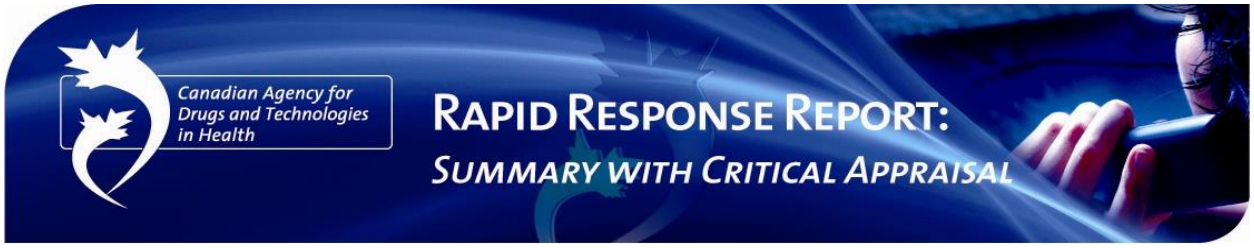

TITLE: Physical Therapy Treatments for Chronic Non-Cancer Pain: A Review of Guidelines

DATE: 10 November 2016

CONTEXT AND POLICY ISSUES

Chronic pain is one of the most common reasons for seeking medical care.[1] While definitions can vary, chronic pain can be considered "pain without biological value that has persisted beyond the normal time and despite the usual customary efforts to diagnose and treat the original condition and injury."[2] The duration of time that is considered beyond normal may also differ, but can be considered a minimum of six weeks or longer than the anticipated healing time.[2] For low back pain to be considered chronic, it will have persisted for 12 weeks or longer.[3] Recommendations for the management of chronic pain consider a multi-faceted approach in order to achieve overall therapeutic goals.[2,4-6] In general, treatment modalities can include pharmacologic, physical medicine, behavioral medicine, neuromodulation, interventional, and surgical approaches.[1] Thus, while pharmacotherapy is an important component of the management plan for chronic pain, it is not the sole focus of pain management and is just one component care; physical therapies play an important and complementary role.[2]

Examples of physical therapies used in the management of chronic pain include exercise and active physical therapy, yoga, manual therapies (such as spinal manipulation therapy and mobilization), acupuncture and massage.[1,2] Physical and exercise therapies are varied and may include exercises to improve range of motion and muscle conditioning to increase the degree of stability and function and improve pain control.[1] Exercises can be passive, during which external force is applied and there is no voluntary muscle contraction or can be active, assisted with partial contraction and external force applied.[1] Acupuncture is an intervention that involves the insertion of needles at specific acupuncture points.[7] In the management of chronic pain it has been hypothesized that acupuncture induces changes in the perception and memory of pain and may induce changes in the sympathetic nervous system.[8] Massage therapy has been defined as “as soft tissue and joint manipulation using the hands or a handheld device” for therapeutic purposes and is another example of a physical therapy used to help control pain.[9] Massage therapy is thought to have a broad range of benefits related to relaxation and circulation.[4]

Familiarity with the evidence-based guidelines around the use of physical therapies to manage chronic pain is important given the diverse therapeutic modalities available in this category, the diverse nature of chronic pain syndromes and the potential for varied efficacy. This report will review existing evidence-based guidelines regarding the use of physical therapy treatments for chronic non-cancer pain.

RESEARCH QUESTION

What are the evidence-based guidelines regarding the use of physical therapy interventions for chronic non-cancer pain in adult patients?

KEY FINDINGS

Eleven evidence-based guidelines included recommendations about the use of physical therapy interventions for the management of chronic, non-cancer pain. Overall, guidelines supported the use of physical and exercise therapy, manual therapy (i.e. spinal manipulation therapy and mobilization techniques), acupuncture, massage, and yoga. However, guidelines were typically limited with respect to the optimal frequency and duration of treatment and sometimes provided contradictory recommendations. Criteria for determining when continued treatment was warranted were generally lacking.

METHODS

Literature Search Strategy

A focused literature search, with main concepts appearing in the title, abstract or major subject heading was conducted on key resources including PubMed, The Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2011 and October 13, 2016.

Selection Criteria and Methods

One reviewer screened citations from the database and grey literature searches and selected studies for inclusion. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Adult patients with chronic non-cancer pain
Intervention	Physical therapy interventions (e.g., physiotherapy, occupational therapy, exercise, weight-loss interventions, postural therapy, manual therapy, yoga, acupuncture, chiropractic intervention)
Comparator	Not required

Table 1: Selection Criteria	
Outcomes	Evidence-based guideline recommendations regarding indications for and the appropriate use of physical therapy interventions for chronic non-cancer pain in adult patients
Study Designs	Guidelines

Exclusion Criteria

Guidance documents or consensus statements that did not include a description of the methodology used in their development, that were not clearly evidence-based, or did not make explicit recommendations were excluded. As well, guidelines that addressed only non-chronic pain (i.e., acute or subacute pain) were excluded. One guideline was excluded because it was subsequently removed from the guideline developer's website[10] after initially being identified in the grey literature search. It appeared to have been replaced by an updated guideline, which was subsequently included in the review.[2]

Critical Appraisal of Individual Studies

The included guidelines were assessed with the AGREE II instrument.[11] Summary scores were not calculated for the included guidelines; rather, a review of the strengths and limitations of each included guideline were described.

SUMMARY OF EVIDENCE

Quantity of Research Available

A total of 633 citations were identified in the literature search. Following screening of titles and abstracts, 601 citations were excluded with 32 potentially relevant reports from the electronic search being retrieved for full-text review. Five potentially relevant publications were retrieved from the grey literature search. Of these 37 potentially relevant articles, 26 publications were excluded due to the incorrect population, intervention, outcome, language of the publication or design. Appendix 1 describes the PRISMA flowchart of the study selection.

Summary of Study Characteristics

The guideline characteristics, including the criteria used for the grading of recommendations and levels of evidence, are summarized in Table A1, Appendix 2. There were eleven evidence-based guidelines included in the review.[2,4,5,7,9,12-17] Of these guidelines, five were Canadian,[7,9,12,15,16] four were American[2,4,14,17] and two were from the United Kingdom.[5,13] Some guidelines had a specific therapeutic focus, with five guidelines addressing the management of chronic low back pain[4,7,9,14,16] and two guidelines addressing chronic neck pain.[12,15] One guideline focused specifically on the management of pain in older adults.[13] Three guidelines were more general, addressing the management of chronic pain not in a specific population or in relation to a specific indication.[2,5,17] The majority of guidelines provided recommendations about the use of more than one type of physical therapy; however, two guidelines were focused only on therapeutic massage therapy (one in chronic neck pain[15] and one in chronic back pain[9]) and one on physical activity.[16]

The criteria used to determine the rating of the level evidence and the strength of recommendation for the included guidelines is also summarized in Table A1, Appendix 2. The approach used differed across guidelines.

Summary of Critical Appraisal

The critical appraisal of the included guidelines is summarized in Table A2, Appendix 3. The included guidelines appeared to be methodologically rigorous in their development process overall, with the exception of one guideline that appeared to be relatively weak from a methodological perspective, due to a failure to report on a number of the AGREE II criteria.[16] All guidelines, except for one,[16] had clearly stated objectives and were evidence-based with the relevant literature being identified through database and grey literature searching, although the selection criteria for the included literature were frequently not clearly stated.[2,5,7,14] For the majority of guidelines, the working groups responsible for formulating recommendations were multidisciplinary, with a broad range of health professions and other experts represented.[2,4,5,7,9,13,15,17] For two guidelines, the composition of the group responsible for formulating recommendations was unclear[14,16] and for another, it appeared that a single profession was represented.[12] It was also unclear, typically, if the views of patients or other end users were sought, with the exception of two guidelines.[5,13] The process used by these groups to formulate recommendations, however, was sometimes unclear.[5,9,14-16] A number of the guidelines were formulated by groups that had established procedures for developing guidelines, a component of which was a process in place to ensure the guideline was updated at regular intervals.[2,5,14] While the recommendations in the guidelines were clearly identifiable in the documents, in a number of guidelines the actual recommendations did not provide much guidance around the actual parameters for using the physical treatment modalities (for example, length of session, frequency and duration).[2,5,7,13,14,16] Further, a key common limitation of the guidelines was that there was a lack of clarity or transparency with respect to how the quality of the literature was used in formulating the guideline recommendations.[4,7,9,15,17]

Summary of Findings

The detailed guideline recommendations can be found in Table A3, Appendix 4. Key recommendations are summarized here.

Physical Therapy

Three of the included guidelines had recommendations pertaining to physical therapy for the management of chronic pain.[2,14,17] Of these guidelines, the most recently published was from the Institute for Clinical Systems Improvement (ICSI) (2016)[2] and was focused on chronic pain in general. Physical therapy (exercise performed under the direct supervision of a physician, physical therapist or athletic trainer) was recommended to facilitate rehabilitation, but its use beyond eight to 12 weeks was endorsed only when there was objective clinical improvement.[2] A typical physical therapy session was considered to be 30 to 90 minutes, two to three times each week for eight to 12 weeks.[2] It was also stated that failure to show improvement within this time frame may suggest the appropriateness of physical therapy should be reconsidered.[2] More detailed recommendations can be found in Table A3, Appendix 4.

