

1	Clinical Practice Guideline:	Spinal Manipulative Therapy (SMT) for
2		Musculoskeletal and Related Disorders
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Related Policies:
 CPG 87: Non-Motorized Flexion Distraction Technique
 CPG 119 Spinal Manipulative Therapy for Non-Musculoskeletal and Related Disorders
 CPG 120: Spinal Manipulative Therapy for Treatment of Children
 CPG 121: Passive Physiotherapy Modalities
 CPG 132: Spinal Manipulative Therapy for Treatment of Children with Non-Musculoskeletal and Related Disorders
 CPG 135: Physical Therapy Medical Policy/Guideline
 CPG 155: Occupational Therapy Medical Policy/Guideline
 CPG 175: Extra-Spinal Manipulation/Mobilization for the Treatment of Upper Extremity Musculoskeletal Conditions
 CPG 177: Extra-Spinal Manipulation / Mobilization for the Treatment of Lower Extremity Musculoskeletal Conditions

21 **Table of Contents**

22 GUIDELINES 2

23 EVIDENCE REVIEW 4

24 Low Back Pain 4

25 Neck Pain23

26 Thoracic Spine Pain.....33

27 Chronic Headache33

28 SAFETY40

29 PRACTITIONER SCOPE AND TRAINING42

30 *References*43

31

1 **GUIDELINES**

2 I. American Specialty Health – Specialty (ASH) considers Spinal Manipulation (or
3 Grade V Mobilization) to be medically necessary when **both of the following** criteria
4 are met:

- 5
- 6 • There is adequate documentation that the member has a symptomatic (acute,
7 subacute, or chronic; with or without radicular components) Musculoskeletal or
8 Related Disorder attributable to a mechanical, structural, or functional disorder
9 of the sacroiliac, lumbosacral; lumbar, thoracic and/or cervical spine or
10 headache disorders including tension-type headache and migraine headache;
11 **and**
 - 12 • There is an absence of contraindications to manipulation/mobilization or
13 diagnostic red flags suggesting a possible organic disorder (e.g., tumor,
14 infection, fracture).
- 15

16 For the purposes of this policy, Musculoskeletal and Related Disorders are defined as
17 conditions with signs and symptoms related to the nervous, muscular, and/or skeletal
18 systems. Musculoskeletal or Related Disorders are conditions typically categorized as:
19 structural, degenerative, or inflammatory disorders; or biomechanical dysfunction of the
20 joints of the body and/or related components of the muscle or skeletal systems (muscles,
21 tendons, fascia, nerves, ligaments/capsules, discs, and synovial structures) and related
22 manifestations or conditions.

23

24 Such spinal disorders may be acute, sub-acute, or chronic and may or may not include
25 radicular components.

26

27 Signs and symptoms of a musculoskeletal or related disorder may include:

- 28 • Pain/tenderness;
 - 29 • Stiffness and/or limited motion;
 - 30 • Tone or texture changes in the adjacent muscles and soft tissues including muscle
31 tightness or weakness;
 - 32 • Asymmetry or malalignment between adjacent spinal segments;
 - 33 • Headache disorders (including tension-type headache and migraine headache); and
 - 34 • Numbness/tingling or other paresthesia, weakness, loss of deep tendon reflexes, or
35 other signs of nerve or nerve root compression or irritation.
- 36

37 Note: The population of eligible members for spinal manipulation includes all ages, co-
38 morbid conditions, and other demographic variables as long as the documentation
39 establishes a valid diagnosis and symptomatic status and satisfies the above criteria.

1 II. Spinal manipulation is considered **not** medically necessary when:

- 2 • The above criteria are not met; or
 3 • The patient has become asymptomatic; or
 4 • There is no progress toward the resolution of symptoms within a reasonable and
 5 predictable period of time; or
 6 • Maximum therapeutic benefit has been achieved, and chiropractic supportive care
 7 is not indicated; or
 8 • The primary aim is to prevent future episodes.

9
 10 III. Spinal manipulation is considered **not** medical necessary for the treatment of conditions
 11 not directly related to the spine including, but not limited to:

- 12 • Asthma
 13 • Infantile colic
 14 • Irritable bowel syndrome
 15 • Dysmenorrhea

16
 17 See the *Spinal Manipulative Therapy for Non-Musculoskeletal Conditions and Related*
 18 *Disorders (CPG 119 – S)* clinical practice guideline for more specific information.

19
 20 ASH considers the use of manual devices (i.e., those that are hand-held with the thrust of
 21 the force of the device being controlled manually) by chiropractors in performing manual
 22 manipulation of the spine or the extremities as a reasonable alternative to high velocity,
 23 low amplitude manipulation when the medical necessity criteria above is met. Use of these
 24 devices may also be considered a possible alternative when high velocity low amplitude
 25 manipulation may be contraindicated.

26
 27 ASH does not support the use of any examination and/or diagnostic method associated with
 28 manual devices. Moreover, ASH does not support claims of benefit(s) associated with
 29 instrument assisted methods of assessment. CPT® coding does not change with the use of
 30 these devices.

1 **CPT® Codes and Descriptions**

CPT® Code	CPT® Code Description
98940	Chiropractic manipulative treatment (CMT); spinal 1-2 regions
98941	Chiropractic manipulative treatment (CMT); spinal 3-4 regions
98942	Chiropractic manipulative treatment (CMT); spinal 5 regions
98925	Osteopathic manipulative treatment (OMT); 1-2 body regions involved
98926	Osteopathic manipulative treatment (OMT); 3-4 body regions involved
98927	Osteopathic manipulative treatment (OMT); 5-6 body regions involved
98928	Osteopathic manipulative treatment (OMT); 7-8 body regions involved
98929	Osteopathic manipulative treatment (OMT); 9-10 body regions involved
97140	Manual therapy techniques (e.g., mobilization/manipulation, manual lymphatic drainage, manual traction), 1 or more regions, each 15 minutes

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EVIDENCE REVIEW

4

Low Back Pain

5

The body of literature relevant to the subject of this clinical policy is quite extensive at this point. There are more than 150 randomized clinical trials that investigate the effectiveness of spinal manipulation for back pain and related disorders. This volume of studies has also resulted in a set of systematic reviews and meta-analyses on the topic. It is these reviews that constitute the primary source of information for this clinical policy guideline. In addition, recent individual clinical trials that have not been included in the systematic reviews will be reviewed.

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Rubinstein et al. performed a systematic review of the effectiveness of spinal manipulative therapy (SMT) for chronic low back pain first in 2011. The authors defined chronic low back pain as pain lasting longer than 12 weeks and SMT as any ‘hands on’ treatment, including both spinal manipulation and mobilization. A total of 26 randomized controlled

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1 trials were included in this review, 9 of which were considered as having a low risk of bias.
2 Studies were included if they were designed to examine the unique contribution of SMT
3 alone. Comparison therapies were grouped as inert interventions, sham SMT, all other
4 interventions, and SMT in addition to any intervention versus that intervention alone.
5 Primary outcomes included pain from a self-reported scale (Visual Analogue Scale [VAS]
6 or Numerical Rating Scale [NRS]), functional status reported on a back pain specific scale
7 (Roland-Morris Disability Questionnaire or Oswestry Disability Index), and global
8 improvement (number of patients reported to be recovered or nearly recovered). The
9 primary technique used was a high-velocity low-amplitude SMT thrust, followed by
10 Maitland mobilization, flexion-distraction mobilization, unspecified mobilization, and
11 unspecified technique. About 1/3 of the studies reported on adverse events, which were
12 limited to muscle soreness, stiffness, and/or other transient increase in pain. Professions
13 included in these studies were bonesetters, chiropractors, and manual/physical therapists.
14 Combinations of these professions were also included. There is high quality evidence that
15 SMT has a statistically significant effect on short-term pain and functional status, but the
16 effect size is small and clinically insignificant. Therefore, SMT is neither superior nor
17 inferior to other low back pain treatments. The authors discuss several possibilities for their
18 results, including how well investigators were able to successfully blind their participants
19 from knowing if they had the sham treatment. Another discussion item was that the patients
20 all had non-specific low back pain, which may be too broad of a category to consider for
21 treatment comparisons. The authors suggest future studies of SMT examine cost-
22 effectiveness. If SMT is as effective as other treatments and has demonstrated its safety as
23 a treatment it makes sense to utilize SMT more often if shown to be a cost-effective form
24 of treatment.

25
26 To look at the effectiveness of spinal manipulation in a more pragmatic setting, in 2011
27 Walker et al. examined 12 randomized controlled studies that combined chiropractic, or
28 spinal manipulation (SM), with additional therapies. Objectives evaluated included pain,
29 disability, back-related function, overall improvement, and patient satisfaction. Studies that
30 were included had a defined region of low back pain and specified duration as acute (less
31 than 6 weeks), subacute (6 to 12 weeks), or chronic (12 weeks or more). Interventions
32 included combinations of therapies such as SM and massage, thermotherapies,
33 electrotherapies, mechanical devices, exercise programs, nutritional advice, orthotics,
34 lifestyle modification, and patient education. The authors evaluated the evidence of the
35 studies with the GRADE approach and assessed the risk of bias based on those results.
36 Only 3 of the 12 studies were classified as having a low risk of bias. Using the VAS,
37 Oswestry Disability Index and the Roland Morris Disability Questionnaire as outcome
38 measures, none of the studies provided a clinically significant difference for combined
39 chiropractic interventions. Individuals with acute and subacute low back pain did
40 experience pain relief after combined chiropractic, rather than spinal manipulation alone.
41 Although this was statistically significant, the effect sizes were small and not considered
42 clinically significant. The authors' suggestions for future research include careful planning

1 and reporting of studies to reduce bias as well as examination of frequency or dosing effect
2 of treatment visits. In 2012, Goertz et al. performed a systematic review that included 38
3 articles examining the effectiveness of high-velocity, low-amplitude (HVLA) spinal
4 manipulation for the treatment of low back pain. The authors reviewed randomized
5 controlled trials that focused on patient-centered outcomes of pain and functional health
6 status. The most commonly used pain ratings were the VAS and NRS, while the most
7 commonly used functional health status tools were the Roland Morris Disability
8 Questionnaire (RMDQ) and the Oswestry Low Back Pain Disability Index (OSW). While
9 the authors agreed with previous studies that there is moderate evidence that spinal
10 manipulation is an effective treatment option for both acute and chronic low back pain,
11 they also share concerns that there is high variation in the quality of studies as well as high
12 variation in reported outcomes. The authors concluded that the variation is most likely due
13 to a combination of heterogeneity of low back pain patients, variations in the spinal
14 manipulation itself, and inadequate reporting of trial methodology. Finally, to aid in the
15 ability to adequately compare spinal manipulation trials, the authors recommend adoption
16 of standards for classification of low back pain, reporting of patient outcome data, and
17 content of randomized controlled trials.

18
19 A meta-analysis of efficacy, cost-effectiveness, and safety of complementary and
20 alternative medicine (CAM) therapies such as acupuncture, manipulation, mobilization,
21 and massage for neck and low back pain in adults was conducted in 2012 by Furlan et al.
22 Studies were included if they reported efficacy and/or economic data of CAM therapies in
23 comparison with no treatment, placebo, or other active treatments in adults with low back,
24 neck, or thoracic pain. Pain intensity and disability were the primary patient outcomes of
25 interest for efficacy and for cost-effectiveness analysis, data was extracted related to costs
26 to the health care sector, production loss, costs in other sectors, patient and family costs,
27 and total costs. In total, 147 studies were included in this meta-analysis; of the studies that
28 examined low back pain 13 analyzed manipulation, 13 analyzed mobilization, 5 analyzed
29 manipulation and mobilization, and 7 analyzed economic impact. In participants with
30 acute/subacute and mixed duration nonspecific low back pain, manipulation was
31 significantly more effective than placebo or no treatment in reducing pain intensity
32 immediately after treatment. In participants with chronic nonspecific low back pain,
33 manipulation was significantly more effective than placebo in reducing pain intensity
34 (VAS score) immediately after treatment. Manipulation was significantly better or no
35 different than pain medication in improving pain intensity but did not differ from pain
36 medication in reducing pain intensity at follow up after treatment. Participants with
37 acute/subacute and chronic nonspecific low back pain who received mobilization
38 experienced significantly improved pain intensity (VAS score) compared to subjects not
39 receiving any treatment. Results regarding participant-reported disability (RMDQ, OSW)
40 were inconsistent, showing either a significant difference favoring mobilization or showing
41 no difference between mobilization and no treatment. Participants with acute/subacute
42 nonspecific low back pain receiving manipulation plus mobilization were not significantly

1 better than those who received a double placebo (sham manipulation and placebo
2 analgesic). Manipulation plus mobilization was significantly better in reducing pain than
3 physiotherapy (e.g., exercise, massage, heat, electrotherapy, ultrasound) in participants
4 with mixed duration low back pain. However, there was no difference between
5 manipulation plus mobilization and usual care (analgesics, muscle relaxants, instruction in
6 proper back care, life-style recommendations, and exercise) in participants with mixed
7 duration of nonspecific low back pain. Unfortunately, due to the small number of studies
8 reporting on economic impact, inconsistencies in methods reported and differences in
9 health care calculations by country, the authors were unable to draw conclusions regarding
10 cost effectiveness. The authors also noted the evidence is inconclusive for treatment of low
11 back pain as the majority of the studies cited were of low quality and recommend a
12 concerted effort to improve study quality in future reporting of CAM studies for
13 musculoskeletal conditions.

