin daily compared with placebo was 3.9 for postherpetic neuralgia, 5.0 for painful diabetic neuropathy, 5.6 for central neuropathic pain, and 11 for fibromyalgia. With 600mg pregabalin daily, somnolence typically occurred in 15 to 25% and dizziness occurred in 27 to 46%. Treatment was discontinued due to adverse events in 18 to 28%. Higher rates of substantial benefit were found in postherpetic neuralgia and painful diabetic neuropathy than in central neuropathic pain and fibromyalgia.	2 (2009), 7 (Aug 2007), 9 (2007), 12 May 2009)	Not recommended
Antidepressants for neuropathic pain			
1. TCA (including amitriptyline, nortriptyline, desipramine, imipramine and clomipramine)	Except for HIV related neuropathies, tricyclic antidepressants (TCAs) are effective and have an NNT of 3.6 for at least moderate pain relief. Patients receiving TCAs were significantly more likely to withdraw from treatment because of adverse effects including dry mouth and sedation. At present, no appropriate evidence that lofepramine, tripramine, dosulepin (dothiepin) or doxepin is clinically effective in treating neuropathic pain.	2 (2009), 9 (2007), 14 (Oct 2005)	Not recommended as a standalone therapy

2. Selective Serotonin Reuptake Inhibitor (SSRI)	At present, no appropriate evidence that SSRIs are clinically effective in treating neuropathic pain.	2 (2009)	Not recommended
3. Serotonin Norepinephrine Reuptake Inhibitor (SNRI)			Not approved as a standalone therapy
- a. Venlafaxine	Overall, Venlafaxine has an NNT of 3.1. For diabetic neuropathy the NNT for effectiveness was 1.3; for postherpetic neuralgia it was 2.7.The NNH (c.q. withdrawal) was 16.2 for venlafaxine. The NNH for minor adverse effects was 9.6 for venlafaxine.	2 (2009), 14 (Oct 2005)	
- b. Duloxetine	Duloxetine, 60mg or 120mg daily, is effective for treating pain in diabetic peripheral neuropathy and fibromyalgia. Minor side effects are common at therapeutic doses. It is as effective as other similar drugs already on the market.	2 (2009), 9 (2007), 15 (March 2009)	
Antidepressants for non-specific low back pain	No difference in pain relief (standardized mean difference -0.04) and conflicting evidence on their effect on pain intensity. Also, no clear evidence in reducing depression in chronic low-back pain patients. Overall, there is no clear evidence that antidepressants are more effective than placebo in patients with chronic low-back pain.	13 (Nov 2008)	Not approved as a standalone therapy
Antipsychotics for acute and chronic pain in adults	Antipsychotics, such as haloperidol, flupentixol, fluphenazine, thioridazine, levomepromazine, prochlorperazine, sulpiride, tiapride and pimozide, might be used as an add-on therapy in treating chronic pain and as a possibility for treating resistant pain. However, usage of antipsychotics is associated with extrapyramidal and sedating side effects.	16 (Oct 2007)	Not approved as a standalone therapy
Ketamine for chronic non-cancer pain	While the current literature provides evidence for *acute relief* of chronic non-cancer pain, information supporting the efficacy and tolerability of ketamine in the long-term treatment of chronic pain is extremely limited. Whether ketamine is an appropriate treatment for any specific chronic pain condition, including migraine prophylaxis and fibromyalgia, needs further study.	17 (2008)	Not approved
Muscle relaxants for non-specific low-back pain	There is strong evidence that muscle relaxants are more effective than placebo for short-term pain relief for patients with *acute* LBP. The pooled relative risk (RR) for non-benzodiazepines versus placebo after two to four days was 0.80 [95% CI; 0.71 to 0.89] for pain relief and 0.49 [95% CI; 0.25 to 0.95] for global efficacy. Adverse events, however, with an RR of 1.50 [95% CI; 1.14 to 1.98] were significantly more prevalent, especially central nervous system adverse effects (RR 2.04 [95% CI; 1.23 to 3.37]). Various muscle relaxants were found to be similar in performance.	18 (Oct 2002)	Not approved
Non-antiepileptic drugs for trigeminal neuralgia	There is insufficient evidence to show significant benefit from non-antiepileptic drugs, including baclofen, tizanidine, tocainide, pimozide, proparacaine hydrochloride, clomipramine, and amitriptyline, in trigeminal neuralgia. Side effects were relatively common and serious ones restricted their clinical use.	19 (Aug 2005)	Not recommended