The Orthopaedic Section of the American Physical Therapy Association (2012)[14] provided guideline recommendations specific to physical therapy interventions in the management of chronic low back pain.[14] The detailed recommendations can be found in Table A3, Appendix 4.

While these guidelines provide information about the technique to use in relation to the type of pain and impairment, the recommended frequency and duration of treatment are not stated.

The State of Colorado, Division of Worker's Compensation (2011)[17] provides detailed recommendations with respect to physical therapy exercise programs for the management of chronic pain disorders, summarized in Table A3, Appendix 4. These recommendations address the specific type of exercise recommended, supervision required, frequency, and duration. However, the indication for each exercise type is not specified. Importantly, the guidelines state that it is the goal of with the physical therapy treatments to teach patients exercise that they can eventually do independently at home

Exercise

Six of the included guidelines addressed exercise as a component of the management plan of one or more form of chronic pain.[2,5,7,12,13,16] In the ICSI (2016)[2] chronic pain guideline it is stated that exercise should be a component of treatment for a patient with chronic pain, but that no one type is superior, with the optimal frequency not being demonstrated, but that at least two to three sessions per week are required for clinical benefit.[2] More detailed recommendations can be found in Table A3, Appendix 4.

The Towards Optimized Practice (TOP) Guidelines (2015)[7] recommend exercise and therapeutic exercise (i.e., exercises prescribed according to the results of an individual patient assessment) to help manage low back pain. Patients are advised to start slow and advised to gradually increase their activity level as tolerated, but more specific recommendations are lacking.[7]

For the management of chronic neck pain, the Canadian Chiropractic Association (2103)[12] recommends regular home stretching with advice or training three to five times per week, and home strengthening and endurance exercises with advice, training or supervision (frequency not specified).

The Scottish Intercollegiate Guidelines Network (SIGN) guidelines (2013) for chronic pain management also recommend exercise and exercise therapies, regardless of their form.[5] Low back pain is a condition specifically identified in the guideline where exercise can improve long-term disability.[5] Strategies to improve adherence to exercise programs are recommended, including supervised sessions, individualized sessions in group settings, use of supplementary material and combining home and group exercise programs.[5]

In one guideline produced by the British Pain Society and British Geriatrics Society that was focused on chronic pain management in older adults, it is stated that exercise should be considered, involving strengthening, flexibility, endurance and balance.[13] However, limited detail is provided beyond that recommendation.

One guideline focused exclusively on the risk assessment and recommendations for physical activity in a number of chronic conditions, one of which was chronic low back pain. Exercise was recommended in patients without serious pathology and it was stated that the activity should be progressive in nature.[16] As well, avoiding high-impact, heavy resistance training or extreme trunk flexion, extension or directions that cause pain was recommended.[16] In pregnancy, aquatic exercise, low-impact aerobics, and pelvic muscle exercises were recommended for the management of low back pain.[16]

Manual or Passive Therapies

Depending on the guideline, the term 'manual therapy' or 'passive therapy' was used to refer to different techniques applied by chiropractors, osteopaths and sometimes physiotherapists. The ICSI (2106) guidelines for chronic pain[2] included spinal manipulation, passive mobilization, and myofascial relaxation performed by a chiropractor or osteopath under the term passive physical treatments. Passive physical treatments were only recommended by the ICSI in their 2016 guideline as part of a treatment strategy in conjunction with active physical therapy or exercise program, as they may provide short-term pain relief and potential medium-term benefit.[2] No specific guidance with respect to treatment frequency or duration was made. Similarly, SIGN guidelines (2013)[5] recommend manual therapies, including manipulation and mobilization, for the short-term relief of chronic low back pain, but do not offer guidance with respect to the treatment duration or frequency. In defining manual therapies, they state that these techniques can be performed by a physiotherapist, chiropractor or osteopath.[5] According to the SIGN guidelines, manual therapy is also recommended for the treatment of chronic neck pain, in combination with exercise.[5]

The State of Colorado, Division of Worker's Compensation (2014)[4] guideline for low back pain includes recommendations related to spinal mobilization and spinal manipulative therapy, stating that these manual therapies may be effective for reducing disability from low back pain that has persisted more than 12 weeks.[4] In addition, it is stated that spinal manipulative therapy produces comparable results to exercise, standard medical care and physiotherapy in reducing pain.[4] It was not specified who should perform these therapies. The Orthopaedic Section of the American Physical Therapy Association (2012)[14] also provided guidelines that endorse the use of manipulative and mobilization procedures for the management of chronic low back pain, but without additional guidance.[14]

The TOP Guidelines (2015) included spinal manipulative treatment and spinal mobilization as manual therapies. Contrary to the previously described guidelines,[4,5,14] the TOP Guidelines (2015) for low back pain indicated that there was insufficient evidence to recommend for or against either treatment modality for the management of chronic low back pain.[7]

The Canadian Chiropractic Society (2013)[12] provides detailed guidelines on the use of manipulation and mobilization techniques for the management of chronic neck pain, the details of which can be found in Table 3, Appendix 4. While the recommendations differ according to technique, manipulation was recommended for chronic neck pain twice weekly for nine weeks.[12]

The State of Colorado, Division of Worker's Compensation (2011)[17] guideline for chronic pain disorders provides detailed recommendations related to the use of manipulation, the details of which can be found in Table 3, Appendix 4. Importantly, it is stated that manipulation can be as effective as common interventions (such as standard medical care, physiotherapy, and exercise alone) for low back pain, and the decision to choose this treatment should be based on patient preference and relative safety, not the expectation of greater efficacy. The guidelines state that manipulation can be performed by an osteopathic physician, chiropractor, properly trained physical therapist, properly trained occupational therapist, or properly trained medical doctor. The recommended frequency is one to two times per week for the first two weeks, followed by once weekly for the next six weeks. The maximum duration of treatment is eight weeks, at which point treatment should be re-evaluated and possibly continued if there is improvement in function, pain and quality of life.[17] This guideline also includes recommendations specific to mobilization and state that it is indicated for muscle spasm around

a joint, trigger points, adhesions, and neural compression, when used with active therapy. It is recommended three times per week, up to six weeks.[17]

Massage Therapy

Recommendations about the use of massage therapy for chronic pain were included in six guidelines.[2,7,9,12,13,15] For chronic pain, the ICSI (2016)[2] stated that massage therapy had been shown to reduce pain scores in patients with low back pain, osteoarthritis of the knee, chronic neck pain and fibromyalgia; however, the duration of treatment and frequency had yet to be determined.[2] The TOP Guidelines (2015) for low back pain also recommend massage therapy as part of an active rehabilitation program, but do not recommend a frequency or duration of treatment.[7] The Ottawa Panel (2012) also recommended massage therapy for low back pain, and also stated that further research was needed to examine the role of technique and dosage, however, the precise meaning of 'dosage' was unclear.[9] Massage therapy was also recommended for up to one month by the Canadian Chiropractic Society for the management of chronic neck pain when used as part of a multimodal treatment strategy.[12] This recommendation was based on two studies in which in which five to 10 massage sessions of 60 to 75 minutes were provided. The frequency was not reported.[12] While the Ottawa Panel (2012) also endorsed massage therapy for chronic neck pain, they stated that evidence was conflicting and that the long-term effects were unclear.[15] One guideline specific to the management of chronic pain in geriatric patients did not support the use of massage therapy.[13]

Acupuncture

Four guidelines included recommendations regarding the use of acupuncture for chronic pain.[4,5,7,13] The TOP Guidelines (2015) for low back pain recommend acupuncture for short-term treatment, but with no specific guidance with respect to frequency or duration of treatment.[7] The SIGN guidelines for chronic pain (2013) also recommend acupuncture for low back pain and osteoarthritis, but similarly do so without additional guidance.[5] The State of Colorado, Division of Worker's Compensation (2014)[4] guideline for low back pain recommend acupuncture for chronic back pain when administered by a credentialed practitioner.[4] They specify that the frequency of treatment is one to three times per week, with an optimum duration of one to two months, with a maximum number of treatments of 15.They considered extending the duration of treatment beyond 15 if there were functional gains.[4] Similar to the use of massage, the British Pain Society and British Geriatrics Society did not support the use of acupuncture in geriatric patients due to limited evidence.[13]

Yoga

Two guidelines included recommendations about the use of yoga to manage chronic pain.[7,17] The TOP guideline (2015)[7] for the management of chronic low back pain supported the use of specific types of yoga (Viniyoga and Iyengar) but stated there was no evidence found to recommend other types of yoga.[7] No recommendations with respect to length of session, frequency or duration were given. State of Colorado, Division of Worker's Compensation (2011) similarly recommended yoga in their guideline for the management of chronic pain disorder,[17] suggesting yoga may be an option for motivated patients, with a maximum duration of 48 sessions and an anticipated time to see a benefit being eight sessions.