14
15 Osteopathic approaches to the effectiveness of manipulation for low back pain were
16 investigated by Orrock and Myers in 2013. Articles were searched for spinal manipulative
17 therapy as well as osteopathic manipulative therapy but were only included in the review
18 if they included a form of osteopathy. The authors chose to focus their review on
19 osteopathic manual interventions performed by osteopathic clinicians in chronic, non-
20 specific lower back pain in adults. Articles were also evaluated for risk of bias based on
21 the Systematic Review Guidelines of the Cochrane Back Review Group. The authors
22 searched many databases but only found 2 articles that met the inclusion criteria and had a
23 low risk of bias. One of the studies concluded the osteopathic intervention was similar in
24 effect to a sham intervention while the other study suggested osteopathic intervention was
25 similar to that of exercise and physiotherapy. The authors note that although both studies
26 had a low risk of bias neither the participants nor the clinicians in the studies were blinded.
27 The authors felt this could influence the study outcomes. Therefore, the authors conclude
28 that more research is needed, ideally with appropriate controls and use of interventions that
29 reflect actual practice, before determining if osteopathic manipulation is effective in
30 treatment of chronic low back pain in adults.

31
32 In 2014, Merepeza examined the effectiveness of spinal manipulation versus prescribed
33 exercises for chronic low back pain. Studies included in the review were those with
34 participants with low back pain of over 12 weeks duration, spinal manipulation performed
35 by a health care provider, exercises prescribed by a health care provider, and a measurable
36 outcome for reducing pain, disability, or improving function. Studies were excluded if
37 participants were diagnosed with spinal stenosis, spondylolisthesis (2nd degree or more),
38 lumbar scoliosis (>20° or more), previous vertebral fractures, systemic causes of chronic
39 low back pain (rheumatoid arthritis), or psychiatric or cognitive co-morbidities. Three
40 studies were found that met the author's inclusion criteria and were evaluated for risk of
41 bias with the PEDro scale. While all 3 studies had a fairly low risk of bias, none of the
42 studies blinded the subjects and the administrators of the treatment therapy. Another bias

1 present in all 3 studies is that the outcomes were self-reported in a subjective manner. One
2 study showed spinal manipulation was more effective than individual physiotherapy for
3 pain reduction and improved function. A different study found that spinal manipulation
4 therapy and motor control exercise were better at reducing pain and disability than general
5 exercise in the short term but not in the long term. Finally, another study found that spinal
6 stabilization exercises were more effective than manual therapy in reducing pain intensity
7 and disability and dysfunction. Merezpeza (2014) concludes that first, chronic low back pain
8 may itself pose a challenge to study because of the heterogeneity of the condition. Second,
9 the author acknowledges that there are many components to exercise and manual therapy
10 as treatments and more evidence is needed to determine what is considered an effective
11 treatment.

12
13 Hidalgo et al. (2014) performed a systematic review focused specifically on different
14 manual therapies for different stages of low back pain. Randomized controlled trials were
15 included only if they had a low risk of bias, appropriate randomization methods,
16 appropriate blinding, and low back pain was treated with manual therapy. The authors used
17 a combination of duration and location of symptoms to specify the population included;
18 participants were classified as having duration of acute-subacute (0-12 weeks) or chronic
19 (>12 weeks). Participants were also categorized as having low back pain defined by the
20 Quebec-Taskforce regarding presence and location of leg pain, with or without
21 neurological deficit. Participants with nerve root pain with neurologic deficit were not
22 included. Manual therapy techniques were categorized into 3 types; high-velocity, low-
23 amplitude thrust with cavitation, mobilization and soft tissue techniques, or a combination.
24 Control groups received no treatment, placebo, usual medical care, or exercise. The authors
25 found 11 studies that met their inclusion criteria that had not previously been reported; 5
26 were of high level of evidence and 6 were of moderate quality of evidence. In contrast with
27 what other systematic reviews have reported, the authors concluded that there is moderate
28 to strong evidence for the benefits of high-velocity, low-amplitude manual therapy in
29 comparison to sham manual therapy for pain relief, functional improvement, and overall
30 health for short term follow up for all durations of low back pain. The authors also
31 concluded that there was moderate evidence to support high-velocity, low-amplitude
32 manual therapy and combination manual therapy with usual medical care in comparison to
33 usual medical care alone for pain, function, and overall quality of life. Additionally, for
34 chronic low back pain, the authors found moderate evidence in support of combination
35 manual therapy with exercises or usual medical care compared to usual medical care alone
36 for pain and function. The authors recommended future research focused on pragmatic,
37 high quality randomized controlled trials, specific types of manual therapy classification,
38 and classification of participants.

39
40 A 2014 systematic review of CAM studies for low back pain was performed by
41 Kizhakkeveettil et al. The authors were specifically interested in examining the effects of
42 an integrative approach to treating low back pain instead of isolating a single therapy.

1 Studies were included in the review if they had at least 1 outcome measure for pain or
2 disability as well as at least 1 treatment group receiving integrated therapy that included at
3 least 1 CAM therapy. The authors found 21 articles that met their search criteria (13 of
4 which included spinal manipulative therapy) and used the Cochrane Back Review Group
5 scale to determine risk of bias. Integrated CAM therapy with active care appeared to be
6 effective for treatment, while adding passive care to CAM therapy was generally
7 ineffective. The authors found this surprising as it is common to have the combination of
8 CAM therapy with passive care (such as heat or ice) as a standard treatment for low back
9 pain. Even though the authors support integrated therapies, they acknowledge that it may
10 be difficult in a real-world setting to coordinate care between practitioners. The authors
11 also acknowledge that some interventions for low back pain appear to be ineffective in the
12 short term but may help prevent chronicity and disability. Finally, the authors state the need
13 for more high-quality research that examines integration of spinal manipulative therapy
14 with exercise, acupuncture, and conventional care rather than single therapies of any type
15 along with reporting appropriate cost effectiveness data.

16
17 In 2014, Tsertsvadze et al. evaluated the cost effectiveness of manual therapies relative to
18 other alternative therapies for management of musculoskeletal conditions. Studies
19 considered for review were classified by which area of the body was being treated (spinal,
20 upper extremity and lower extremity). Twenty-five publications from 11 different trials
21 were included for review that reported specific economic factors for analysis. The risk of
22 bias was rated as low for 7 of the 11 trials and high for 4 of the 11 trials. Of the trials
23 included, 4 reported information regarding low back pain. The first trial found individual
24 physiotherapy more effective and ‘marginally more costly’ than spinal stabilization
25 therapy. The second trial found a combination of manual therapy, stabilization exercise
26 and physician consultation more effective than physician consultation alone at 24-month
27 follow up. The third study evaluated manipulation alone, exercise alone, and manipulation
28 and exercise to general practitioner care. The addition of manipulation had better
29 participant outcomes and lower overall cost. The last study compared manual
30 physiotherapy with a brief pain management program for participants with acute low back
31 pain. Although the manual physiotherapy group had more improvement in disability and
32 was more cost effective, the results were not statistically significant between the groups.

33
34 In 2014, Menke performed a comparative effectiveness meta-analysis of manual therapies,
35 including spinal manipulative therapy (SMT), for the treatment of low back pain. Menke
36 searched the literature and found 56 studies from 1974-2010 for a total of 257 study arms.
37 The study arms were then classified into treatment types such as SMT, exercise,
38 physiotherapy modalities, usual medical care, and control groups. The treatment types were
39 then divided into acute and chronic low back pain for short- and long-term effects.
40 Treatments for acute pain levels were no better than the course of natural history while
41 treatment for chronic pain showed a weak response to SMT. Additionally, study quality
42 measurements were taken to measure levels of evidential support. The author found that

1 overall SMT study quality improved 1.2% each year from 1974 and proposed that the
2 reason SMT has had success was not because of the treatment, but because of the
3 psychosocial support received during treatment and encouraged future research to examine
4 this component of SMT.

5
6 Schneider et al. (2015) conducted a study comparing the effectiveness of manual-thrust
7 manipulation (MTM), mechanical-assisted manipulation (MAM), and usual medical care
8 (UMC) in adults with low back pain of less than 3 months duration with a minimum self-
9 reported pain of 3 on a 0-10 scale and a minimum disability of 20 on a 0-100 scale.
10 Participants randomized to the MTM group received high-velocity, low-amplitude thrust
11 manipulations in the side posture position. Participants randomized to the MAM group
12 received activator methods chiropractic using the activator IV adjusting instrument in the
13 prone position following palpation and Activator method of leg length analysis.
14 Participants in the MTM and MAM groups attended 2 office visits per week for 4 weeks
15 and participated in follow-up data collection. Participants randomized to the UMC group
16 were seen by a board-certified physical medicine and rehabilitation physician. They were
17 told most new episodes of low back pain are self-limiting, prescribed over the counter
18 analgesics and nonsteroidal anti-inflammatory drugs, given advice to stay active and avoid
19 bed rest, as per current clinical guidelines for primary care management of non-specific
20 low back pain. The UMC group patients had 3 total office visits; an initial visit and 2 follow
21 up visits occurring at week 2 and week 4. After the week 4 assessment, participants were
22 free to try other forms of treatment if they felt they needed it. All participants in all 3
23 treatment groups were provided with a copy of the same educational handout with
24 information regarding proper posture and movements. The primary outcome assessment
25 was the OSW. Scores range from 0-100, with higher numbers representing higher levels of
26 disability. The secondary outcome was self-reported pain on a scale of 0 ('no pain') to 10
27 ('unbearable pain'). At 4 weeks, the MTM group showed significantly reduced OSW
28 scores compared to the MAM and UMC groups. Comparing the MAM group to the UMC
29 group showed a non-significant difference. The pain scores showed similar results; MTM
30 had reduced pain scores compared to the MAM and UMC groups, however comparing the
31 MAM to the UMC group showed no significant difference. The authors conclude there was
32 a statistically significant decrease in disability and pain for the MTM group for the short-
33 term measurement. The benefit of MTM was not statistically significant at the 3- or 6-
34 month follow-ups. Manipulation should be offered as an effective treatment for short term
35 relief of low back pain, especially for patients who prefer to make an informed treatment
36 decision in accordance with their individual values and preferences; this leads to enhanced
37 patient satisfaction. Another important factor the authors discuss is the presence of a
38 statistically significant difference between the MTM and MAM groups, indicating that not
39 all forms of manipulation may have the same effect on all low back pain patients.