Opioids

Opioids for neuropathic pain	Short-term studies provide only equivocal evidence regarding the efficacy of opioids in reducing the intensity of neuropathic pain. Intermediate-term trials demonstrated that opioids are effective for some subtypes of neuropathic pain and for the relatively short duration of the published studies. Side effects such as nausea, dizziness, and drowsiness were common.	20 (June 2005), 2 (2009)	As per Practice Directive C10-1, the Board provides opioids for 8 weeks, with progress reports on pain and function required. Approval for extension can be sought after consultation with the Board's medical advisors. Should approval be given, the injured worker and their physician are required to sign a treatment agreement.
	The benefits of opioids in clinical practice for the long-term management of chronic LBP remain questionable.	21 (May 2007)	
	Long term opioid administration, either orally, transdermally, or intrathecally, to treat chronic non-cancer pain reduced pain significantly. However, many participants discontinued due to adverse effects (oral: 22.9%, transdermal: 12.1%, intrathecal: 8.9%) or insufficient pain relief (oral: 10.3%, intrathecal: 7.6%, transdermal:5.8%). Signs of opioid addiction were reported in about 0.27% of patients. Findings regarding quality of life and functional status were inconclusive.	22 (May 2009)	
Opioid switching to improve pain relief and drug tolerability	No clear evidence on the effectiveness of switching opioids for patients with inadequate pain relief and intolerable opioid-related toxicity/adverse effects.	23 (Jan 2003)	Not recommended
Hydromorphone for acute and chronic pain	Hydromorphone, a potent drug, is not superior to morphine for the management of moderate to severe pain. Morphine is the gold standard for the management of moderate to severe cancer-related pain. Hydromorphone behaves like other strong opioids in terms of its analgesic efficacy and tolerability and it is not clinically significantly different from other strong opioids, such as morphine.	24 (Nov 2006)	Not recommended
Tramadol for neuropathic pain	Moderate-quality evidence that patients receiving tramadol were significantly more likely to report at least 50% pain reduction compared with patients receiving placebo. Significantly more likely to withdraw from treatment; significantly more likely to report constipation, nausea and dizziness.	2 (2009)	Not recommended
	Among patients with osteoarthritis, tramadol or tramadol/paracetamol decreases pain intensity (8.5 units on 100 unit scale), produces symptom relief, and improves function, but these benefits are small. Adverse events, although reversible and not life threatening, often cause participants to stop taking the medication.	25 (Aug 2005)	
	May not be better than less expensive analgesics.	26-28 (March 2008)	

Pain Management Programs

Pain management programs (PMPs)	PMPs, also known as Multimodal Rehabilitation Pain Programs, consist of education on pain physiology, pain psychology, healthy function, and self-management of pain problems; guided practice on setting goals and working towards them; identifying and changing unhelpful beliefs and ways of thinking; relaxation; and changing habits which contribute to disability. There is high quality evidence on the effectiveness of PMPs in reducing pain, returning people to work, and reducing sick leaves compared to passive controls or separate interventions. However, their effectiveness for neck and shoulder pain among working age adults is questionable. Further, for chronic low back pain patients, it is important to investigate the components of a program before committing to one.	29 (2007), 30 (2006), 31 (Nov 2002), 32 (2003)	WorkSafeBC provides: •Comprehensive Multidisciplinary Pain Assessment in order to assist case managers in adjudicating decisions in chronic pain; •Pain Management Program, a multidisciplinary treatment program consisting of a physiotherapist, occupational therapist, psychologist, pharmacist and physician who assist workers who require assessment and/or management of their complex pain issue; •Sympathetically mediated Pain Rehabilitation Services, a multidisciplinary team treating injured workers diagnosed with Complex Regional Pain Syndrome. These services can be accessed through referral by the Board's Medical Advisors.