Limitations

Guidelines were not identified from the literature search for all therapies of interest, such as occupational therapy, weight-loss interventions, and postural therapy. Further, for some therapies, there were only guidelines available for specific chronic pain conditions. Within the guidelines, recommendations were often vague with respect to the frequency and duration of physical therapies for chronic pain.

The definition of chronic pain was unclear in some of the included guidelines, and the definition could potentially vary across guidelines. As well, the definitions of the interventions themselves could potentially vary across the guidelines and were not always provided. Some guidelines separated out different types of a category of interventions into subcategories (for example, different types of manipulation) or by body part, whereas others grouped the evidence for different interventions in the category together. This has the potential to lead to differences in recommendations or strength of recommendations across guidelines, assumingly due to differences in the evidence base upon which the recommendations were made. The appropriateness of lumping versus splitting is likely a matter of expert opinion within a specific discipline.

For some interventions, such as yoga, acupuncture, and massage, there were limitations with respect to the quality of the literature. This limited the ability to make specific, evidence-based recommendations about the optimal duration and frequency about the use of these therapies in most guidelines. However, in some guidelines, recommendations were made with respect to frequency and treatment duration, without explicit linkage to any literature.[4,17] Thus, the extent to which these recommendations are truly evidence-based is questionable.

One 2013 guideline considered geriatrics as a separate age group and some therapies that were generally endorsed in the adult population overall (such as massage and acupuncture) were not recommended in this subpopulation. It is unclear if more recent literature would be available that would change this recommendation. Further, geriatrics were the only subgroup that was identified in a guideline. It is unclear if other important subgroups exists (perhaps defined by chronic conditions) that would be relevant to explore if the literature permitted.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

Pharmacotherapy is the most commonly used approach to management of chronic pain.[1] However, using a combination of therapies can be more effective over the long-term than using a single approach.[1] As such, a multidisciplinary, multimodal approach to chronic pain management combining pharmacologic and non-pharmacologic approaches, including physical therapies, is recommended.[2] There are a number of different physical therapies that are recommended.[2,4,5,7,9,12-17]

Eleven evidence-based guidelines regarding the use of physical therapy interventions for chronic non-cancer pain in adult patients that met the inclusion criteria were identified for the search timeframe. For chronic low back pain, guidelines generally recommended the use of physical therapy, exercise therapy, yoga (Viniyoga and Iyengar), manual therapy, massage and acupuncture as part of an overall treatment approach. However, one guideline stated that there was insufficient evidence to recommend for or against the use of spinal mobilization and spinal manipulation treatment for chronic low back pain. For chronic neck pain, guidelines generally recommended the use of physical therapy, exercise therapy, and manual therapy. The use of

massage for this indication was somewhat conflicting; with one guideline stating the long-term evidence was lacking (despite recommending this approach) and two recommending its use without qualification. For chronic pain more generally, guidelines also supported the use of physical therapy, exercise therapy, manual therapy, and massage as part of an overall treatment approach.

Typically, the guidelines tended to be vague with respect to the actual prescription for these treatments (i.e., the duration of the session, frequency and number of session). Where guidelines were specific, it was unclear whether this part of the recommendation was truly evidence based.

One guideline focused on pain management in older adults and did not find sufficient evidence to support the use of massage or acupuncture in this age group.

For some types of physical therapies, such as occupational therapy, weight-loss interventions, and postural therapy, evidence-based guidelines recommendations published during the search time frame were not identified.

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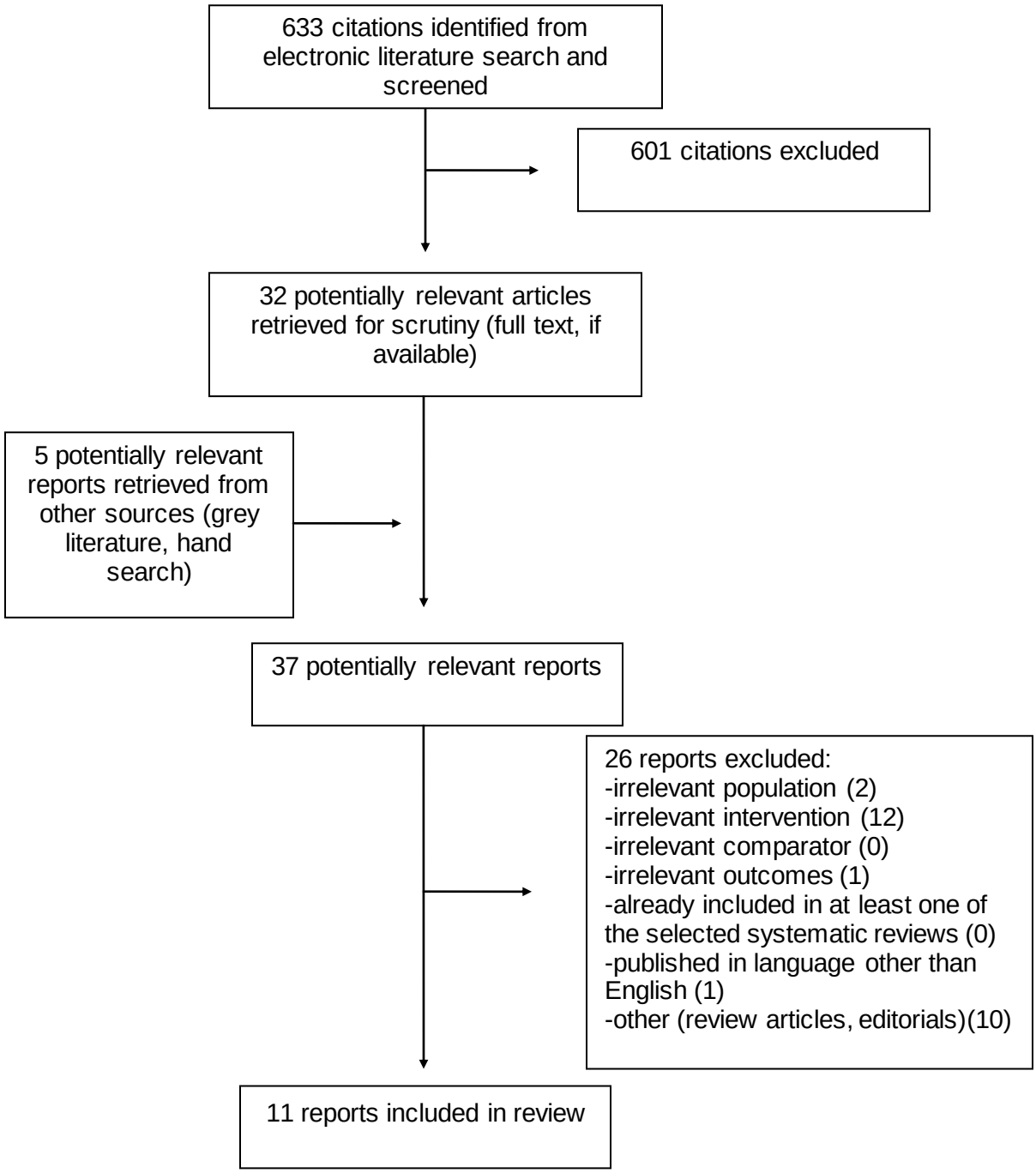
APPENDIX 1: Selection of Included Studies



Appendix 2: Grading of Recommendations and Levels of Evidence

Table A1: Grading of Recommendations and Levels of Evidence

Guideline Society or Collaboration, Country	Focus of Guideline	Strength of Recommendation	Level of Evidence
Institute for Clinical Systems Improvement, 2016[2] United States	Pain: Assessment, Non-Opioid Treatment Approaches and Opioid Management	Not made	Intended to use GRADE, but due to a paucity of RCTs and systematic reviews, the GRADE methodology could not be applied. The work group used the best available evidence to reach consensus recommendations. For each recommendation, the relevant resources used to support that recommendation were reported as guideline, systematic review or RCT.
Towards Optimized Practice, 2015[7] Canada	Adults with low back pain	**Do** • The Guideline Development Group (GDG) accepted the original recommendation, which provided a prescriptive direction to perform the action or used the term "effective" to describe it • The GDG supplemented a recommendation or created a new one, based on their collective professional opinion, which supported the action • A supplementary literature search found at least one systematic review presenting consistent evidence to support the action **Do not do** • The GDG accepted the original recommendation, which provided a prescriptive direction not to perform the action, used the term "ineffective" to describe it, or stated that the evidence does "not support" it • The GDG supplemented a recommendation or created a new one, based on their	Systemic Review Randomized Control Trial Non-Randomized Comparative Study Case Series Guideline Expert Opinion

Table A1: Grading of Recommendations and Levels of Evidence			
Guideline Society or Collaboration, Country	**Focus of Guideline**	**Strength of Recommendation**	**Level of Evidence**
		collective professional opinion, which did not support the action • A supplementary literature search found at least one systematic review presenting consistent evidence that did not support the action **Do not know** • The Guideline Development Group (GDG) accepted the original recommendation, which provided a prescriptive direction to perform the action or used the term "effective" to describe it • The GDG supplemented a recommendation or created a new one, based on their collective professional opinion, which supported the action • A supplementary literature search found at least one systematic review presenting consistent evidence to support the action	
Low Back Pain; State of Colorado, Division of Worker's Compensation, 2014[4] United States	Adults with back pain	**Consensus** means the judgment of experienced professionals based on general medical principles. Consensus recommendations are designated in the guideline as "generally well-accepted," "generally accepted," "acceptable/accepted," or "well-established." **"Some"** evidence means the recommendation considered at least one adequate scientific study, which reported that a treatment was effective. The Division recognizes that further research is likely to have an impact on the intervention's effect. **"Good"** evidence means the recommendation considered the availability of multiple adequate	Stated as following GRADE methodology.