1 In 2016, Chou et al. published (under the auspices of the Agency for Healthcare Research
 2 and Quality [AHRQ] and currently archived) a systematic review—*Noninvasive Treatment*
 3 *for Low Back Pain*. This review included both pharmacological and non-pharmacological
 4 treatments. The latter included spinal manipulation, acupuncture, exercise, low-level laser,
 5 heat, yoga, relaxation techniques, cognitive behavioral therapy (CBT), and electrical
 6 stimulation of various types, ultrasound, lumbar supports, and traction. Findings for SMT
 7 included:

- 8 • For acute low back pain, two trials (one included in a systematic review) found
 9 spinal manipulation associated with better effects on function versus sham
 10 manipulation (statistically significant in one trial); in one trial effects on pain
 11 favored manipulation but were small and not statistically significant (strength of
 12 evidence (SOE): low for function, insufficient for pain).
- 13 • For chronic low back pain, a systematic review found spinal manipulation
 14 associated with small, statistically nonsignificant effects versus sham manipulation
 15 on pain at 1 month; one trial reported similar results for function; one trial not
 16 included in the systematic review reported generally consistent results (SOE: low
 17 for pain, insufficient for function).
- 18 • For acute low back pain, a systematic review found no differences between spinal
 19 manipulation versus and inert treatment in pain relief at 1 week, though one trial
 20 found SMT associated with better longer-term pain relief; there were no differences
 21 in function at 1 week or at 3 months (SOE: low for pain and function).
- 22 • For chronic low back pain, one high-quality trial found spinal manipulation
 23 associated with greater improvement in the “main complaint” versus an inert
 24 treatment; results from three low risk of bias trials and three additional trials not
 25 included in the systematic review were somewhat inconsistent, though some trials
 26 reported effects that favored manipulation (SOE: low).
- 27 • For acute low back pain, a systematic review found no difference between spinal
 28 manipulation versus other active interventions in pain relief at 1 week, 1 month, 3
 29 to 6 months, or 1 year. Findings were similar for function, with no differences
 30 observed at any time point. A subsequent trial of patients with acute or subacute
 31 low back pain found spinal manipulation associated with moderate effects versus
 32 usual care on pain and small effects on function at short-term follow-up, but effects
 33 were smaller and no longer statistically significant at 3 and 6 months (SOE:
 34 moderate for pain and function).
- 35 • For chronic low back pain, a systematic review found spinal manipulation
 36 associated with better short-term pain relief versus other active interventions at 1
 37 month and 6 months, though the magnitude of effects was below the small/slight
 38 threshold. There was no difference at 12 months. Manipulation was also associated
 39 with greater function improvement in function versus other active interventions at
 40 1 month; effects were smaller and no longer statistically significant at 6 and 12
 41 months. Three trials not included in the systematic reviews reported results
 42 consistent with these findings (SOE: moderate for pain and function).

- 1 • For acute low back pain, four trials in a systematic review found spinal
2 manipulation plus either exercise or advice associated with greater improvement in
3 function at 1 week versus exercise or advice alone, but there were no differences at
4 1 month or 3 months (SOE: low).
- 5 • For chronic low back pain, a systematic review found spinal manipulation plus
6 another active treatment associated with greater pain relief at 1 month, 3 months,
7 and 12 months versus the other treatment alone, combination therapy was also
8 associated with better function at 1 month, 3 months and 12 months. One trial not
9 included in the systematic review reported results consistent with these findings
10 (SOE: low).
- 11 • For radicular low back pain, one good-quality trial found spinal manipulation plus
12 home exercise and advice associated with greater improvement in leg and back pain
13 at 12 weeks versus home exercise and advice alone, but effects were smaller and
14 no longer statistically significant at 52 weeks (SOE: low).
- 15 • Harms were not reported well in most trials of spinal manipulation. No serious
16 adverse events were reported, and most adverse events were related to muscle
17 soreness or transient increases in pain (SOE: low).

18
19 Chou et al. (2017) also published a systematic review on nonpharmacologic therapies for
20 low back pain for an American College of Physicians Clinical Practice Guideline. Results
21 were consistent with the conclusion stated previously from the AHRQ publication. Similar
22 findings were noted within the Veteran’s Administration/Department of Defense
23 guidelines for treatment of low back pain. They suggest offering spinal
24 mobilization/manipulation as part of a multimodal program for patients with acute or
25 chronic low back pain (VA/DoD, 2017). Clinical Guidelines Committee of the American
26 College of Physicians published a Clinical Practice Guideline from the American College
27 of Physicians on noninvasive treatments for acute, subacute, and chronic low back pain.
28 This guideline states that for patients with acute or chronic low back pain, SMT is
29 recommended as one of several nonpharmacologic initial treatment options (Qaseem et al.,
30 2017). Paige et al. (2017) systematically reviewed studies of the effectiveness and harms
31 of SMT for acute (≤ 6 weeks) low back pain. Of 26 eligible RCTs identified, 15 RCTs
32 (1,711 patients) provided moderate-quality evidence that SMT has a statistically significant
33 association with improvements in pain. Twelve RCTs (1,381 patients) produced moderate-
34 quality evidence that SMT has a statistically significant association with improvements in
35 function. Heterogeneity was not explained by type of clinician performing SMT, type of
36 manipulation, study quality, or whether SMT was given alone or as part of a package of
37 therapies. No RCT reported any serious adverse event. Minor transient adverse events such
38 as increased pain, muscle stiffness, and headache were reported 50% to 67% of the time in
39 large case series of patients treated with SMT. Authors concluded that among patients with
40 acute low back pain, spinal manipulative therapy was associated with modest
41 improvements in pain and function at up to 6 weeks, with transient minor musculoskeletal
42 harms. However, the heterogeneity in study results was large.

1 Skelly et al. (2018) reports in a review on chronic pain non-invasive non-pharmacological
2 treatments that at short and intermediate terms, spinal manipulation, was associated with
3 slight improvements in function compared with usual care or inactive controls. Skelly et
4 al. (2020) updated the evidence from their 2018 report assessing persistent improvement
5 in outcomes following completion of therapy for noninvasive nonpharmacological
6 treatment for selected chronic pain conditions. They included 233 RCTs (31 new to this
7 update). Many were small ($N < 70$), and evidence beyond 12 months after treatment
8 completion was sparse. The most common comparison was with usual care. Evidence on
9 harms was limited, with no evidence suggesting increased risk for serious treatment-related
10 harms for any intervention. Effect sizes were generally small for function and pain. For
11 chronic low back pain, function improved over short and/or intermediate term for spinal
12 manipulation, (SOE: low). At intermediate term, spinal manipulation (SOE: moderate) was
13 associated with improved pain. Coulter et al. (2018) aimed to determine the efficacy,
14 effectiveness, and safety of various mobilization and manipulation therapies for treatment
15 of chronic low back pain in a systematic literature review and meta-analysis. Fifty-one
16 trials were included in the systematic review. Nine trials (1,176 patients) provided
17 sufficient data and were judged similar enough to be pooled for meta-analysis. Subgroup
18 analyses showed that manipulation significantly reduced pain and disability, compared
19 with other active comparators including exercise and physical therapy. Mobilization
20 interventions, compared with other active comparators including exercise regimens,
21 significantly reduced pain, but not disability. Studies comparing manipulation or
22 mobilization with sham or no treatment were too few or too heterogeneous to allow for
23 pooling as were studies examining relationships between dose and outcomes. Few studies
24 assessed health-related quality of life. Twenty-six of 51 trials were multimodal studies and
25 narratively described. Authors concluded that there is moderate-quality evidence that
26 manipulation and mobilization are likely to reduce pain and improve function for patients
27 with chronic low back pain; manipulation appears to produce a larger effect than
28 mobilization. Both therapies appear safe. Multimodal programs may be a promising option
29

30 Evans et al. (2018) conducted a multicenter randomized trial comparing 12 weeks of spinal
31 manipulative therapy (SMT) combined with exercise therapy (ET) to ET alone.
32 Participants were 185 adolescents aged 12 to 18 years with chronic low back pain (LBP).
33 The primary outcome was LBP severity at 12, 26, and 52 weeks. Secondary outcomes
34 included disability, quality of life, medication use, patient- and caregiver-rated
35 improvement, and satisfaction. Outcomes were analyzed using longitudinal linear mixed
36 effect models. An omnibus test assessing differences in individual outcomes over the entire
37 year controlled for multiplicity. Of the 185 patients enrolled, 179 (97%) provided data at
38 12 weeks and 174 (94%) at 26 and 52 weeks. Adding SMT to ET resulted in a larger
39 reduction in LBP severity over the course of 1 year ($P = 0.007$). The group difference in
40 LBP severity (0-10 scale) was small at the end of treatment (mean difference = 0.5; $P =$
41 0.08) but was larger at weeks 26 (mean difference = 1.1; $P = 0.001$) and 52 (mean difference
42 = 0.8; $P = 0.009$). At 26 weeks, SMT with ET performed better than ET alone for disability

1 (P = 0.04) and improvement (P = 0.02). The SMT with ET group reported significantly
2 greater satisfaction with care at all time points (P ≤ 0.02). There were no serious treatment-
3 related adverse events. For adolescents with chronic LBP, spinal manipulation combined
4 with exercise was more effective than exercise alone over a 1-year period, with the largest
5 differences occurring at 6 months. These findings warrant replication and evaluation of
6 cost effectiveness.

7
8 Rubenstein et al. (2019) assessed the benefits and harms of spinal manipulative therapy
9 (SMT) for the treatment of chronic low back pain. Forty-seven randomized controlled trials
10 including a total of 9,211 participants were identified, who were on average middle aged
11 (35-60 years). Most trials compared SMT with recommended therapies. Moderate quality
12 evidence suggested that SMT has similar effects to other recommended therapies for short
13 term pain relief and a small, clinically better improvement in function. According to
14 authors, high quality evidence suggested that compared with non-recommended therapies
15 SMT results in small, not clinically better effects for short term pain relief and small to
16 moderate clinically better improvement in function. In general, these results were similar
17 for the intermediate and long-term outcomes as were the effects of SMT as an adjuvant
18 therapy. Most of the observed adverse events reported were musculoskeletal-related,
19 transient in nature, and of mild to moderate severity. Authors concluded that SMT produces
20 similar effects to recommended therapies for chronic low back pain, whereas SMT seems
21 to be better than non-recommended interventions for improvement in function in the short
22 term. Clinicians should inform their patients of the potential risks of adverse events
23 associated with SMT.

24
25 Thomas et al. (2020) evaluated the comparative effectiveness of spinal manipulation and
26 spinal mobilization at reducing pain and disability compared with a placebo control group
27 (sham cold laser) in a cohort of young adults with chronic LBP. Participants received 6
28 treatment sessions of (1) spinal manipulation, (2) spinal mobilization, or (3) sham cold
29 laser therapy (placebo) during a 3-week period. Main outcomes and measures: Coprimary
30 outcome measures were the change from baseline in Numerical Pain Rating Scale (NPRS)
31 score over the last 7 days and the change in disability assessed with the Roland-Morris
32 Disability Questionnaire (scores range from 0 to 24, with higher scores indicating greater
33 disability) 48 to 72 hours after completion of the 6 treatments. A total of 162 participants
34 (mean [SD] age, 25.0 [6.2] years; 92 women [57%]) with chronic LBP (mean [SD] NPRS
35 score, 4.3 [2.6] on a 1-10 scale, with higher scores indicating greater pain) were
36 randomized; 54 participants to the spinal manipulation group, 54 to the spinal mobilization
37 group, and 54 to the placebo group. There were no significant group differences for sex,
38 age, body mass index, duration of LBP symptoms, depression, fear avoidance, current pain,
39 average pain over the last 7 days, and self-reported disability. At the primary end point,
40 there was no significant difference in pain score change between spinal manipulation and
41 spinal mobilization, spinal manipulation and placebo, or spinal mobilization and placebo.
42 There was no significant difference in self-reported disability score change between spinal

1 manipulation and spinal mobilization, spinal manipulation and placebo or spinal
2 mobilization and placebo. Authors concluded that in this trial, neither spinal manipulation
3 nor spinal mobilization appeared to be effective treatments for mild to moderate chronic
4 LBP. According to Flynn (2020) in a review of treatments for chronic musculoskeletal
5 pain, spinal manipulation leads to a small benefit for chronic neck and low back pain.

6
7 Hawk et al. (2020) developed an evidence-based clinical practice guideline through a
8 broad-based consensus process on best practices for chiropractic management of patients
9 with chronic musculoskeletal (MSK) pain. Delphi process was conducted January-
10 February 2020. The 62-member Delphi panel reached consensus on chiropractic
11 management of five common chronic MSK pain conditions: low-back pain, neck pain,
12 tension headache, osteoarthritis (knee and hip), and fibromyalgia. Recommendations were
13 made for nonpharmacological treatments, including acupuncture, spinal
14 manipulation/mobilization, and other manual therapy; modalities such as low-level laser
15 and interferential current; exercise, including yoga; mind-body interventions, including
16 mindfulness meditation and cognitive behavior therapy; and lifestyle modifications such
17 as diet and tobacco cessation. Authors concluded that clinicians should consider multiple
18 approaches. Both active and passive, and both physical and mind–body interventions
19 should be considered in the management plan. Spinal manipulation/mobilization was
20 included in this recommendation for low back pain.

21
22 Chou et al. (2020) evaluated the effectiveness and comparative effectiveness of opioid,
23 nonopioid pharmacologic, and nonpharmacologic therapy in patients with specific types of
24 acute pain, including effects on pain, function, quality of life, adverse events, and long-
25 term use of opioids. One hundred eighty-three RCTs on the comparative effectiveness of
26 therapies for acute pain were included. Findings noted that spinal manipulation might be
27 effective for acute back pain with radiculopathy. Most studies had methodological
28 limitations. Effect sizes were primarily small to moderate for pain, the most commonly
29 evaluated outcome.