Psychosocial Management			
Psychological therapies for the management of chronic pain (excluding headache) in adults	Cognitive Behavioural Therapy (CBT) and Behaviour Therapy (BT) have weak effects in improving pain. CBT and BT have minimal effects on disability associated with chronic pain. CBT and BT are effective in altering mood outcomes, and there is some evidence that these changes are maintained at six months. Guidance is still required on the best content, duration, intensity, and format of treatment.	33 (Aug 2008)	Part of multidisciplinary Pain Management Program
Cognitive behavioural therapy	CBT yields better social and physical function, as well as 25% greater ability to cope, in chronic pain patients compared with other behavioural therapies.	30 (2006)	Part of multidisciplinary Pain Management Program
Behavioural treatment for chronic low-back pain	Combined cognitive therapy and progressive relaxation therapy is more effective than WLC (waiting list control) on short-term pain relief. Long term effects are unknown. No difference between behavioural treatment and exercise therapy.	34 (Oct 2003)	Part of multidisciplinary Pain Management Program

Invasive/Surgical Management			
Systematic administration of local anesthetic agents to relieve neuropathic pain	Lidocaine and oral analogs were safe drugs in controlled clinical trials for neuropathic pain, were better than placebo, and were as effective as other analgesics. *However, the effectiveness of lidocaine is very short, relatively very small in size, and associated with potentially harmful side effects.*	35 (2004)	Not recommended
Shock wave therapy for lateral elbow pain	Extracorporeal shock wave therapy (ESWT) provides little or no benefit in terms of pain and function in lateral elbow pain. Steroid injections may be more effective than ESWT. Shock wave therapy may cause pain, nausea, and reddening of the skin.	36 (Feb 2005)	Low energy shock wave therapy is not approved
Spinal cord stimulation (SCS) for chronic pain	There may be evidence on the efficacy of SCS in reducing pain among Complex Regional Pain Syndrome patients but not on function and the efficacy started to lose its effectiveness after 6 months. With regard to the application of SCS to treat limb ischemia, there is some evidence on its effectiveness in salvaging limbs. With regard to the application of SCS to treat failed back surgery syndrome, the evidence is inconclusive in reduction of pain or, at best, there may be short term effectiveness (3-6 months) in pain reduction. Among injured workers, SCS is not more effective than pain clinics or usual care after 6 months.	37 (Sept 2003), 38 (Mar 2009)	Not approved
Sympathectomy for neuropathic pain	Evidence for the effectiveness of sympathectomy for neuropathic pain is very weak. Furthermore, complications of the procedure may be significant.	39 (Feb 2003)	Not approved

Trigger point injections for chronic non-malignant musculoskeletal pain	The evidence for its effectiveness when used as the sole treatment for patients with chronic head, neck, and shoulder pain or whiplash syndrome is inconclusive. The combined use of dry needling and trigger point injections with procaine offers no obvious clinical benefit in the treatment of chronic craniofacial pain, while the effectiveness of trigger point injections for the treatment of cervicogenic headache is unknown. There is no proof that trigger point injections are more effective than other less invasive treatments, such as physical therapy and ultrasound, in achieving pain relief. The most common complication of trigger point injections is a vasovagal syncopal episode. Other complications can include bleeding, transverse cuts or tears in the muscles, injury to nerve fibres, damage to blood vessels (ecchymosis, hematoma), infection, anaphylactic reaction, allergic reaction to the injected fluid, and compartment syndrome.	40 (Sept 2004), 41 (2003)	Not recommended