Table A1: Grading of Recommendations and Levels of Evidence			
Guideline Society or Collaboration, Country	**Focus of Guideline**	**Strength of Recommendation**	**Level of Evidence**
		scientific studies or at least one relevant high-quality scientific study, which reported that a treatment was effective. The Division recognizes that further research may have an impact on the intervention's effect. **"Strong"** evidence means the recommendation considered the availability of multiple relevant and high-quality scientific studies, which arrived at similar conclusions about the effectiveness of a treatment. The Division recognizes that further research is unlikely to have an important impact on the intervention's effect.	
Canadian Chiropractic Association and the Federation Clinical Practice Guidelines Project, 2013[12] Canada	Adults with Chronic Neck Pain	**Strong** Consistent findings among ≥2 low-risk-of-bias controlled trials with no limiting factors **Moderate** Consistent findings among ≥ 2 low-risk-of-bias controlled trials with minor limiting factors or 1 low-risk-of-bias controlled trial with no limiting factors **Weak** 1 low-risk-of-bias controlled trial with limiting factors **Inconsistent** Unresolvable differences	
Multidisciplinary Collaboration including the British Pain Society and British Geriatrics Society, 2013[13] United Kingdom	Management of pain in older people.	Not reported	**1++** High-quality meta-analyses, systematic reviews of RCTs or RCTs with a very low risk of bias. **1+** Well-conducted meta analyses, systematic reviews of RCTs or RCTs with a low risk of bias. **1−** Meta-analyses, systematic reviews or RCTs or RCTs with a high risk of bias. **2++** High-quality systematic reviews of case–control or cohort studies or high-quality case control or cohort studies with a very low risk of confounding, bias or chance, and a high probability that the relationship is causal.

Table A1: Grading of Recommendations and Levels of Evidence			
Guideline Society or Collaboration, Country	**Focus of Guideline**	**Strength of Recommendation**	**Level of Evidence**
			2+ Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal. **2−** Case–control or cohort studies with a high risk of confounding, bias or chance, and a significant risk that the relationship is not causal. **3** Non-analytic studies, e.g. case reports, case series. **4** Expert opinion.
SIGN, 2013 (Scottish Intercollegiate Guidelines Network)[5] Scotland	Management of Chronic Pain	**Grade A:** At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results **Grade B:** A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; *or* Extrapolated evidence from studies rated as 1++ or 1+ **Grade C:** A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; *or* Extrapolated evidence from studies rated as 2++ **Grade D:** Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+	**1++** High-quality meta-analyses, systematic reviews of RCTs or RCTs with a very low risk of bias. **1+** Well-conducted meta analyses, systematic reviews of RCTs or RCTs with a low risk of bias. **1−** Meta-analyses, systematic reviews or RCTs or RCTs with a high risk of bias. **2++** High-quality systematic reviews of case–control or cohort studies or high-quality case control or cohort studies with a very low risk of confounding, bias or chance, and a high probability that the relationship is causal. **2+** Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal. **2−** Case–control or cohort studies with a high risk of confounding, bias or chance, and a significant risk that the relationship is not causal. **3** Non-analytic studies, e.g. case reports, case series. **4** Expert opinion.

Table A1: Grading of Recommendations and Levels of Evidence			
Guideline Society or Collaboration, Country	**Focus of Guideline**	**Strength of Recommendation**	**Level of Evidence**
Orthopaedic Section of the American Physical Therapy Association, 2012[14] United States	Low Back Pain	**A** – Strong evidence **B** – Moderate evidence **C** – Weak evidence **D** – Conflicting evidence **E** – Theoretical/foundational evidence **F** – Expert opinion	**Strong evidence** – A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study. **Moderate evidence** – A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation. **Weak evidence** – A single level II study or a preponderance of level III and IV studies including statements of consensus by content experts support the recommendation. **Conflicting evidence** – Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies. **Theoretical/foundational evidence** – A preponderance of evidence from animal or cadaver studies, from conceptual models/principles, or from basic sciences/bench research support this conclusion. **Expert opinion** – Best practice based on the clinical experience of the guidelines development team.
Ottawa Panel, 2012[9] Canada	Therapeutic massage for low back pain	Evidence was graded from A (strongly recommended, based on clinical importance ≥20% and statistical significance) to D- (strongly not recommended based on a well-designed RCT with >100 participants favoring the control group)	
Ottawa Panel, 2012[15] Canada	Therapeutic massage for neck pain	Evidence was graded from A (strongly recommended, based on clinical importance ≥20% and statistical significance) to D- (strongly not recommended based on a well-designed RCT with >100 participants favoring the control group)	
Chillibeck 2011[16] Canada	Evidence-based risk assessment and	A – Strong B – Intermediate C – Weak	1 – Randomized controlled trials 2 – Randomized controlled trials with limitations or observational trials with

Table A1: Grading of Recommendations and Levels of Evidence			
Guideline Society or Collaboration, Country	**Focus of Guideline**	**Strength of Recommendation**	**Level of Evidence**
	recommendations for physical activity in low back pain.		overwhelming evidence 3 – Observational studies 4 – Anecdotal evidence
State of Colorado, Division of Worker's Compensation, 2012[17] United States	Chronic Pain Disorder	**Consensus** means the judgment of experienced professionals based on general medical principles. Consensus recommendations are designated in the guideline as "generally well-accepted," "generally accepted," "acceptable/accepted," or "well-established." **"Some"** evidence means the recommendation considered at least one adequate scientific study, which reported that a treatment was effective. The Division recognizes that further research is likely to have an impact on the intervention's effect. **"Good"** evidence means the recommendation considered the availability of multiple adequate scientific studies or at least one relevant high-quality scientific study, which reported that a treatment was effective. The Division recognizes that further research may have an impact on the intervention's effect. **"Strong"** evidence means the recommendation considered the availability of multiple relevant and high-quality scientific studies, which arrived at similar conclusions about the effectiveness of a treatment. The Division recognizes that further research is unlikely to have an important impact on the intervention's effect.	Stated as following GRADE methodology.

CCT – Controlled clinical trial; GDG – Guidelines development group; GRADE – Grading of Recommendations Assessment, Development and Evaluation; RCT – Randomized controlled trial

Appendix 3: Summary of Critical Appraisal Using AGREE II[11]

Table A2: Summary of Critical Appraisal Using AGREE II[11]

Guideline Society or Collaboration, Country, Author and Year	Strengths	Limitations
Institute for Clinical Systems Improvement, 2016[2] United States	• The guideline scope and target population, as well purpose were all clearly stated. • The working group that developed the guideline had representation from all important related disciplines (e.g, nursing, pharmacy, anesthesiology, internal medicine, rehabilitation medicine, neurology, psychology, etc.). • There is a process in place for continually updating the guideline and recommendations, with the potential for revision every 12 to 24 months. • The process involved external and peer-review. • The literature search appeared to be comprehensive. • Tools for implementation and monitoring were included. • The recommendations were clear and included a clear linkage to the supporting evidence.	• The selection criteria for the included literature were not reported. • They had intended to follow the GRADE approach but could not due to a paucity of literature available.
Towards Optimized Practice, 2015[7] Canada	• The guideline development group included family physicians, specialist physicians, physiotherapists, occupational therapists, nurses, pharmacists, researchers, and psychologists. • The literature search was systematic and extensive. • The quality of included guidelines was assessed according to the AGREE tool (but not reported in the final guideline). • The level of evidence to support each recommendation was clear, but the underlying quality of that evidence was not reported. • Process for developing recommendations was reported in a separate publication.[18]	• The selection criteria for the seed guidelines were unclear. • Some of the seed guidelines were potentially out of date (published as early as 2003). • Unclear how guideline quality was considered in making the recommendation. • The underlying quality of the evidence to support the recommendations was not reported.
Low Back Pain; State of Colorado, Division of Worker's Compensation, 2014[4] United States	• Used a standard process that follows the GRADE methodology. • Clearly states the objective, target population and user of the guidelines. • Very detailed and explicit recommendations for treatment. • Used systematic literature review methods to identify the relevant literature. • Explicitly stated that the studies were too heterogeneous to pool any data. • Assessed the quality of the included studies using the Cochrane Risk of Bias Tool.	• The recommendations in the guideline were not explicitly linked to the evidence.