30
31 Thornton et al. (2021) summarized the evidence for non-pharmacological management of
32 LBP in athletes, a common problem in sport that can negatively impact performance and
33 contribute to early retirement. Among 1,629 references, 14 RCTs involving 541 athletes
34 were included. Treatments included exercise, biomechanical modifications, and manual
35 therapy. Exercise was the most frequently investigated treatment. There was a reduction in
36 pain and disability reported after all treatments. Authors concluded that while several
37 treatments for LBP in athletes improved pain and function, it was unclear what the most
38 effective treatments were, and for whom. Exercise approaches generally reduced pain and
39 improved function in athletes with LBP. No conclusions regarding the value of manual
40 therapy (massage, spinal manipulation) or biomechanical modifications alone could be
41 drawn because of insufficient evidence. High-quality RCTs are urgently needed to
42 determine the effect of commonly used interventions in treating LBP in athletes.

1 Compared to traditional aggregate analyses individual participant data (IPD) meta-analyses
2 allows for a more precise estimate of the treatment effect. Given this, de Zoete et al. (2021)
3 assessed the effect of SMT on pain and function for chronic LBP in a IPD meta-analysis.
4 Of the 42 RCTs fulfilling the inclusion criteria, they obtained IPD from 21 ($n=4,223$). Most
5 trials ($s=12$, $n=2,249$) compared SMT to recommended interventions. There is moderate
6 quality evidence that SMT vs recommended interventions resulted in similar outcomes on
7 pain and functional status at one month. Effects at other follow-up measurements were
8 similar. Results for other comparisons (SMT vs non-recommended interventions; SMT as
9 adjuvant therapy; mobilization vs manipulation) showed similar findings. Authors
10 concluded that sufficient evidence suggests that SMT provides similar outcomes to
11 recommended interventions, for pain relief and improvement of functional status. SMT
12 would appear to be a good option for the treatment of chronic LBP. Study design:
13 Individual participant data (IPD) meta-analysis. In another study, de Zoete et al. (2021)
14 aimed to identify which participant characteristics moderate the effect of spinal
15 manipulative therapy (SMT) on pain and functioning in chronic LBP. IPD were requested
16 from RCTs examining the effect of SMT in adults with chronic LBP for pain and function
17 compared to various other therapies (stratified by comparison). Potential patient
18 moderators ($n = 23$) were a priori based on their clinical relevance. They received IPD from
19 21 of 46 RCTs ($n = 4,223$). The majority (12 RCTs, $n = 2,249$) compared SMT to
20 recommended interventions. The duration of LBP, baseline pain (confirmatory), smoking,
21 and previous exposure to SMT (exploratory) had a small moderating effect across
22 outcomes and follow-up points; these estimates did not represent minimally relevant
23 differences in effects. No other moderators demonstrated a consistent pattern across time
24 and outcomes. Few moderate analyses were conducted for the other comparisons because
25 of too few data. Authors state they did not identify any moderators that enable clinicians
26 to identify which patients are likely to benefit more from SMT compared to other
27 treatments.

28
29 Jenks et al. (2022) assessed the effects of SMT on pain and function in older adults with
30 chronic LBP in an individual participant data (IPD) meta-analysis. RCTs which examined
31 the effects of SMT in adults with chronic LBP compared to interventions recommended in
32 international LBP guidelines were included. Pain and functional status were examined at
33 4, 13, 26, and 52 weeks. 10 studies were retrieved, including 786 individuals, of which 261
34 were between 65 and 91 years of age. There is moderate-quality evidence that SMT results
35 in similar outcomes at 4 weeks. Second stage and sensitivity analysis confirmed these
36 findings. Authors concluded that SMT provides similar outcomes to recommended
37 interventions for pain and functional status in the older adult with chronic LBP. SMT
38 should be considered a treatment for this patient population. Trager et al. (2022) examined
39 the relationship between chiropractic spinal manipulative therapy (CSMT) and lumbar
40 discectomy are both used for lumbar disc herniation (LDH) and lumbosacral radiculopathy
41 (LSR). Adults ages 18-49 with newly diagnosed LDH/LSR (first date of diagnosis) were
42 included. Exclusions were prior lumbar surgery, absolute indications for surgery, trauma,

1 spondylolisthesis, and scoliosis. Propensity score matching controlled for variables
2 associated with the likelihood of discectomy (e.g., demographics, medications). Patients
3 were divided into cohorts according to receipt of CSMT. After matching, there were 5785
4 patients per cohort (mean age 36.9 ± 8.2). The odds ratio (95% CI) for discectomy was
5 significantly reduced in the CSMT cohort compared with the cohort receiving other care
6 over 1-year and 2-year follow-up. Authors' findings suggest receiving CSMT compared
7 with other care for newly diagnosed LDH/LSR is associated with significantly reduced
8 odds of discectomy over 2-year follow-up. Given socioeconomic variables were
9 unavailable, and an observational design precludes inferring causality, the efficacy of
10 CSMT for LDH/LSR should be examined via randomized controlled trial to eliminate
11 residual confounding.

12
13 Trager et al. (2022) examined the relationship between chiropractic spinal manipulative
14 therapy (CSMT) and prescription benzodiazepines for radicular low back pain (rLBP).
15 Adults aged 18-49 with an index diagnosis of rLBP were included. Serious etiologies of
16 low back pain, structural deformities, alternative neurological lesions, and absolute
17 benzodiazepine contraindications were excluded. Patients were assigned to cohorts
18 according to CSMT receipt or absence. Propensity score matching was used to control for
19 covariates that could influence the likelihood of benzodiazepine utilization. After
20 matching, there were 9,206 patients (mean (SD) age, 37.6 (8.3) years, 54% male) per
21 cohort. Odds of receiving a benzodiazepine prescription were significantly lower in the
22 CSMT cohort over all follow-up windows pre-matching and post-matching. Authors
23 suggest that receiving CSMT for newly diagnosed rLBP is associated with reduced odds
24 of receiving a benzodiazepine prescription during follow-up. These results provide real-
25 world evidence of practice guideline-concordance among patients entering this care
26 pathway.

27
28 Zaina et al. (2023) sought to identify evidence-based rehabilitation interventions for
29 persons with non-specific low back pain (LBP) with and without radiculopathy and to
30 develop recommendations from high-quality clinical practice guidelines (CPGs) to inform
31 the World Health Organization's Package of Interventions for Rehabilitation. Authors
32 identified 4 high-quality CPGs. Recommended interventions included (1) education about
33 recovery expectations, self-management strategies, and maintenance of usual activities; (2)
34 multimodal approaches incorporating education, exercise, and spinal manipulation; (3)
35 nonsteroidal anti-inflammatory drugs combined with education in the acute stage; and (4)
36 intensive interdisciplinary rehabilitation that includes exercise and cognitive/behavioral
37 interventions for persistent pain. They did not identify high-quality CPGs for people
38 younger than 16 years of age. Authors concluded that for people with LBP with and without
39 radiculopathy, recommendations emphasize the potential benefits of education, exercise,
40 manual therapy, and cognitive/behavioral interventions.

1 Sørensen et al. (2023) examined whether targeting spinal manipulative therapy (SMT) by
2 applying the intervention to a specific vertebral level produces superior clinical outcomes
3 than a nontargeted approach in patients with nonspecific low back pain. Ten randomized
4 controlled trials ($n = 931$ patients) were included. There was moderate-certainty evidence
5 of no difference between targeted SMT and a nontargeted approach for pain intensity at
6 post-intervention and at follow-up. For patient-reported disability, there was moderate-
7 certainty evidence of no difference at post-intervention and at follow-up. Adverse events
8 were reported in 4 trials and were minor and evenly distributed between groups. Authors
9 concluded that targeting a specific vertebral level when administering SMT for patients
10 with nonspecific low back pain did not result in improved outcomes on pain intensity and
11 patient-reported disability compared to a nontargeted approach.

12
13 Feise et al. (2023) compared the benefits and harms of treatments for the management of
14 chronic low back pain without radiculopathy. Systematic review and meta-analysis of
15 randomized controlled trials were evaluated. Adults with chronic nonspecific low back
16 pain, excluding radicular pain, in any clinical setting were included. Outcome measures
17 included comparison of pain at immediate-term (≤ 2 weeks) and short-term (> 2 weeks to
18 ≤ 12 weeks) and serious adverse events. Three studies provided data on the benefits of
19 interventions, and 30 provided data on harms. Studies included interventions of
20 acupuncture ($n=8$); manipulation ($n=2$); pharmacological therapies ($n=9$), including
21 NSAIDs and opioid analgesics; surgery ($n=8$); and epidural corticosteroid injections ($n=3$).
22 Acupuncture (moderate quality of evidence, benefit rating of 3) and manipulation
23 (moderate quality of evidence, benefit rating of 5) were effective in reducing pain intensity
24 compared to sham. The benefit of the other interventions was scored as uncertain due to
25 not being effective, statistical heterogeneity preventing pooling of effect sizes, or the
26 absence of relevant trials. The harms level warnings were at the lowest (e.g., indicating
27 rarer risk of events) for acupuncture, spinal manipulation, NSAIDs, combination ingredient
28 opioids, and steroid injections, while they were higher for single ingredient opioid
29 analgesics (level 4) and surgery (level 6). Authors concluded that there is uncertainty about
30 the benefits and harms of all the interventions reviewed due to the lack of trials conducted
31 in patients with chronic nonspecific low back pain without radiculopathy. From the limited
32 trials conducted, nonpharmacological interventions of acupuncture and spinal
33 manipulation provide safer benefits than pharmacological or invasive interventions.
34 However, more research is needed. There were high harms ratings for opioids and surgery.

35
36 Trager et al. (2024) reviewed chiropractic research trends since 1972 and recent clinical
37 practice guideline (CPG) recommendations regarding SMT. Authors searched for articles
38 associated with chiropractic (spanning 1972–2024), analyzing publication trends and
39 keywords, and also searched CPGs addressing SMT use (spanning 2013–2024). They
40 identified 6286 articles on chiropractic. The rate of publication trended upward. Keywords
41 initially related to historical evolution, scope of practice, medicolegal, and regulatory
42 aspects evolved to include randomized controlled trials and systematic reviews. They

1 identified 33 CPGs, providing a total of 59 SMT-related recommendations. The
2 recommendations primarily targeted low back pain (n = 21) and neck pain (n = 14); of
3 these, 90% favored SMT for low back pain while 100% favored SMT for neck pain. Recent
4 CPG recommendations favored SMT for tension-type and cervicogenic headaches. There
5 has been substantial growth in the number and quality of chiropractic research articles over
6 the past 50 years, resulting in multiple CPG recommendations favoring SMT. These
7 findings reinforce the utility of SMT for spine-related disorders.
8

9 Farley et al. (2024) evaluated spinal manipulative therapy (SMT), dry needling (DN), and
10 exercise for LBP. The study was a 3-armed parallel-group design randomized clinical trial.
11 They enrolled and randomized 96 participants with LBP into a multimodal strategy of
12 treatment consisting of a combination of DN and SMT, DN only, and SMT only, followed
13 by an at-home exercise program. All participants received 4 treatment sessions in the first
14 2 weeks followed by a 2-week home exercise program. Outcomes included clinical
15 (Oswestry Disability Index, numeric pain intensity rating) and mechanistic (lumbar
16 multifidus, erector spinae, and gluteus medius muscle activation) measures at baseline, 2,
17 and 4 weeks. Participants in the DN and SMT groups showed larger effects and statistically
18 significant improvement in pain and disability scores, and muscle percent thickness change
19 at 2 weeks and 4 weeks of treatment when compared to the other groups.
20

21 Gevers-Montoro et al. (2024) aimed to investigate the efficacy of SMT to improve CPLBP
22 and its underlying mechanisms in a randomized placebo-controlled dual-blind mixed
23 experimental trial. Ninety-eight individuals with CPLBP and 49 controls were recruited.
24 Individuals with CPLBP received SMT (n = 49) or a control intervention (n = 49), 12 times
25 over 4 weeks. The primary outcomes were CPLBP intensity (0-100 on a numerical rating
26 scale) and disability (Oswestry Disability Index). Secondary outcomes included pressure
27 pain thresholds in 4 body regions, pain catastrophizing, Central Sensitization Inventory,
28 depressive symptoms, and anxiety scores. Individuals with CPLBP showed widespread
29 mechanical hyperalgesia and higher scores for all questionnaires. SMT reduced pain
30 intensity compared with the control intervention, but not disability. Similar mild to
31 moderate adverse events were reported in both groups. Mechanical hyperalgesia at the
32 manipulated segment was reduced after SMT compared with the control intervention. Pain
33 catastrophizing was reduced after SMT compared with the control intervention, but this
34 effect was not significant after accounting for changes in clinical pain. Although the
35 reduction of segmental mechanical hyperalgesia is likely to contribute to the clinical
36 benefits of SMT, the role of pain catastrophizing remains to be clarified. This randomized
37 controlled trial found that 12 sessions of SMT yield greater relief of CPLBP than a control
38 intervention. These clinical effects were independent of expectations and accompanied by
39 an attenuation of hyperalgesia in the targeted segment and a modulation of pain
40 catastrophizing.