Physical Therapy			
Traction for low-back pain with or without sciatica	Consistent results indicate that continuous or intermittent traction as a single treatment for LBP is not likely effective to treat patients with acute, sub-acute or chronic LBP with or without sciatica.	43 (Oct 2006)	Not approved as a standalone therapy
Spinal manipulative therapy for acute and chronic low-back pain	For patients with acute low-back pain, spinal manipulative therapy was superior only to sham therapy (10mm difference [95% CI, 2 to 17mm] on a 100mm visual analogue scale) or therapies judged to be ineffective or even harmful. Spinal manipulative therapy had no statistically or clinically significant advantage over general practitioner care, analgesics, physical therapy, exercise, or back school. Results for patients with chronic low-back pain were similar.	42 (Jan 2000)	The Board initially approves treatment for 4 consecutive weeks. If further treatment is required, chiropractors need to submit a report delineating treatment and return to work prior to 4 more weeks of treatment. Should treatment be required beyond 8 consecutive weeks, approval first requires review from the Board's Medical Advisors.
Photonic stimulation for the treatment of chronic pain	Photonic stimulators are devices that produce infrared light. This light is directed at specific parts of the body to increase blood flow and, allegedly, relieve pain. There is no reliable evidence on the effectiveness of photonic stimulation for the treatment of chronic pain.	44 (Nov 2002)	Not approved
Interferential stimulation (IFT) for the treatment of musculoskeletal pain	No evidence that IFT is superior to placebo for the treatment of musculoskeletal pain.	45 (Aug 2005)	Not approved

Superficial heat or cold for low back pain	There is moderate short term evidence that heat wrap therapy has a small effect in reducing pain and disability for patients with acute LBP. The addition of exercise to heat wraps provides further benefit. There is still not enough evidence about the effect of the application of cold for low-back pain of any duration, or for heat for chronic LBP. Heat treatments include hot water bottles, soft heated packs filled with grain, poultices, hot towels, hot baths, saunas, steam, heat wraps, heat pads, electric heat pads, and infra-red heat lamps. Cold treatments include ice, cold towels, cold gel packs, ice packs, and ice massage.	46 (Oct 2005)	Not approved as a standalone therapy
Electromagnetic fields for the treatment of osteoarthritis	Current evidence suggests that electrical stimulation therapy, including pulsed electromagnetic field therapy, may provide improvements for knee OA. However, the clinical significance from a patient's perspective was questionable.	47 (2001)	Not approved
Electrotherapy for neck pain	Very low quality evidence that pulsed electromagnetic field therapy (PEMF), repetitive transcranial magnetic stimulation (rTMS) and transcutaneous electrical nerve stimulation (TENS) are more effective than placebo. Low quality evidence that permanent magnets (necklace) are no more effective than placebo. Very low quality evidence that modulated galvanic current, iontophoresis and electric muscle stimulation (EMS) are no more effective than placebo.	48 (Dec 2008)	Not approved
Conservative treatments for whiplash associated disorders (WAD)	Unclear evidence on the effectiveness of either passive or active treatments to relieve the symptoms of WAD grades 1 or 2.	49 (Nov 2006)	Not approved
Transcutaneous electrical nerve stimulation (TENS):			
- a. for chronic pain	The analgesic effectiveness of TENS still remains uncertain, including for treatment of osteoarthritis of the knee and chronic LBP. However, it may be effective in treating diabetic neuropathy.	50 (Apr 2008), 51 (Aug 2008), 52 (July 2007), 53 (Apr 2009)	The Board provides TENS as part of a physical therapy program for musculoskeletal injury related treatment.
- b. rheumatoid arthritis in the hand	There are conflicting effects of TENS on pain outcomes in patients with RA. Acupuncture-like TENS (AL-TENS) was beneficial for reducing pain intensity and improving muscle power scores over placebo while, conversely, conventional TENS (C-TENS) resulted in no clinical benefit in pain intensity compared with placebo. However, C-TENS resulted in a clinical benefit in patient assessment of change in disease over AL-TENS.	54 (Oct 2002)	Not applicable
Low level laser therapy for nonspecific low-back pain or neck pain	Insufficient evidence on its effectiveness in treating nonspecific low back pain or neck pain. The optimal dose, application technique, or length of treatment, if any, remains to be determined.	55 (Nov 2007) 56 (July 2008)	Not approved