Table A2: Summary of Critical Appraisal Using AGREE II[11]		
Guideline Society or Collaboration, Country, Author and Year	**Strengths**	**Limitations**
Canadian Chiropractic Association and the Federation Clinical Practice Guidelines Project, 2013[12]	• Guideline development committee used a process based upon the criteria of the Appraisal of Guidelines Research and Evaluation (AGREE) collaboration for literature searching, screening, review, analysis, and interpretation • Objective and target audience of guideline clearly stated as "a supportive tool for practitioners and for their patients." The guideline was not intended to be used as a standard of care. • The strengths and limitations of the available evidence were clearly summarized. • The criteria for selecting the evidence were clearly stated. • The link between the recommendations and the supporting evidence was clear. • The literature search appeared to be comprehensive, consisting of database searching and hand searching.	• Unclear if the development group included individuals from all relevant professionals (Chiropractors and Occupational Therapy appeared to be represented) • It was unclear if there was a mechanism for updating the guideline. • It was unclear if the guideline had been externally reviewed as part of the development process.
Multidisciplinary Collaboration including the British Pain Society and British Geriatrics Society, 2013[13]	• Guidelines were developed by a collaborative group that included a broad range of professionals from epidemiology, geriatric medicine, pain medicine, nursing, physiotherapy, occupational therapy, psychology, pharmacy and service users. • Objective was clearly defined and stated as "to inform health professionals in any care setting who work with older adults on best practice for the management of pain and to identify where there are gaps in the evidence that require further research." • The literature search appeared to be comprehensive, consisting of database searching and hand searching. • The criteria for selecting the evidence were clearly stated and two reviewers selected the studies and graded the evidence. • The population to whom the guideline is intended to apply is clearly described.	• While the evidence was graded, there was no strength of recommendation reported and the link between the grading of evidence and actual recommendations was unclear. • It was unclear if the guideline had been externally reviewed as part of the development process. • The supplement in which the guideline was published was supported by funding from the Association of the British Pharmaceutical Industry.
SIGN, 2013 (Scottish Intercollegiate Guidelines Network)[5]	• The guideline was developed according to SIGN methodology • The guideline had clearly stated objectives as well as a statement of the intended purpose of the guideline. • The evidence was identified through systematic methods (database searching and grey literature searching). • The composition of the guidelines committee was clearly described and had representation from key disciplines.	• The methodology for formulating the recommendations was not described in extensive detail. • The selection criteria for the included literature were not presented in the guideline report.

Table A2: Summary of Critical Appraisal Using AGREE II[11]		
Guideline Society or Collaboration, Country, Author and Year	**Strengths**	**Limitations**
	• The recommendations and the grade of recommendation were both clear. • There is a process in place for updating the guideline. • External consultation and review was part of the guideline development process.	
Orthopaedic Section of the American Physical Therapy Association, 2012[14]	• The guideline had clearly stated objectives as well as a statement of the intended purpose of the guideline. • The evidence was identified through database searching and had searching. • A plan to update the guideline was in place at the time of guideline writing. • The guideline recommendations reflected the levels of evidence.	• The inclusion criteria for the evidence and methods used to select the evidence were not stated • Methods for formulating recommendations were unclear. • The composition of the guidelines development committee was unclear.
Ottawa Panel, 2012[9]	• The methodology followed the Ottawa Expert Panel methods and used a quantitative approach consistent with the Cochrane Collaboration. • Methodologists, specialists with clinical experience in biostatistics, massage therapy, occupational therapy, physiotherapy, massage therapists, physiotherapists, chiropractor, physiatrists and physicians. • The criteria for selection were clearly defined, and the selection was performed by two reviewers. • The Panel developed recommendations based upon recommendations based on RCTs with high methodological quality.	• Only 4 of 11 RCTs that met the inclusion criteria were considered to be sufficiently high quality to be considered as evidence to inform the recommendation. • Did not appear to search the grey literature or hand search. • The process used to arrive at recommendations was unclear. • There was no strength of recommendation or level of evidence reported for the recommendation made.
Ottawa Panel, 2012[15]	• The methodology followed the Ottawa Expert Panel methods and used a quantitative approach consistent with the Cochrane Collaboration. • Methodologists, specialists with clinical experience in biostatistics, massage therapy, occupational therapy, physiotherapy, massage therapists, physiotherapists, chiropractor, physiatrists and physicians. • The criteria for selection were clearly defined, and the selection was performed by two reviewers. • The Panel developed recommendations based upon recommendations based on RCTs with high methodological quality.	• Only 5 of 10 RCTs that met the inclusion criteria were considered to be sufficiently high quality to be considered as evidence to inform the recommendation. • Did not appear to search the grey literature or hand search. • The process used to arrive at recommendations was unclear. • There was no strength of recommendation or level of evidence reported for the recommendation made
Chillibeck 2011[16]	• Clear presentation of recommendations, with grading of the evidence to support the recommendation. • The objective of the review and guideline (to identify risks that occur during physical activity and to develop safe recommendations with respect to physical	• Study quality tended to be low. • The quality of the individual studies was assessed with the Jadad tool, which may not be appropriate for observational studies. • The process used to formulate the recommendations was unclear.

Table A2: Summary of Critical Appraisal Using AGREE II[11]		
Guideline Society or Collaboration, Country, Author and Year	**Strengths**	**Limitations**
	activity) was clearly stated. • The literature search appeared to be comprehensive and was supplemented by hand searching. • The eligibility criteria were clear. All study designs were eligible for inclusion as the focus was on adverse effects and it was the goal of the authors to capture real world data, not just clinical trial settings. • 52 studies were included, so there was a large evidence base to draw from. • Stated that the process used conformed to the AGREE Collaboration, although the exact methodology was not always clear.	• The composition of the Expert Panel that formulated the guidelines was unclear. • It was unclear if the guideline recommendations were externally reviewed.
Chronic Pain Disorder; State of Colorado, Division of Worker's Compensation, 2011[17]	• Used a standard process that follows the GRADE methodology. • Clearly states the objective, target population and user of the guidelines. • Very detailed and explicit recommendations for treatment. • Used systematic literature review methods to identify the relevant literature. • Explicitly stated that the studies were too heterogeneous to pool any data. • Assessed the quality of the included studies using the Cochrane Risk of Bias Tool.	• The recommendations in the guideline are not explicitly linked to the evidence.

AGREE – Appraisal of Guidelines for Research and Evaluation; GRADE – Grading of Recommendations Assessment, Development and Evaluation; RCT – Randomized controlled trial; SIGN - Scottish Intercollegiate Guidelines Network

Appendix 4: Summary of Recommendations by Source

Table A3: Summary of Recommendations by Source

Guideline Society or Collaboration, Year	Recommendations
Institute for Clinical Systems Improvement, 2016[2]	**Summary Recommendations – Physical Rehabilitation Modalities** **"Exercise should be a component of the treatment for a patient with chronic pain.** **Benefit:** Exercise improves chronic pain symptoms and functional status, and bolsters overall health and sense of wellbeing. **Harm:** There may be potential exacerbation of underlying, or undiagnosed, musculoskeletal injury, cardiovascular or neurologic disease. **Benefit-Harms Assessment:** There is not one particular exercise that is superior, and the optimal frequency has not been demonstrated. The current evidence suggests at least 2-3 exercise sessions per week are necessary for clinical benefit. **Relevant Resources:** *Falla, 2013 (Randomized Control Trial); Cuesta-Vargas, 2011 (Randomized Control Trial); Standaert, 2011 (Systematic Review); Dufour, 2010 (Randomized Control Trial); Hall, 2008 (Systematic Review/Meta- Analysis); Hurwitz, 2008 (Evidence Synthesis); Hayden, 2005 (Systematic Review)* **Passive modalities should be performed only as an adjunct to a concomitant active physical therapy or exercise program**. **Benefit:** Passive physical treatments provide short-term pain relief and potential medium-term benefit. **Harm:** There is minimal risk of harm when applied by trained practitioners. **Benefit-Harms Assessment:** Recommend passive treatments only as a complement to an active therapy or exercise program. **Relevant Resources:** *Vincent, 2013 (Systematic Review); Standaert, 2011 (Systematic Review)* **Extending physical therapy beyond 8-12 weeks for chronic pain patients should be based on objective clinical improvement**. **Benefit:** Physical therapy facilitates rehabilitation and optimizes functional performance in chronic pain patients when used appropriately. **Harm:** There may be additional resources and cost for patients and service providers without evidence of improved outcomes. **Benefit-Harms Assessment:** An active physical therapy program is recommended. Deconditioned pain patients should begin with a graded or progressive physical therapy program to minimize risk of exercise associated injury, and improve patient engagement and compliance. **Relevant Resources:** *Cuesta-Vargas, 2015 (Randomized Control Trial); Cramer, 2013 (Randomized Control Trial); Falla, 2013 (Randomized Control Trial); Standaert, 2011 (Systematic Review); Dundar, 2009 (Randomized Control Trial);Koumantakis, 2005 (Randomized Control Trial); Rainville, 2002 (Observational Study)"p.46* **Detailed Evidence** **"Exercise and Active Physical Therapy** • Exercise as a therapeutic intervention is defined as a structured, repetitive, physical activity aimed to improve or maintain physical fitness *(Caspersen, 1985)*. Clinicians