1 Yu et al. (2024) evaluated benefits and harms of rehabilitation interventions for non-
2 specific low back pain (LBP) or thoracic spine pain in the pediatric population. They
3 screened 8461 citations and 307 full-text articles. Ten quantitative studies (i.e., 8 RCTs, 2
4 non-randomized clinical trials) and one qualitative study were included. With very low to
5 moderate certainty evidence, in adolescents with LBP, spinal manipulation (1-2
6 sessions/week over 12 weeks, 1 RCT) plus exercise may be associated with a greater
7 likelihood of experiencing clinically important pain reduction versus exercise alone; and
8 group-based exercise over 8 weeks (2 RCTs and 1 non-randomized trial) may reduce pain
9 intensity. The qualitative study found information provided via education/advice and
10 compliance of treatment were related to effective treatment. No economic studies or studies
11 examining thoracic spine pain were identified. Authors concluded that spinal manipulation
12 and group-based exercise may be beneficial in reducing LBP intensity in adolescents.
13 Education should be provided as part of a care program. The overall evidence is sparse.
14 Methodologically rigorous studies are needed.

15
16 Nim et al. (2024) assessed whether spinal manipulative therapy (SMT) application
17 procedures (i.e., target, thrust, and region) impacted changes in pain and disability for
18 adults with spine pain in a systematic review with network meta-analysis. They included
19 randomized controlled trials (RCTs) from recent systematic reviews and newly identified
20 RCTs published during the review process and employed artificial intelligence to identify
21 potentially relevant articles not retrieved through electronic database searches. Authors
22 included RCTs of the effects of high-velocity, low-amplitude SMT, compared to other
23 SMT approaches, interventions, or controls, in adults with spine pain. The outcomes were
24 spinal pain intensity and disability measured at short-term (end of treatment) and long-term
25 (closest to 12 months) follow-ups. They included 161 RCTs (11,849 participants). Most
26 SMT procedures were equal to clinical guideline interventions and were slightly more
27 effective than other treatments. When comparing inter-SMT procedures, effects were small
28 and not clinically relevant. A general and nonspecific rather than a specific and targeted
29 SMT approach had the highest probability of achieving the largest effects. Results were
30 based on very low- to low-certainty evidence, mainly downgraded owing to large within-
31 study heterogeneity, high risk of bias, and an absence of direct comparisons. Authors
32 concluded that there was low-certainty evidence that clinicians could apply SMT according
33 to their preferences and the patients' preferences and comfort. Differences between SMT
34 approaches appear small and likely not clinically relevant.

35
36 Rizzo et al. (2025) provided evidence on the effects of non-pharmacological and non-
37 surgical interventions for people with LBP and to highlight areas of remaining uncertainty
38 and gaps in the evidence regarding the effects of these interventions for people with LBP.
39 They included 31 Cochrane reviews of 644 trials that randomized 97,183 adults with LBP.
40 Authors had high confidence in the findings of 19 reviews, moderate confidence in the
41 findings of two reviews, and low confidence in the findings of 10 reviews. They presented
42 results for non-pharmacological/non-surgical interventions compared to placebo/sham or

1 no treatment/usual care at short-term (\leq three months) follow-up. Authors concluded that
2 spinal manipulation probably makes no difference to function compared to placebo for
3 people with acute/subacute LBP. Multidisciplinary therapies probably reduce pain
4 intensity, and improve function slightly for people with chronic LBP, compared to usual
5 care.

6
7 Giovannico et al. (2025) evaluated the efficacy of high-velocity low-amplitude thrust
8 (HVLAT) manipulations in patients with cervical, thoracic, and lumbar radiculopathy in a
9 systematic review. Randomized controlled trials comparing HVLAT to different
10 interventions in patients with cervical, thoracic, or lumbar radiculopathy were eligible, if
11 they reported outcomes related to pain intensity, disability, range of motion, and/or health-
12 related quality of life. Eleven trials (N = 991) were included. HVLAT was associated with
13 significant pain reduction compared to sham HVLAT and to non-recommended
14 interventions in both cervical and lumbar radiculopathy. HVLAT was associated with
15 reduced pain compared to conventional physical therapy alone at short- and medium-term
16 follow-up. There were no differences at long-term follow-up. The overall risk of bias was
17 high; the certainty of evidence ranged from very low to moderate. Authors concluded that
18 HVLAT could reduce pain and disability in patients with cervical and lumbar
19 radiculopathy in the short term and medium term compared with sham HVLAT
20 interventions, conventional physical therapy alone, and spinal mobilization, but not if
21 compared to spinal mobilization with leg movement.

22
23 Bagagiolo et al. (2025) evaluated if musculoskeletal manipulations (MM), including
24 osteopathic manipulation and chiropractic care, are effective to improve quality of life,
25 pain intensity and function in older adults with musculoskeletal disorders. Randomized
26 controlled trials, controlled non-randomized trials and open label trials evaluating the
27 efficacy and safety of MM such as osteopathic manipulation, chiropractic manipulation,
28 myofascial release, craniosacral therapy, as monotherapy or adjunctive therapies in older
29 people (age \geq 65 years) with musculoskeletal disorders were included. The main outcomes
30 included pain intensity, functionality and quality of life. Additionally, other related
31 outcomes were considered, such as medical use duration, mood, mobility, motion, strength
32 and endurance. Five parallel randomized controlled trials were included, with a total
33 sample size of 676 participants (41.6% women with a mean age of 77.3 years): 34 with
34 chronic pain, 265 with neck pain and 377 with low back pain. MMs were not effective in
35 patients with chronic pain, neither in pain intensity nor in functionality. For neck pain,
36 considering the main outcomes, only in one of the two studies was there a statistically
37 significant improvement in neck pain intensity only at week 12 for spinal manipulative
38 treatment (SMT)+home exercise (HE) compared with HE alone. For low back pain,
39 SMT+HE showed a statistically significant reduction in pain at 12 weeks compared with
40 HE. For neck pain and low back pain, no statistically significant improvement in functional
41 status and quality of life was observed with MM compared with any control group. All five
42 studies reported adverse events, none of which were serious. Authors concluded that this

1 review provides limited and inconclusive evidence about MM to improve quality of life,
2 pain management and functional status in older adults with musculoskeletal disorders.
3 However, MM appears to be generally safe and well-tolerated.

4
5 de Zoete et al. (2026) evaluated the benefits and harms of SMT compared to (1) sham
6 SMT/placebo intervention, (2) no treatment, and (3) other conservative interventions in
7 people with chronic LBP (18+ years old) in a Cochrane Review. Authors included
8 randomized controlled trials (RCTs) that examined the effect of spinal manipulation or
9 mobilization in adults with chronic LBP compared to sham SMT/placebo, no treatment,
10 and other conservative interventions. They excluded studies that exclusively examined
11 sciatica. The critical outcomes were pain, functional status, and adverse events. The
12 primary time point was one month for pain and functional status. They also evaluated
13 adverse events at the end of the intervention. Seventy-six RCTs (11,866 participants) met
14 our inclusion criteria, 50 (66%) of which were not included in the previous version of this
15 review. Seventeen trials (2021 participants) compared SMT to sham SMT/placebo, and
16 four trials (435 participants) compared SMT to no treatment. Most trials (43, including
17 8291 participants) examined the effect of SMT compared to other conservative
18 interventions. The remaining trials examined other comparisons. Treatment allocation was
19 appropriately conducted in just four sham SMT/placebo-controlled trials (24%), while only
20 six trials 'blinded' participants to the intervention (35%), indicating a high risk of selection
21 and performance bias. Similarly, the no-treatment controlled trials were as susceptible to
22 selection bias (50%) and performance bias (75%). All trials were conducted in high-income
23 (n = 53) or middle-income (n = 23) countries. In most studies, the population was middle-
24 aged and included men and women. Results show the following findings. For SMT versus
25 sham SMT/placebo: Very low-certainty evidence (downgraded for inconsistency and study
26 limitations) that SMT may result in a small reduction in pain compared to sham
27 SMT/placebo at one month and very low-certainty evidence (downgraded for study
28 limitations and inconsistency) that SMT may result in a medium improvement in functional
29 status compared to sham SMT/placebo at one month, but the evidence is very uncertain.
30 SMT versus no treatment: We found very low-certainty evidence (downgraded for study
31 limitations, inconsistency, and imprecision) that SMT may result in a medium reduction in
32 pain compared to no treatment at one month, but the evidence is very uncertain. Low-
33 certainty evidence (downgraded for study limitations and imprecision) that SMT may result
34 in a large improvement in functional status compared to no treatment at one month. SMT
35 versus other conservative interventions Low-certainty evidence (downgraded for
36 inconsistency) indicated that SMT may result in little to no difference in pain and may
37 result in a small improvement in functional status compared to other conservative
38 interventions at one month. These effects, however, should be interpreted with caution due
39 to the substantial statistical heterogeneity for which there is no clear explanation. Less than
40 half of the studies (47%) reported on adverse events, of which 12 studies reported these
41 systematically. Adverse events in the SMT group were limited to muscle soreness,
42 stiffness, and/or transient increase in pain. None of the studies registered any serious

1 complications related to either the experimental or control group treatment. The evidence
 2 is very uncertain about the adverse effects of SMT. Authors concluded that when SMT is
 3 compared to sham SMT/placebo, it may result in a small improvement in pain and medium
 4 improvement in functional status in adults with chronic low back pain. When compared to
 5 no treatment, SMT may result in a medium improvement in pain and a large improvement
 6 in functional status. When compared to other conservative interventions, SMT may result
 7 in little to no difference in pain and a small improvement in functional status. The evidence
 8 is of low to very low certainty, largely due to the fact that the effects of SMT were
 9 examined in trials conducted in different settings and populations, with different types of
 10 SMT technique, dosage, and frequency of treatment. Continuing to conduct RCTs in the
 11 same manner will neither strengthen the evidence nor our confidence in it.

12 13 **Neck Pain**

14 A review conducted by Walser et al. (2009) assessing the effectiveness of thoracic spinal
 15 manipulation (TSM) in managing musculoskeletal conditions. Thirteen studies were
 16 included in the review with 9 investigating the use of TSM for the treatment of neck pain.
 17 Four high-quality and 1 fair-quality studies reported significant improvement in pain in
 18 participants who received TSM over a comparison group. Two studies with fair to poor
 19 quality found significant within-group increases in cervical rotation. The authors
 20 concluded there is satisfactory evidence to support TSM as a treatment for certain patients
 21 with neck pain in the short-term. The efficacy of TSM alone or in combination with other
 22 conservative interventions for the management of patients with non-specific neck pain was
 23 assessed by Huisman et al. (2013). Ten studies met the criteria for inclusion, with a range
 24 in methodological quality from “average” to “good.” The authors concluded that overall,
 25 there was insufficient evidence to support or refute TSM as a more effective treatment than
 26 control treatments in reducing pain and disability. However, the results of the review
 27 showed evidence that combining TSM with other treatments such as exercise, spinal
 28 mobilization, electro-thermal therapy, infrared radiation therapy, and education was more
 29 effective than any of those treatments delivered without TSM.

30
 31 D’Sylva et al. (2010) published a systematic review assessing the effectiveness of
 32 combination therapy approaches on neck pain with multiple outcomes including pain,
 33 function, disability, and patient satisfaction. The combination therapies were defined as
 34 manipulation and mobilization; manipulation, mobilization, and soft tissue work; and
 35 manual therapy and physical medicine modalities. The authors selected 19 trials, 37%
 36 (7/19) of which had a low risk of bias. Most of the methodological weaknesses found
 37 pertained to allocation concealment and blinding procedures. However, the authors noted
 38 that when performing manual treatments, blinding the patient is difficult and blinding the
 39 provider is impossible. Regarding an ideal combined treatment approach, using
 40 manipulation and mobilization alone provide short-term (but not long-term) pain relief.
 41 Manipulation, mobilization, and soft tissue work were also shown to relieve pain and

1 increase patient satisfaction in the short-term. Combining manual therapy and exercise
2 seems to produce longer-term improvements across multiple outcomes.