Complementary and Alternative Medicine			
Touch therapies for pain relief in adults	Touch therapies, including Healing Touch (HT), Therapeutic Touch (TT) and Reiki, showed very small effects (0.83 units on a 0 to 10 unit scale) in lowering pain intensity compared to unexposed participants.	57 (June 2008)	Not approved
Neuroreflexotherapy (NRT) for non-specific low-back pain	A less widely used technique from Spain, NRT showed short term (15 to 60 days) statistically significantly better outcomes in pain, mobility, disability, medication use, consumption of resources, and costs, but not quality of life.	58 (July 2009)	Not approved
Massage for mechanical neck disorders	Neither massage alone nor massage combined with other treatments showed a significant advantage over other comparison groups including no treatment, hot packs, active range-of-movement exercises, interferential current, acupuncture, exercises, sham laser, TENS, manual traction, mobilization, education, and pain medication.	59 (Sept 2004)	The Board provides massage, delivered by a Registered Massage Therapist, as part of rehabilitative therapy for injured workers with musculoskeletal related injuries. Massage is provided for 5 consecutive weeks with a maximum of 3 treatments per week until return to work. Treatment is limited to one rehabilitation massage per day. Should the injured worker not return to work after 5 weeks, approval to continue massage can be obtained after consultation with the Board's Medical Advisors for up to a maximum of 3 additional weeks of treatment.
Massage for low-back pain	Massage might be beneficial for patients with subacute and chronic non-specific low-back pain, especially when combined with exercises and education. There is a trend towards acupressure or pressure point massage techniques providing more relief than classic (Swedish) massage.	60 (May 2008)	

Acupuncture for tension-type headache	There are clinically relevant short-term (up to 3 months) benefits of acupuncture over routine care for response, number of headache days, and pain intensity among patients with acute headaches. No evidence on long term effects (> 3 months).	61 (Jan 2008)	WorkSafeBC does not generally accept responsibility for the cost of acupuncture. Any exception must be previously authorized, and when authorized, treatment is for a short period of time and only in conjunction with a comprehensive treatment plan that includes activation and other pain management strategies. Upon approval, injured workers can receive up to five acupuncture treatments over two weeks.
Acupuncture and dry-needling for low back pain	For chronic low-back pain, acupuncture is more effective for pain relief and functional improvement than no treatment or sham treatment immediately after treatment and in the short-term only. Acupuncture is not more effective than other conventional and "alternative" treatments. Acupuncture and dry-needling may be useful adjuncts to other therapies for chronic low-back pain.	62 (Feb 2003)	
Acupuncture for shoulder pain	There is not enough evidence to say whether acupuncture works to treat shoulder pain or whether it is harmful.	63 (Dec 2003)	
Herbal therapy for treating rheumatoid arthritis	There may be some potential benefit for the use of gamma-linolenic acid (GLA) in rheumatoid arthritis for relief of pain, morning stiffness, and joint tenderness. GLA may provide supplementary or alternative treatment to NSAIDs for some patients.	64 (2000)	Not applicable
Herbal medicine for low back pain	Although there have been good results with three herbal medicines (Devil's Claw (Harpagophytum Procumbens), Willow Bark (Salix Alba), and Cayenne (Capsicum Frutescens) in short-term trials, there is no evidence yet that any of these substances are safe and useful for long term use.	65 (July 2005)	Not approved
Vitamin D for the treatment of chronic painful conditions in adults	There is insufficient evidence for an effect of vitamin D in chronic pain conditions.	66 (Sept 2009)	Not approved

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