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	should consider the effectiveness, appropriate dose and potential adverse events when prescribing exercise or physical therapy. A patient-centered approach encourages the patient to be an active participant in the treatment program, which improves clinical outcomes *(Jordan, 2010)*. • Active therapy is defined as strength training and/or conditioning exercise performed by patients under the direction of a licensed practitioner such as a physician, physical therapist or athletic trainer. **Indications/considerations** • All patients with chronic pain should participate in an exercise program to improve function and fitness *(Malmivaara, 2006)*. Formal physical therapy and recreational or self-directed exercise are both beneficial for chronic pain rehabilitation. • Exercise under expert direction of a physical therapist has demonstrable efficacy in the medical literature in improving pain symptoms and functional performance in chronic pain patients *(Falla, 2013; Cuesta- Vargas, 2011; Standaert, 2011; van Middelkoop, 2011; Hall, 2008; Hurwitz, 2008; Malmivaara, 2006; Hayden, 2005)*. • Since most patients with chronic pain are physically deconditioned from inactivity, graded or progressive physical therapy is recommended. This approach is better tolerated in this population, which improves patient participation and compliance. Progressive therapy focuses on motor learning principles where specific muscular contractions are first learned and mastered before moving on to a sequence of muscular movements with increasing load *(Falla, 2013; Jull, 2009; Lindström, 1992)*. • One type of exercise has not been shown to be definitively more effective than another. Studies have shown benefit of flexion exercises, extension exercises, isokinetic intensive machine muscle strengthening, and group aerobic low-impact exercises. Group aerobic exercise and stretching can be as beneficial as structured land-based physical therapy, suggesting this is a reasonable, low-cost alternative for patients *(Mannion, 1999)*. • Appropriate indications for aquatic therapy are gait instability, neuromuscular disease, inflammatory or degenerative joint disease, morbid obesity, or deconditioning secondary to acute/subacute medical illness *(Dundar, 2009)*. Two sessions of aquatic therapy per week is equally efficacious as three sessions per week *(Cuesta-Vargas, 2015)*. • Active physical therapy for chronic spinal pain conditions should show clinical improvement in pain and function within 8-12 weeks of initiation. Typical physical therapy sessions are 30-90 minutes, occurring two to three times per week, often with an additional daily home exercise program of 10 minutes. • If no clinical benefit occurs within this time frame, the appropriateness and efficacy for the prescribed physical therapy should be reconsidered *(Cuesta-Vargas, 2015; Cramer, 2013; Falla, 2013; Standaert, 2011)*. • Geriatric patients can benefit from a physical rehabilitation program. The American Geriatric Society Panel of Exercise and Osteoarthritis encourages light- to moderate-intensity physical activity for both prevention and possibly restoration of health and functional capacity in patients with chronic disease *(American Geriatrics Society Panel on Exercise and Osteoarthritis, 2001)*. **Passive Physical Treatments** Passive therapies are defined as the external application of manual and physical treatments to the patient by a clinician. As part of the Choosing Wisely® campaign, the American Physical Therapy Association recommends that clinicians don't employ passive physical agents except when necessary to facilitate participation in an active treatment program. The definitions and indications for conventional passive physical modalities are detailed below. ***Spinal manipulation therapy*** This is a specific type of manual therapy performed directly on patients by specially trained physicians, chiropractors and physical therapists. It usually involves applying high-velocity

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	low amplitude thrust movements, or slow passive muscle relaxation techniques to increase range of motion and reduce spinal pain. **Indications/considerations** • Manual therapies treating chronic non-specific axial neck pain have been demonstrated, in a systematic review of high-quality RCT's, to have moderate short-term efficacy and minimal long-term efficacy. • Manual therapies included in this review were typical chiropractic or osteopathic technical procedures: manipulation, passive mobilization and myofascial relaxation techniques. There was not one particular manual therapy superior to the others. A key finding was that concurrent exercise therapy improved the efficacy of all manual therapies *(Vincent, 2013)*. • Spinal manipulation therapy for chronic low back pain has similar clinical improvements relative to structured exercise after two months. This was based on a rigorous systematic review, though the evidence for this conclusion is low *(Standaert, 2011)*. • Spinal manipulative therapy has been shown to be effective in the early intervention of low back pain *(Dagenais, 2010; Walker, 2010; Jüni, 2009; Santilli, 2006; Assendelft, 2004)*. ***Massage therapy*** Massage therapy is the manual manipulation of musculoskeletal and connective tissue to improve relaxation and enhance physical rehabilitation. **Indications/considerations:** • Massage therapy has been shown to reduce pain scores for patients with low back pain *(Hsieh, 2006; Cherkin, 2001)*, osteoarthritis of the knee *(Perlman, 2006)*, juvenile rheumatoid arthritis *(Field, 1997)*, chronic neck pain *(Bakar, 2014)* and fibromyalgia *(Brattberg, 1999)*. • Yet to be determined are the optimal number, duration and frequency of sessions for treating pain."p.47 to 48
Towards Optimized Practice, 2015[7] Canada	**Do** **Recommend exercise and therapeutic exercise (Evidence SR)** • "Encourage patient to initiate gentle exercise and to gradually increase the exercise level within his/her pain tolerance. Sophisticated equipment is not necessary. • Other options may include unsupervised walking and group exercise programs, such as those offered by chronic disease management programs. The peer support of group exercise is likely to result in better outcomes, giving patients improved confidence and empowering them to manage with less medical intervention. • When exercise exacerbates the patient's pain, the exercise program should be assessed by a qualified physical therapist or exercise specialist. • If exercise persistently exacerbates their pain, patients should be further assessed by a physician to determine if further investigation, medication, treatment, or consultation is required. *Some studies reported mild negative reactions to exercise programs, such as increased low back pain and muscle soreness in some patients." P.12* **Recommend therapeutic aquatic exercise for chronic low back pain (Evidence SR) p. 12** **Yoga (Evidence SR)** • "There is some evidence that Viniyoga and Iyengar types of yoga can be helpful in the treatment of chronic low back pain. • No evidence was found to recommend other types of yoga

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	• *It is important to find an instructor who has experience in working with individuals who have low back pain to avoid further injury"p.12* **Manual Therapy – Massage Therapy (Evidence SR)** • "Recommend massage therapy as an adjunct to a broader active rehabilitation program."p.13 **Acupuncture (Evidence SR)** • "Recommend acupuncture as a short-term therapy or as an adjunct to a broader active rehabilitation program. • No serious adverse events were reported in the clinical trials. The incidence of minor adverse events was 5%." P.13 **Do not know** **Manual Therapy – Spinal Manipulative Treatment (Evidence SR)** • "There is inconclusive evidence to recommend for or against spinal manipulative treatment for chronic low back pain." p.17 **Manual Therapy – Spinal Mobilization (Evidence SR)** • "There is inconclusive evidence to recommend for or against spinal mobilization for chronic low back pain." p.17
Low Back Pain; State of Colorado, Division of Worker's Compensation, 2014[4]	**Manual Therapy – Manipulation/Mobilization** "There is some evidence that manual therapy, followed by active exercises, may be effective for the reduction of disability from nonspecific low back pain lasting more than 12 weeks. There is good evidence that spinal manipulative therapy (SMT) is comparable to exercise, standard medical care, and physiotherapy in reducing chronic low back pain, and good evidence that that SMT does not provide a clinically important superior pain relief over these interventions." p.87 "For subacute/chronic pain, there is some evidence that manipulation/mobilization, including thrust techniques, may provide additional benefits on pain and function when used to supplement an individually tailored exercise program. There is good evidence that two sessions of thrust manipulation of the thoracolumbar spine followed by an exercise regimen leads to better low back function at six months than oscillatory non-thrust manipulation in patients with subacute low back pain."p.89 **Acupuncture** "There is good evidence that acupuncture, true or sham, is superior to usual care for the reduction of disability and pain in patients with chronic nonspecific low back pain, and that true and sham acupuncture are likely to be equally effective."p.40 Acupuncture is recommended for subacute or chronic pain patients who are trying to increase function and/or decrease medication usage and have an expressed interest in this modality. Credentialed practitioners with experience in evaluation and treatment of chronic pain patients must perform acupuncture evaluations. • Time to Produce Effect: 3 to 6 treatments. • Frequency: 1 to 3 times per week.