3
4 The literature on the efficacy of manual therapies alone or with exercises in patients with
5 nonspecific neck pain was reviewed by Vincent et al. (2013). The authors divided the
6 studies into 3 groups based on symptom duration: acute (defined as <3 months), chronic
7 (>3 months) and neck pain of variable duration. The selection criteria rendered 27 RCTs
8 of which 9 were determined to be low quality and 18 high quality. In general, the evidence
9 suggests that manual therapy contributes to improvements in pain and function, especially
10 when used in combination with other therapies. For patients with acute neck pain,
11 manipulation produced better short-term results than electro-thermal therapy and better
12 long-term results than anti-inflammatory or analgesic medications (with varied treatment
13 protocols). Multimodal management that included manual therapy was favored over
14 passive interventions such as a cervical collar or rest, and contradictory results were found
15 when cervical and thoracic manipulation were compared. For chronic neck pain, regardless
16 of follow-up duration, manual therapy combined with exercise provided better
17 improvements in pain and function than did manual therapy or exercise alone. In the short-
18 term, results were better with manipulation than with medications or acupuncture;
19 however, in the long-term, no differences were found between these groups. For patients
20 with a varied duration of neck pain, the combination of manipulation and mobilization or
21 exercise and mobilization was better than exercise alone, medications and passive
22 interventions. Cervical manipulation combined with laser therapy was more effective than
23 either treatment performed alone.

24
25 Miller et al. (2010) reviewed the evidence for trials investigating the effectiveness of
26 manual therapy, which included manipulation and mobilization, and exercise for neck pain
27 in adults with neck pain. Seventeen studies were included in the review and examined
28 acute, subacute, chronic, and mixed durations of pain. The range in risk of bias was low (5
29 trials) to high risk (12 trials), and the authors again cite blinding as a limitation in applying
30 methodological criteria. Patient-reported outcomes cannot meet observer blinding criteria,
31 and manual therapies prohibit the provider from being blinded to the treatment.
32 Mobilization and manipulation provided similar benefits, and the use of these treatments
33 alone was shown to relieve pain in the short-term. Exercise alone was shown to improve
34 pain and function in the long-term. Combining manual therapy and exercise produced
35 greater short-term pain reduction than exercise alone and longer-term improvements across
36 multiple outcomes when compared to manual therapy alone. Salt et al. (2011) conducted a
37 systematic review to investigate evidence for the non-invasive management of
38 cervicobrachial pain. Eleven studies were included. There was conflicting evidence that
39 manual therapy and exercise provided a long-term reduction in pain and influenced
40 function and disability. Meta-analyses suggested that manual therapy and exercise
41 improved pain immediately following treatment, but results were not statistically
42 significant. One trial compared cervical manipulation and medication to a medication-only

1 group in patients with pain in the neck, arm or hand related to cervical joint hypomobility.
2 A significant between-group difference was found when measuring immediate results,
3 however; differences were not sustained at 1- and 3-week follow-up.

4
5 Martel et al. (2011) hypothesized that participants with chronic neck pain who received
6 preventative SMT in combination with a home exercise program would experience
7 improvements in pain, disability and function compared to a group receiving only SMT or
8 no treatment. The authors performed a 2-phase RCT in which the first phase (symptomatic)
9 consisted of 10-15 treatments that were provided over a 5- to 6-week period. The results of
10 this phase revealed a clinically and statistically significant average decrease of 1.1 cm on
11 the VAS (Visual Analog Scale) for pain and 6.5 points on the BQ (Bournemouth
12 Questionnaire) for disability. Function (measured by ROM) significantly improved as well,
13 except for lateral flexion. Participants were randomized into a SMT, SMT with exercise or
14 an attention-controlled group (no treatment, but self-management such as applying ice was
15 allowed and discussed condition at each visit) during the second phase (preventative). This
16 phase entailed 10 months of treatment at approximately 1x/month for the active groups and
17 every 2 months for the inactive. Significant group differences were not found for outcomes
18 in this phase, however; most of the participants in each group retained a level of pain below
19 clinically acceptable (2-point difference from baseline symptomatic phase VAS).
20 Therefore, results indicated no additional benefit to participants receiving monthly
21 preventative SMT or SMT with home exercise compared with a consultation visit to a
22 chiropractor every other month and the hypothesis was rejected. This suggests by simply
23 managing a patient for neck pain may decrease recurrence of incidents, and that strategies
24 for treatment vs. those for prevention need further investigation and delineation.

25
26 In a randomized controlled trial by Casanova-Mendez et al., (2014) two different thoracic
27 spinal manipulative techniques were compared for immediate and short-term effects on
28 patients with chronic neck pain. Sixty-four participants were allocated, received a single
29 active treatment, and completed the study. The intervention for the dog-technique group
30 was described as directing the patient to assume a supine position with their arms folded
31 across their chest. The right hand of the therapist was positioned to contact the T4
32 vertebrae; the other hand was placed on the participant's elbows to add flexion, reduce
33 slack, and deliver a HVLA thrust in the anteroposterior direction. The other intervention,
34 toggle-recoil (TR), was described as the therapist contacting the T4 transverse processes
35 with the pisiforms in crossed-hand set-up on a participant lying prone. A posterior anterior
36 HVLA thrust was delivered. Outcomes measured were pain pressure threshold (PPT),
37 ROM and self-reported pain, and all outcomes improved using both techniques. The TR
38 group results were superior, showing statistical significance in all outcomes, however;
39 there were no clinical differences between the groups except for slightly better effects from
40 TR on left rotation, extension, and right lateral flexion.

1 Low-force mobilization was examined against high-force mobilization and placebo in a
2 RCT conducted by Snodgrass et al. (2014) to add to the evidence regarding optimal dosing
3 for chronic neck pain treatment. The primary outcome was PPT, and resting pain, ROM
4 and spinal stiffness measured as secondary outcomes immediately following treatment and
5 at a 4-day follow-up session. Sixty-four participants were randomized into 1 of the 3 groups
6 receiving a single session of treatment. In the low-force group, the average mean force
7 applied was 30.8 N and 88.6 N for the high-force group during 3 sets of 1-minute
8 posteroanterior mobilization applied to the most painful spinous process. The placebo
9 treatment consisted of detuned laser for 3 sets of 1 minute. No differences were found
10 between groups in PPT or ROM at immediate or follow-up measurements. The high-force
11 group fared better than placebo in spinal stiffness at follow-up but was not significantly
12 different from the low-force group. However, regarding pain, participants in the high-force
13 group reported significant pain reduction at follow-up over the low-force group (not over
14 placebo).

15
16 Young et al. (2014) performed a review examining the effects of thoracic spinal
17 manipulation (TSM) for the treatment of mechanical neck pain. The quality of evidence
18 overall was determined to be fair (measured with the PEDro scale), and the authors'
19 inclusion criteria rendered 14 studies. This review aimed to focus on literature comparing
20 the effectiveness of TSM versus mobilization, however; only 1 study was found that
21 directly compared these treatments. Additionally, only short-term outcomes were collected
22 in all trials. Results showed that TSM was superior to mobilization, placebo, modalities,
23 and no treatment. These results prompted the authors to conclude that the evidence is scarce
24 and of questionable methodological quality regarding the use of thoracic mobilization, but
25 a considerable amount of varied quality evidence exists supporting TSM as an intervention
26 for improvements in pain, disability, and ROM in the short-term.

27
28 A systematic review was conducted by Tsertsvadze et al. (2014) of trial-based economic
29 evaluations of manual therapy compared to other alternative treatments. Two trials out of
30 the included 25 reported results of the effectiveness of manual therapy in treating neck
31 pain. One trial found that spinal mobilization, defined as low velocity passive movements
32 within or at the limit of joint ROM, had significantly lower costs and slightly better effects
33 compared to either physiotherapy or general practitioner care at 1-year follow-up. Clinical
34 outcomes showed manual therapy provided a faster recovery rate than physiotherapy and
35 general practitioner care after 7 weeks, with respective rates at 68%, 51% and 36%.
36 Another trial evaluated manual therapy, defined as manipulation and mobilization, against
37 a behavioral graded activity (BGA) program. The authors concluded that their cost-
38 effective analyses showed that BGA is not cost-effective in comparison with manual
39 therapy in measures of recovery and quality of life.

40
41 Chu et al. (2014) focused their review and meta-analysis on the evaluation of sympathetic
42 nervous system responses and clinical outcomes using spinal manual therapy (SMT) to the

1 cervical or thoracic spine in the management of neck, upper back, or upper extremity pain.
2 Spinal manipulation was a term used in the search strategy but did not render any results
3 after applying the inclusion criteria. For this review, the intervention most described
4 consisted of a Grade III mobilization technique (using Maitland classification), where the
5 researcher contacted the designated vertebral segment using oscillatory pressure. In total,
6 11 studies were included; 3 of those studies used a pain outcome and 4 measured ROM. In
7 studies that included a comparison group, between-group analysis was calculated using
8 data from a control group. Within-group analyses were also performed, and authors
9 reported both the between- and within-group analyses showed small but significant effect
10 sizes in improved pain and ROM. Manual therapy produced increased peripheral skin
11 conductance and upper extremity ROM as well as decreased skin temperature and patient-
12 reported pain.

13
14 Lopez-Lopez et al. (2015) investigated the differences in effectiveness between
15 manipulation, mobilization and sustained natural apophyseal glide (SNAG) techniques and
16 their relationship to psychological factors in the treatment of chronic neck pain. The
17 primary outcome was pain, and ROM and pressure pain threshold (PPT) were secondary
18 outcomes measured immediately following a single treatment. The group assigned to
19 manipulation received a high-velocity low-amplitude supine technique, the mobilization
20 group received a unilateral posteroanterior grade III passive oscillatory technique in the
21 prone position, and the SNAG technique was performed on a seated patient while they
22 simultaneously moved their head from a standardized position. The mean difference in pain
23 at rest was 3.08 ($P < 0.01$) in the HVLA group, 1.51 ($P < 0.05$) in the mobilization group,
24 and 0.26 (not significant) in the SNAG group. However, in pain and functional
25 measurements with movement and PPT, there were no differences between the groups
26 overall as all significantly improved. Concerning psychological factors, better outcomes
27 were shown with mobilization if the participant had high levels of anxiety. If anxiety was
28 low, the manipulation and SNAG techniques produced better results.

29
30 A Cochrane review was conducted by Gross et al. in 2015 as an update of 2 previous
31 reviews (performed in 2004 and 2010) assessing the effects of manipulation or
32 mobilization alone compared to a control or another treatment on pain and other outcomes
33 in adults with neck pain. The review included 51 randomized controlled trials with a total
34 of 2,920 participants, and 80% (41/51) of the studies were of low or very low quality.
35 Eighteen of the trials compared manipulation/mobilization to a control, 34 compared
36 manipulation/mobilization to another treatment, and one trial had two comparisons.
37 Manipulation was evaluated for both the cervical and thoracic spinal regions. For subacute
38 or chronic neck pain, a single session of cervical manipulation provided temporary pain
39 relief when compared to an inactive control. Multiple treatments produced conflicting
40 evidence at short-term follow-up. However, multiple sessions of thoracic spinal
41 manipulation were shown to reduce pain in short-term and intermediate-term follow-up in
42 patients with acute or subacute neck pain and improve function in patients with acute to

1 chronic neck pain when compared to control. Cervical manipulation for acute to subacute
 2 neck pain was more effective for improving pain and function than various combinations
 3 of analgesics, muscle relaxants and non-steroidal anti-inflammatory medications.

4
 5 For the conservative treatment of cervical radiculopathy, Zhu et al. (2015) examined the
 6 evidence for the effectiveness and safety of using cervical spine manipulation. Three
 7 studies, published in Chinese, met the criteria for inclusion in the systematic review, and
 8 the analysis represented a total of 502 patients with a diagnosis of degenerative cervical
 9 radiculopathy. Each was a two-arm RCT comparing manipulation to cervical computer
 10 traction (serving as a control group) where active treatment frequency was approximately
 11 2x/ week and inactive frequency varied from 3-7x/week. The duration of the treatments in
 12 2 of the trials was 2 weeks (1 including a 4-week follow-up), and 4 weeks in the other.
 13 Mean differences in pain measured by VAS showed statistically significant improvements
 14 in the active groups in all 3 studies. Overall, the authors deemed the level of evidence to
 15 be of moderate quality due to statistical heterogeneity ($I^2 >50\%$). They used the PEDro
 16 scale to determine methodological quality; a score of 5 or above (out of a possible 10) was
 17 considered acceptable and indicated low risk of bias. Two of the 3 studies scored a 5, and
 18 1 scored a 6. The items related to blinding considerations were not met in all 3 of the
 19 studies, and the authors echoed the opinions of many other authors regarding the limitations
 20 or difficulties in blinding during trials involving spinal manipulation. However, other
 21 methods of more concern were a lack of detail regarding sample size calculations,
 22 randomization, allocation concealment, and intention-to-treat analyses. Additionally,
 23 adverse event reporting was not prevalent, leading to inconclusive safety results.