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	• Optimum Duration: 1 to 2 months. • Maximum Duration: 15 treatments. Any of the above acupuncture treatments may extend longer if objective functional gains can be documented and when symptomatic benefits facilitate progression in the patient's treatment program. Treatment beyond 15 treatments must be documented with respect to need and the ability to facilitate positive symptomatic and functional gains. Such care should be re-evaluated and documented with each series of treatments. All treatments should be accompanied by active therapy." P. 40 to 41
Canadian Chiropractic Association and the Federation Clinical Practice Guidelines Project, 2013[12]	**Exercise—Chronic Neck Pain.** • "Regular home stretching (3-5 times per week) with advice/training is recommended in the treatment of chronic neck pain for long and short-term benefits in reducing pain and analgesic intake (grade of recommendation—strong). • This recommendation is based on 3 low-risk-of-bias studies. • Home strengthening and endurance exercises with advice/ training/supervision are recommended for both short- and long-term benefits (neck pain, cROM) in the treatment of chronic neck pain (grade of recommendation—strong). • This recommendation is based on 4 low-risk-of-bias studies. • One additional study with a limiting factor supported this recommendation. • In all 5 studies, regular home exercises were performed daily to 3 times per week. • Two additional low risk citations with limiting factors found exercises of no benefit. Despite the conflicting results, this recommendation was graded strong owing to the 4 low-risk-of-bias studies."p.47 **Manipulation—Chronic Neck Pain.** • "Spinal manipulative therapy is recommended in the treatment of chronic neck pain for short- and long-term benefit (pain, disability; grade of recommendation—weak). • This recommendation is based on 1 low-risk-of-bias study with a limiting factor that used 2 treatments per week for 9 weeks." p.46 **Manipulation/Multimodal—Chronic Neck Pain.** • "Spinal manipulative therapy is recommended in the treatment of chronic neck pain as part of a multimodal approach (including advice, upper thoracic high velocity low amplitude thrust, low level laser therapy, soft tissue therapy, mobilizations, pulsed short wave diathermy, exercise, massage, and stretching) for both short- and long-term benefit (pain, disability, cROMs; grade of recommendation—strong). • This recommendation was graded strong owing to 2 low-risk-of-bias studies. • This recommendation is also supported by 5 low-risk-of bias studies with limiting factors that used a number of treatments over several weeks, in addition to assessing the impact of a single treatment over the short term."p.46 **Mobilization—Chronic Neck Pain.** • "Mobilization is recommended for the treatment of chronic neck pain for short-term (immediate) benefit (pain, cROM; grade of recommendation —moderate). • This recommendation is based on 3 low-risk of- bias studies with limiting factors."p.47 **Manual Therapy/Multimodal—Chronic Neck Pain.** • "Manual therapy is recommended in the treatment of chronic neck pain for the short- and long-term benefit (pain, disability, cROM, strength) in combination with advice, stretching, and exercise (grade of recommendation—strong). • This recommendation is based on 2 low-risk-of-bias studies.

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	• This recommendation is also supported by 2 low-risk-of bias studies with limiting factors."p.47 **Thoracic Manipulation—Chronic Neck Pain.** • Based on inconsistent findings from 3 low-risk-of-bias studies, there is insufficient evidence that supports a recommendation for the use of thoracic manipulation for the treatment of chronic neck pain.p.52 **Massage/Multimodal—Chronic Neck Pain.** • "Massage is recommended for the treatment of chronic neck pains for short-term (up to 1 month) benefit (pain, disability, and cROM) when provided in combination with self-care, stretching, and/or exercise (grade of recommendation — moderate). • This recommendation is based on 1 low-risk-of bias study and 1 low-risk-of-bias study with a limiting factor. In both studies, 5 to 10 upper body/neck massage sessions lasting 1 hour to 75 minutes were provided." p.47
Multidisciplinary Collaboration including the British Pain Society and British Geriatrics Society, 2013[13]	**Exercise** • "Increasing activity by way of exercise should be considered. • Exercise should involve strengthening, flexibility, endurance and balance. • The preference of the person for the type of exercise should be given serious consideration. • Motivation and barriers to exercise and activity should be discussed and planned for. • Exercise should be customised to the individual capacity and needs of the person. • Maintenance of productive activity and/or exercise should be facilitated."p.i22 **Acupuncture, Massage** "There is limited evidence to support the use of complementary therapies with older adults. What evidence does exist is generally weak and based upon small-scale studies without proper use of controls or randomisation procedures." p.i23 *No link to grading of evidence provided. No strength of recommendation was made in the guidelines.
SIGN, 2013 (Scottish Intercollegiate Guidelines Network)[5]	**Exercise** "Exercise and exercise therapies, regardless of their form, are recommended in the management of patients with chronic pain.(Grade B) p.5 Advice to stay active should be given in addition to exercise therapy for patients with chronic low back pain to improve disability in the long term. Advice alone is insufficient.(Grade A)" p.5 The following approaches should be used to improve adherence to exercise: • supervised exercise sessions (Grade B) • individualised exercises in group settings (Grade B) • addition of supplementary material (Grade C) • provision of a combined group and home exercise programme. (Grade B) p.28 **Manual Therapy (Manipulation and Mobilization)** Manual therapy should be considered for short term relief of pain for patients with chronic low back pain.(Grade B) p.25 Manual therapy, in combination with exercise, should be considered for the treatment of

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	patients with chronic neck pain.(Grade B) p.25 **Acupuncture** Acupuncture should be considered for short term relief of pain in patients with chronic low back pain or osteoarthritis.(Grade A) p.29
Orthopaedic Section of the American Physical Therapy Association, 2012[14]	**Manual Therapy** "Thrust manipulative and non-thrust mobilization procedures can also be used to improve spine and hip mobility and reduce pain and disability in patients with subacute and chronic low back and back-related lower extremity pain. (Recommendation based on strong evidence.)" p.3 -4 **Interventions – Trunk Coordination, Strengthening, and Endurance Exercises** "Clinicians should consider utilizing trunk coordination, strengthening, and endurance exercises to reduce low back pain and disability in patients with subacute and chronic low back pain with movement coordination impairments and in patients post lumbar microdiscectomy. (Recommendation based on strong evidence.)"p.4 **Interventions – Flexion Exercises** "Clinicians can consider flexion exercises, combined with other interventions such as manual therapy, strengthening exercises, nerve mobilization procedures, and progressive walking for reducing pain and disability in older patients with chronic low back pain with radiating pain. (Recommendation based on weak evidence.)" p.4 **Interventions – Lower Quarter Nerve Mobilization Procedures** "Clinicians should consider utilizing lower quarter nerve mobilization procedures to reduce pain and disability in patients with subacute and chronic low back pain and radiating pain. (Recommendation based on weak evidence.)"p.4 **Interventions – Progressive Endurance Exercise and Fitness Activities** "Clinicians should consider 1) moderate to high intensity exercise for patients with chronic low back pain without generalized pain, and 2) incorporating progressive, low intensity, sub-maximal fitness and endurance activities into the pain management and health promotion strategies for patients with chronic low back pain with generalized pain. (Recommendation based on strong evidence)." p.5
Ottawa Panel, 2012[9]	**Massage Therapy** "The Ottawa Panel CPGs recommends massage therapy as an effective intervention to reduce sub-acute and chronic LBP symptoms and decrease disability at immediate post treatment and short term relief when combined with therapeutic exercise and education. Further research is needed to examine the effects of dosage and technique. Replication of long term effects would allow for greater confidence in this treatment."p444
Ottawa Panel, 2012[15]	**Massage Therapy** "The Ottawa Panel CPGs recommends therapeutic massage as an effective intervention that may provide an immediate post-treatment reduction in symptoms related to sub-acute and chronic mechanical neck disorders. However, the long-term effects of therapeutic massage are still unclear due to contradicting data, lack of follow up data and a limited number of high quality studies. Future research is needed to examine the role of therapeutic massage as part of a comprehensive, multidisciplinary approach and its long-term effects."p.316
Chillibeck 2011[10]	**Exercise** Recommendation 2 "Persons with nonspecific chronic low back pain, without serious pathology (i.e., previous back surgery, spondylolysis, spondylolisthesis, neurological symptoms, inflammatory and infectious conditions, or spinal fractures), can safely perform a variety of PAs that are