24
 25 In a revised clinical practice guideline linked to the International Classification of
 26 Functioning, Disability and Health From the Orthopaedic Section of the American Physical
 27 Therapy Association, Blanpied et al. (2017) reports that for acute neck pain with mobility
 28 deficits, clinicians should provide thoracic manipulation, a program of neck ROM
 29 exercises, and scapulothoracic and upper extremity strengthening to enhance program
 30 adherence and clinicians may provide cervical manipulation and/or mobilization. For
 31 subacute neck pain with mobility deficits included whiplash associated disorders,
 32 clinicians may provide thoracic manipulation and cervical manipulation and/or
 33 mobilization. For chronic neck pain with mobility deficits, clinicians should provide a
 34 multimodal approach of the following:

- 35 • Thoracic manipulation and cervical manipulation or mobilization
- 36 • Mixed exercise for cervical/scapulothoracic regions: neuromuscular exercise (e.g.,
 37 coordination, proprioception, and postural training), stretching, strengthening,
 38 endurance training, aerobic conditioning, and cognitive affective elements

39
 40 For patients with subacute or chronic neck pain with headache, clinicians should provide
 41 cervical manipulations or mobilizations. For patients with chronic neck pain with radiating
 42 pain, clinicians should provide mechanical intermittent cervical traction, combined with

1 other interventions such as stretching and strengthening exercise plus cervical and thoracic
2 mobilization/manipulation.

3
4 Griswold et al. (2018) compared the clinical effectiveness of concordant cervical and
5 thoracic non-thrust manipulation (NTM) and thrust manipulation I for patients with
6 mechanical neck pain. The Neck Disability Index (NDI) was the primary outcome.
7 Secondary outcomes included the Patient-Specific Functional Scale (PSFS), numeric pain-
8 rating scale (NPRS), deep cervical flexion endurance (DCF), global rating of change
9 (GROC), number of visits, and duration of care. Outcomes were collected at baseline, visit
10 2, and discharge. Patients were randomly assigned to receive either NTM or TM directed
11 at the cervical and thoracic spines. Techniques and dosages were selected pragmatically
12 and applied to the most symptomatic level. One hundred three patients were included in
13 the analyses (NTM, $n = 55$ and TM, $n = 48$). The between-group analyses revealed no
14 differences in outcomes on all outcome measures, number of visits and duration of care.
15 Authors concluded that NTM and TM produce equivalent outcomes for patients with
16 mechanical neck pain.

17
18 Masaracchio et al. (2019) investigated the role of thoracic spine manipulation (TSM) on
19 pain and disability in the management of mechanical neck pain (MNP). Across the included
20 studies, there was increased risk of bias for inadequate provider and participant blinding.
21 The GRADE approach demonstrated an overall level of evidence ranging from very low
22 to moderate. Meta-analysis that compared TSM to thoracic or cervical mobilization
23 revealed a significant effect favoring the TSM group for pain and disability. Meta-analysis
24 that compared TSM to standard care revealed a significant effect favoring the TSM group
25 for pain and disability at short-term follow-up, and a significant effect for disability at long-
26 term follow-up. Meta-analysis that compared TSM to cervical spine manipulation revealed
27 a non-significant for pain without a distinction between immediate and short-term follow-
28 up. Limitations include heterogeneity among the studies making it difficult to assess the
29 true clinical benefit, as well as the overall level of quality of evidence. Authors conclude
30 that TSM has been shown to be more beneficial than thoracic mobilization, cervical
31 mobilization, and standard care in the short-term, but no better than cervical manipulation
32 or placebo thoracic spine manipulation to improve pain and disability. Coulter et al. (2019)
33 sought to determine the efficacy, effectiveness, and safety of various mobilization and
34 manipulation therapies for treatment of chronic nonspecific neck pain. A total of 47
35 randomized trials were included in the systematic review and included a total of 4,460
36 patients with nonspecific chronic neck pain who were being treated by a practitioner using
37 various types of manipulation and/or mobilization interventions. A total of 37 trials were
38 categorized as unimodal approaches and involved thrust or non-thrust compared with
39 sham, no treatment, or other active comparators. Of these, only 6 trials with similar
40 intervention styles, comparators, and outcome measures/timepoints were pooled for meta-
41 analysis at 1, 3, and 6 months, showing a small effect in favor of thrust plus exercise
42 compared to an exercise regimen alone for a reduction in pain and disability. Multimodal

1 approaches appeared to be effective at reducing pain and improving function from the 10
2 studies evaluated. Authors concluded that studies provide low-moderate quality evidence
3 that various types of manipulation and/or mobilization will reduce pain and improve
4 function for chronic nonspecific neck pain compared to other interventions. It appears that
5 multimodal approaches, in which multiple treatment approaches are integrated, might have
6 the greatest potential impact. According to the published trials reviewed, manipulation and
7 mobilization appear safe.

8
9 Bernal-Utrera et al. (2020) compared the effects of two experimental treatments based on
10 manual therapy and therapeutic exercise. The short-term and mid-term changes produced
11 by different therapies on subjects ($n=69$) with non-specific chronic neck pain were studied.
12 The sample was randomized, divided into three groups: manual therapy, therapeutic
13 exercise, and placebo. No statistically significant differences ($P 0.05$) were obtained
14 between the experimental groups, if they exist against the control group. Nonetheless, they
15 found that manual therapy improved perceived pain before than therapeutic exercise, while
16 therapeutic exercise reduced cervical disability before than manual therapy. Authors
17 concluded that there were no differences between groups in short and medium terms.
18 Manual therapy achieves a faster reduction in pain perception than therapeutic exercise.
19 Therapeutic exercise reduces disability faster than manual therapy. Clinical improvement
20 could potentially be influenced by central processes.

21
22 Hawk et al. (2020) developed an evidence-based clinical practice guideline through a
23 broad-based consensus process on best practices for chiropractic management of patients
24 with chronic musculoskeletal (MSK) pain. Delphi process was conducted January-
25 February 2020. The 62-member Delphi panel reached consensus on chiropractic
26 management of five common chronic MSK pain conditions: low-back pain (LBP), neck
27 pain, tension headache, osteoarthritis (knee and hip), and fibromyalgia. Recommendations
28 were made for nonpharmacological treatments, including acupuncture, spinal
29 manipulation/mobilization, and other manual therapy; modalities such as low-level laser
30 and interferential current; exercise, including yoga; mind-body interventions, including
31 mindfulness meditation and cognitive behavior therapy; and lifestyle modifications such
32 as diet and tobacco cessation. Authors concluded that clinicians should consider multiple
33 approaches for neck pain. Both active and passive, and both physical and mind-body
34 interventions should be considered in the management plan. Spinal
35 manipulation/mobilization was included in this recommendation for neck pain.

36
37 Chaibi et al. (2021) reviewed original randomized controlled trials (RCTs) assessing the
38 effect of spinal manipulative therapy (SMT) for acute neck pain. Six studies were included.
39 The overall pooled effect size for neck pain was very large -1.37 favoring treatments with
40 SMT compared with controls. Minor transient adverse events reported included increased
41 pain and headache, while no serious adverse events were reported. Authors concluded that
42 SMT alone or in combination with other modalities was effective for patients with acute

1 neck pain. However, limited quantity and quality, pragmatic design, and high heterogeneity
2 limit the findings. Bakken et al. (2021) investigated the combination of home stretching
3 exercises and spinal manipulative therapy in a multicenter randomized controlled clinical
4 trial, carried out in multidisciplinary primary care clinics. The treatment modalities utilized
5 were spinal manipulative therapy and home stretching exercises compared to home
6 stretching exercises alone. Both groups received 4 treatments in 2 weeks. The primary
7 outcome was pain, where the subjective pain experience was investigated by assessing pain
8 intensity (Numerical Rating Scale - 11) and the quality of pain (McGill Pain
9 Questionnaire). Neck disability and health status were secondary outcomes, measured
10 using the Neck Disability Index the EQ-5D, respectively. One hundred thirty-one adult
11 subjects were randomized to one of the two treatment groups. All subjects had experienced
12 persistent or recurrent neck pain in the previous 6 months and were blinded to the other
13 group intervention. The clinicians provided treatment for subjects in both groups and could
14 not be blinded. The researchers collecting data were blinded to treatment allocation, as was
15 the statistician performing data analyses. An intention-to-treat analysis was used. Sixty-six
16 subjects were randomized to the intervention group, and sixty-five to the control group.
17 Authors concluded that based on their findings, there is no additional treatment effect from
18 adding spinal manipulative therapy to neck stretching exercises over 2 weeks for patients
19 with persistent or recurrent neck pain.

20
21 Thoomes et al. (2022) aimed to establish consensus on effective nonsurgical treatment
22 modalities at different stages (i.e., acute, subacute, or chronic) of cervical radiculopathy
23 (CR) using the Delphi method approach. Experts within the field rated their agreement with
24 a list of proposed treatment modalities according to the stage of CR. Agreement was
25 measured using a 5-point Likert scale. Descriptive statistics were used to measure
26 agreement (median, interquartile ranges, and percentage of agreement). Consensus criteria
27 were defined as a priori for each round. Consensus for Round 3 was based on ≥ 2 of the
28 following: a median Likert scale value of ≥ 4 , interquartile range value of ≤ 1 , and/or a
29 percentage of agreement $\geq 70\%$. Data analysis produced a consensus list of effective
30 treatment modalities in different stages of recovery. According to experts, the focus of
31 multimodal management in the acute stage should consist of patient education and spinal
32 manipulative therapy, specific (foraminal opening) exercises, and sustained pain-relieving
33 positions. In the subacute stage, increasing individualized physical activity including
34 supervised motor control, specific exercises, and/or neurodynamic mobilization could be
35 added. In the chronic stage, focus should shift to include general aerobic exercise as well
36 as focused strength training. Postural education and vocational ergonomic assessment
37 should also be considered. Authors concluded that multimodal conservative management
38 of individuals with CR should take the stage of the condition into consideration. The focus
39 of therapeutic interventions should shift from passive pain-relieving intervention in the
40 acute stage to increasingly more individualized physical activity and self-management in
41 the chronic stage.

1 Minnucci et al. (2023) aimed to estimate the benefits and harms of cervical spinal
 2 manipulative therapy (SMT) for treating neck pain. RCTs evaluating SMT compared to
 3 guideline-recommended and non-recommended interventions, sham SMT, and no
 4 intervention for adults with neck pain were eligible for this systematic review. Prespecified
 5 outcomes included pain, range of motion, disability, and health-related quality of life.
 6 Authors included 28 RCTs. There was very low to low certainty evidence that SMT was
 7 more effective than recommended interventions for improving pain at short term and long
 8 term and for reducing disability at short-term and long term. Transient side effects only
 9 were found (e.g., muscle soreness). Authors concluded that there was very low certainty
 10 evidence supporting cervical SMT as an intervention to reduce pain and improve disability
 11 in people with neck pain.

12
 13 Liu et al. (2023) aimed to determine the effectiveness of manipulative therapy for chronic
 14 neck pain in a systematic review and meta-analysis. Seventeen RCTs, including 1,190
 15 participants, were included in this meta-analysis. Manipulative therapy showed better
 16 results regarding pain intensity and neck disability than the control group. Manipulative
 17 therapy was shown to relieve pain intensity and neck disability. However, the studies had
 18 high heterogeneity, which could be explained by the type and control interventions. In
 19 addition, there were no significant differences in adverse events between the intervention
 20 and the control groups. Authors concluded that manipulative therapy reduces the degree of
 21 chronic neck pain and neck disabilities.

22
 23 Carrasco-Uribarren et al. (2024) investigated the effects of cervical thrust or non-thrust
 24 manipulations compared to thoracic or cervicothoracic manipulations for improving pain,
 25 disability, and range of motion in patients with neck pain. Six studies were included. Meta-
 26 analyses revealed no differences between cervical thrust or non-thrust manipulations and
 27 thoracic or cervicothoracic manipulations in pain intensity, disability, or cervical range of
 28 motion in any plane. The certainty of evidence was downgraded to very low for pain
 29 intensity, to moderate or very low for disability and to low or very low for cervical range
 30 of motion. There is moderate to very low certainty evidence that there is no difference in
 31 effectiveness between cervical thrust or non-thrust manipulations and thoracic or
 32 cervicothoracic manipulations for improving pain, disability, and range of motion in
 33 patients with neck pain.