Table A3: Summary of Recommendations by Source	
Guideline Society or Collaboration, Year	**Recommendations**
	progressive in nature. However, they should initially avoid high-impact PA, heavy resistance training, or extreme trunk flexion, extension, or rotation in a direction that induces pain (Level 2, Grade B).”p.S67 Recommendation 7 “Pregnant women with low back pain can safely perform aquatic exercise (i.e., water aerobics), low-impact aerobics, and pelvic muscle exercises (Level 2, Grade A).” p.S71
State of Colorado, Division of Worker’s Compensation, 2011[17]	**Active Therapy** (Supervised Physical Therapies)** “Active therapy requires an internal effort by the individual to complete a specific exercise or task. This form of therapy requires supervision from a therapist or medical provider such as verbal, visual, and/or tactile instruction(s). Active therapy is intended to promote independence and self-reliance in managing the physical pain as well as to improve the functional status in regard to the specific diagnosis and general conditioning and wellbeing. At times, a provider may help stabilize the patient or guide the movement pattern but the energy required to complete the task is predominately executed by the patient. Therapy in this section should not be merely a repeat of previous therapy but should focus specifically on the individual goals and abilities of the patient with chronic pain. The goal of active therapy is to teach the patient exercises that they can perform regularly on their own. Patients should be instructed to continue active therapies at home as an extension of the treatment process in order to maintain improvement levels.” P.91 ***“Aquatic Therapy:*** is a well-accepted treatment which consists of the therapeutic use of aquatic immersion for therapeutic exercise to promote strengthening, core stabilization, endurance, range-of-motion, flexibility, body mechanics, and pain management. The pool should be large enough to allow full extremity range-of-motion and fully erect posture. Aquatic vests, belts and other devices can be used to provide stability, balance, buoyancy, and resistance. • Time to Produce Effect: 4 to 5 treatments. • Frequency: 3 to 5 times per week. • Optimum Duration: 4 to 6 weeks. • Maximum Duration: 6 weeks. A self-directed program is recommended after the supervised aquatics program has been established, or, alternatively a transition to a self-directed dry environment exercise program.”p.91 to 92 ***“Functional Activities:*** are well-established interventions which involve the use of therapeutic activity to enhance mobility, body mechanics, employability, coordination, and sensorymotor integration. • Time to Produce Effect: 4 to 5 treatments. • Frequency: 3 to 5 times per week. • Optimum Duration: 4 to 6 weeks. • Maximum Duration: 6 weeks.”p.93 ***“Spinal Stabilization:*** is a generally well-accepted treatment. The goal of this therapeutic program is to strengthen the spine in its neural and anatomic position. The stabilization is dynamic which allows whole body movements while maintaining a stabilized spine. It is the ability to move and function normally through postures and activities without creating undue vertebral stress. • Time to Produce Effect: 4 to 8 treatments. • Frequency: 3 to 5 times per week. • Optimum Duration: 4 to 8 weeks. • Maximum Duration: 8 weeks.”p.93

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	"Neuromuscular Re-education: is a generally accepted treatment. It is the skilled application of exercise with manual, mechanical, or electrical facilitation to enhance strength; movement patterns, neuromuscular response, proprioception, kinesthetic sense, coordination; education of movement, balance and posture. Indications include the need to promote neuromuscular responses through carefully timed proprioceptive stimuli, to elicit and improve motor activity in patterns similar to normal neurologically developed sequences, and improve neuromotor response with independent control. • Time to Produce Effect: 2 to 6 treatments. • Frequency: 3 times per week. • Optimum Duration: 4 to 8 weeks. • Maximum Duration: 8 weeks."p.94 **'Therapeutic Exercise:** with or without mechanical assistance or resistance, may include isoinertial, isotonic, isometric and isokinetic types of exercises. Indications include the need for cardiovascular fitness, reduced edema, improved muscle strength; improved connective tissue strength and integrity, increased bone density, promotion of circulation to enhance soft tissue healing, improvement of muscle recruitment, improved proprioception, and coordination, and increased range of motion are used to promote normal movement patterns. May also include alternative/complementary exercise movement therapy (with oversight of a physician or appropriate healthcare professional)."p.94 to 95 • There is some evidence that Iyengar yoga, which avoids back bending, results in improved function and decreased chronic mechanical low back pain for up to 6 months. • One quarter of the participants dropped out. • Instruction occurred 2 times per week for 24 weeks and was coupled with home exercise. Yoga may be an option for motivated patients. 48 sessions is the maximum expected duration and time to effect is 8."p.94 **Manipulation** "Manipulation: Manipulative Treatment (not therapy) is defined as the therapeutic application of manually guided forces by an operator to improve physiologic function and/or support homeostasis that has been altered by the injury or occupational disease, and has associated clinical significance. • There is good evidence that a combination of exercise and spinal manipulation is more effective than manipulation alone in relieving chronic neck pain, and that these advantages remain for more than one year after the end of treatment. • Conversely, there is some evidence that a combination of spinal manipulation and exercise is more effective than exercise alone in reducing pain and improving function of low back pain for one year. • There is good evidence that spinal manipulation has a small superiority to other common interventions (standard medical care, physiotherapy, and exercise alone) for chronic low back pain, making it comparable to other commonly accepted interventions for this indication. • The decision to refer a patient for spinal manipulation rather than for other treatments should be made on the basis of patient preference and relative safety, not on an expectation of a greater treatment effect. • Manipulation may be indicated in patients who have not had an evaluation for manual medicine, or have not progressed adequately in an exercise program. • Manipulative treatments may be applied by osteopathic physicians, chiropractors, properly trained physical therapists, properly trained occupational therapists, or properly trained medical doctors. • Some popular and useful techniques include, but are not limited to, high velocity, low amplitude (HVLA), muscle energy, strain-counterstrain, a balanced

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	ligamentous tension and myofascial release. • Under these different types of manipulation exist many subsets of different techniques that can be described as a) direct- a forceful engagement of a restrictive/pathologic barrier, b) indirect- a gentle/non-forceful disengagement of a restrictive/pathologic barrier, c) the patient actively assists in the treatment and d) the patient relaxing, allowing the practitioner to move and balance the body tissues. • When the proper diagnosis is made and coupled with the appropriate technique, manipulation has no contraindications and can be applied to all tissues of the body, including muscles, tendons, ligaments, joints, fascia and viscera. Pre-treatment assessment should be performed as part of each manipulative treatment visit to ensure that the correct diagnosis and correct treatment is employed. • Contraindications to HVLA manipulation include joint instability, fractures, severe osteoporosis, infection, metastatic cancer, active inflammatory arthritides, aortic aneurysm, and signs of progressive neurologic deficits. • Time to Produce Effect: 4 to 6 treatments. • Frequency: 1 to 2 times per week for the first 2 weeks as indicated by the severity of the condition. • Treatment may continue at 1 treatment per week for the next 6 weeks. • Optimum Duration: 8 weeks. • Maximum Duration: 8 weeks. • At week 8, patients should be reevaluated. • Care beyond 8 weeks may be indicated for certain chronic pain patients in whom manipulation is helpful in improving function, decreasing pain and improving quality of life. • In these cases, treatment may be continued at one treatment every other week until the patient has reached MMI and maintenance treatments have been determined. Extended durations of care beyond what is considered "maximum" may be necessary in cases of re-injury, interrupted continuity of care, exacerbation of symptoms, and in those patients with comorbidities. Such care should be re-evaluated and documented on a monthly basis. **Mobilization (Soft Tissue):** Is a generally well-accepted treatment. Mobilization of soft tissue is the skilled application of muscle energy, strain/counter strain, myofascial release, manual trigger point release, and manual therapy techniques designed to improve or normalize movement patterns through the reduction of soft tissue pain and restrictions. These can be interactive with the patient participating or can be with the patient relaxing and letting the practitioner move the body tissues. • Indications include muscle spasm around a joint, trigger points, adhesions, and neural compression. Mobilization should be accompanied by active therapy. • Time to Produce Effect: 4 to 9 treatments. • Frequency: Up to 3 times per week. • Optimum Duration: 4 to 6 weeks. • Maximum Duration: 6 weeks."p.96 to 98 **"Acupuncture** • Acupuncture is recommended for chronic pain patients who are trying to increase function and/or decrease medication usage and have an expressed interest in this modality. • Credentialed practitioners with experience in evaluation and treatment of chronic pain patients must perform acupuncture evaluations. • Indications include joint pain, joint stiffness, soft tissue pain and inflammation,

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	paresthesia, post-surgical pain relief, muscle spasm, and scar tissue pain. **Acupuncture with Electrical Stimulation:** • It is indicated to treat chronic pain conditions, radiating pain along a nerve pathway, muscle spasm, inflammation, scar tissue pain, and pain located in multiple sites. • There is some evidence that a combination of electrical acustimulation to the wrist combined with neck stretching and strengthening exercises for 30 minutes two times per week for a period of about 4 weeks demonstrates more improvement in chronic neck pain and patient self-confidence in performing functional activities than neck exercises alone for up to one month. • Time to Produce Effect: 3 to 6 treatments. • Frequency: 1 to 3 times per week. • Optimum Duration: 1 to 2 months. • Maximum Duration: 15 treatments."p35 to 36

* Mechanical/compressive pain refers to tumors or cysts that may compress pain sensitive structures. Dislocations, instabilities, fractures, etc., may also cause a strain on pain sensitive structures.
** Active therapy requires an internal effort by the individual to complete a specific exercise or task.
CPG: Clinical practice guideline; cROM: Cervical range of motion; HVLA: high-velocity, low-amplitude; LBP: Lower back pain; MMI: Maximum medical improvement; PA: Physical activity; RCT – Randomized controlled trial; SR: Systematic review; SMT: spinal manipulative therapy;