34
 35 Akgüller et al. (2025) aimed to compare the effectiveness of cervical thrust manipulation
 36 and exercise in patients with mechanical neck pain (MNP). Sixty (mean age 31.45 ± 7.31
 37 years) patients were randomized into three groups: manipulation (Group 1); exercise
 38 (Group 2); and manipulation plus exercise (Group 3). All interventions were performed 2
 39 days a week for 6 weeks. The visual analog scale (VAS) and Neck Disability Index (NDI)
 40 were primary outcome measures; pressure pain threshold (PPT), range of motion (ROM),
 41 Short form-36 (SF-36), and Global Rating of Change (GROC) were secondary outcome
 42 measures. All parameters improved in all groups. Only the minimal clinically important

1 difference (MCID) for NDI was achieved in Group 3. Group 3 had greater improvement
 2 in: VAS-rest; NDI; PPT-left; and vitality, as well as higher GROG compared to the other
 3 groups. Group 3 was superior to Group 2 in terms of: ROM; and emotional well-being.
 4 Group 1 was superior to Group 2 in terms of ROM. Authors concluded that the combined
 5 application of cervical thrust manipulation and exercise in MNP resulted in greater
 6 improvement in clinical parameters, especially function, and higher patient satisfaction in
 7 the short term compared to their application alone. Because of its positive effects, cervical
 8 thrust manipulation can be added to the exercise program according to the patient's needs
 9 and suitability for manipulation.

10
 11 Diao et al. (2025) evaluated the efficacy and safety of SMT in the treatment of acute neck
 12 pain (ANP). Eight randomized controlled trials (RCTs) with 965 patients were included.
 13 Forest plot analysis showed SMT was better than the control in reducing and improving
 14 cervical range of motion (CROM) in all measured aspects. It also significantly reduced
 15 disability scores. No serious adverse events were reported. Authors concluded that the
 16 evidence supports the use of SMT as an effective and safe intervention for reducing pain,
 17 improving CROM, and decreasing disability in patients with ANP.

18 19 **Thoracic Spine Pain**

20 Spinal manipulation has not been studied in any systematic way (e.g., through RCTs) for
 21 the treatment of pain in the mid-back region. Some studies cited have included thoracic
 22 spine manipulation as part of a treatment package for neck pain, but none have looked at
 23 pain in the thoracic spine itself as an outcome. Indeed, there are virtually no experimental
 24 studies that have evaluated the treatment of thoracic spine pain of mechanical origin. This
 25 scientific vacuum cannot be interpreted to constitute a virtual ban on the treatment of
 26 thoracic spine pain. Patients with such complaints are going to present themselves and are
 27 entitled to a reasoned response by the healthcare provider.

28
 29 Given the literature on analogous disorders of the lumbar and cervical spine and given the
 30 likelihood that the active mechanisms of manual therapies such as spinal manipulation are
 31 comparable in the thoracic spine, this clinical policy guideline views spinal manipulation
 32 as a valid treatment option for thoracic spinal pain. As such, spinal manipulation is
 33 considered medically necessary when:

- 34 • There is a diagnosis of spinal pain of mechanical origin;
- 35 • There are no diagnostic red flags;
- 36 • There is adequate documentation; and
- 37 • Adequate clinical progress continues to be made.

38 39 **Headache Disorders**

40 A study by Chaibi et al. (2011) was completed reviewing the efficacy of MT for the
 41 treatment of migraine. Seven studies were included in the review of which 4 applied SMT.
 42 A group of authors performed 2 of the studies where the first was a controlled trial and the

1 second was a follow-up questionnaire. The authors of the systematic review gave these
2 studies a low methodological quality score. The first study compared 3 groups: cervical
3 SMT by a chiropractor, cervical SMT by physician or physical therapist, and cervical
4 mobilization (control group) by a physician or physical therapist. The resultant mean
5 reductions in frequency, intensity, and duration (pre- and post-treatment) were 40, 43 and
6 36% in the chiropractic SMT group, 13,12 and 8% in the physician/PT SMT group, and
7 34, 15 and 20% in mobilization group with no statistically significant differences between
8 the groups. At the 20-month follow-up, further improvement was reported from pre- to
9 post-trial mean reduction in attack frequency at 58, 29 and 54% in the respective groups.
10 Another RCT (with a good methodological score) with 3 groups compared SMT by
11 diversified technique, amitriptyline, and a combination of SMT/amitriptyline during and
12 after an 8-week intervention period. From baseline to the last 4 weeks of treatment and
13 from baseline to 4 weeks post-treatment, mean intensity decreased by 40 and 42% in SMT
14 group, 49 and 24% in amitriptyline group, and 41 and 25% in the combination group. Mean
15 frequency was reduced equally between the groups. From baseline to post-treatment, over-
16 the-counter medication was reduced by 55%, 28% and 15% in the groups, respectively.
17 With a good methodological quality score, the 4th study found statistically significant
18 improvement favoring the SMT group over the control. Reductions in frequency ($p<0.05$),
19 duration ($P<0.01$), disability ($p<0.05$) and medication use ($p<0.001$) were shown. The
20 authors concluded that providers may want to consider referring migraine patients for SMT
21 if they are not responding to prophylactic medication or if reasons exist against medication
22 as SMT might be an equally effective treatment. Again, Posadzki and Ernst performed a
23 parallel systematic review and included 3 of the same studies. They did not regard SMT as
24 a treatment recommendation based on the scarcity of evidence and poor quality of studies.
25 Posadzki and Ernst (2012) performed a review of SMT for tension type headache (TTH)
26 and found favorable results for the treatment but could not pool data due to the statistical
27 and clinical heterogeneity of the included studies. The results of this meta-analysis found
28 a moderate effect size supporting MT and suggest that it is more effective than medication
29 in the short term for patients with TTH. Chaibi and Russell (2012) conducted a systematic
30 review assessing the efficacy of MT for the treatment of primary chronic headache. The
31 search terms contained various headache conditions combined with MT terms including
32 ‘manipulative therapy,’ ‘spinal manipulative therapy,’ and ‘chiropractic treatment.’ Out of
33 the 6 studies that met the review criteria, 1 evaluated massage therapy and 5 evaluated
34 physical therapy for treatment effects for chronic TTH. The physical therapy interventions
35 consisted of soft tissue therapy, exercises, stretching, TENS, postural correction, and
36 mobilization; therefore, SMT was not evaluated. However, the results showed that MT was
37 equal in efficacy to prophylactic medication with tricyclic antidepressants. The massage
38 group had significant reduction in headache intensity when compared to detuned
39 ultrasound. In 3 of the physical therapy trials, 54-85% of participants had $\geq 50\%$ reduction
40 in headache frequency post-treatment, and 2 of the studies reported a maintained effect at
41 a 6-month follow-up.

1 Racicki et al. (2013) conducted a study assessing the effectiveness of various non-invasive
2 treatments for cervicogenic headaches. The conservative interventions included were MT
3 or exercise. Six studies were included in the review, and all were determined to have good
4 methodological quality scores on the PEDro scale. One of the most common
5 methodological weaknesses involved blinding. The therapists were not blinded in all 6
6 studies, but as is the case with all MT studies, the intervention that is delivered must be
7 known. Three of the trials did not blind the participants. Three studies had weaknesses
8 associated with not offering point measures or measures of variability for 1 key outcome
9 and intention to treat analysis. Some conflicting evidence was found among the studies; 4
10 concluded that manipulative therapy had a significant effect, but 2 showed no clinically or
11 statistically significant differences (1 of which was conducted with participants aged 7-15
12 years). Five studies evaluated manipulation (1 included cervico-scapular strengthening
13 exercises and mobilization) and 1 evaluated mobilization only. The cervical spine was the
14 main region where the interventions were applied, but 1 study also incorporated upper
15 thoracic SMT. After calculating effect sizes and reviewing all results, the authors found
16 improvements in headache intensity, frequency and in neck pain when utilizing cervical
17 manipulation, mobilization, and exercise. These findings echoed those of 2 previous
18 reviews.

19
20 Chaibi and Russell (2014) also performed a systematic review to assess the efficacy of
21 manual therapies for the treatment of cervicogenic headache. The authors identified 7
22 studies that met the inclusion criteria with 6 involving a cervical SMT intervention. All
23 studies were deemed to have at least good methodological quality based on scores of over
24 50 out of 100, and 1 study with excellent quality scoring 81. The most common
25 methodological issues were related to blinding and the number of participants. Two studies
26 reported a statistically significant reduction in NSAID consumption from pre- to post-
27 treatment in the cervical SMT group, but no statistically significant difference in
28 consumption between cervical SMT and control groups. Another trial found a 50%
29 reduction in the frequency of participant's headaches in the exercise group (76%), cervical
30 SMT group (71%), combined exercise and SMT group (81%) and control (29%) and 100%
31 reduction in 31, 33, 42 and 4% of the groups respectively. The combined group also showed
32 significantly reduced durations of headaches immediately post-treatment ($P<0.05$) and at
33 12-month follow-up ($P<0.05$). Dose response was evaluated in 2 of the studies. One
34 reported percentages of improvement in headache intensity and frequency that increased
35 as treatment incidence increased; however, significant reductions in intensity were shown
36 in the SMT 4x/week group compared to 1x/week at 4-week follow-up and in the SMT 3
37 and 4x/week compared to 1x/week at 12-week follow-up. The other study compared 1 and
38 2x/week SMT and light massage control groups and found more improvement in the
39 treatment groups over the controls, but significant improvement was found specifically in
40 the 2x/week SMT group ($P<0.05$) compared to the control group at 4, 12 and 24-week
41 follow-up concerning headache intensity. Based on 1 treatment, another study showed
42 significant reductions in headache days from baseline to 2-month follow-up in both the

1 cervical SMT ($P < 0.01$) and sham ($P < 0.03$) groups but no statistically significant change in
2 either group regarding headache frequency, total duration, and intensity. The authors
3 concluded that the results were difficult to evaluate due to only 1 study incorporating a
4 control group, but SMT may be an effective treatment for cervicogenic headache. A very
5 similar systematic review was published by Posadzki and Ernst (2011), who concluded that
6 evidence for the effectiveness of SMT for cervicogenic headaches is inconclusive.

7
8 Espi-Lopez et al. (2014) designed a study to determine the effectiveness of delivering one
9 MT technique versus a combination of MT techniques in patients with tension type
10 headache (TTH). Patients were randomized into 1 of the 3 active treatment groups or the
11 control (4th group) at 19 per group. The treatment plan for each group consisted of 4 visits
12 at 7-day intervals. The active treatments were either a suboccipital soft tissue inhibition
13 therapy (SI); manipulation of the occiput, atlas, and axis (OAA); or combined SI + OAA.
14 Outcomes measured varying factors of headache disability including the Headache
15 Disability Inventory (HDI assesses an overall score and subscales of pain severity,
16 frequency, function, and emotions) and presence of associated symptoms such as
17 photo/phonophobia and pericranial tenderness). Both the OAA and combined groups
18 showed significant reductions in headache frequency and differences in functional and
19 emotional subsets of HDI score ($P < 0.05$). No change in frequency was observed in the SI
20 or control groups. In all 3 active groups, headache severity was significantly reduced
21 ($P < 0.05$) where no change was noted for the control. Only participants receiving the
22 combined treatment reported significantly less frequency of photo/phonophobia and
23 pericranial tenderness. Regarding between-group differences, results favored the OAA and
24 combined groups. The authors concluded that individual techniques have different effects,
25 but that manipulative OAA alone was effective for reducing severity, frequency, and
26 functional and emotional features of disability related to TTH.

27
28 Espi-Lopez et al. (2014) also evaluated the effectiveness of manual and manipulative
29 therapy for patients with TTH. Patients were randomly assigned to either receive 1 of 3
30 active treatments (SI, OAA or a combination) or no treatment. Outcomes included a
31 perception of pain questionnaire, cervical ranges of motion, and frequency and intensity of
32 headaches. Measures were collected pre-treatment and at the end of a 4-week treatment
33 period, and again at a 4-week follow-up. Perception of pain improved significantly in all
34 treatment groups with manipulation showing the greatest treatment effect. All treatment
35 groups showed increased left and right rotation; however, only the SI and OAA groups had
36 sustained benefit at the 4-week follow-up. The frequency of headaches was significantly
37 reduced through the end of the study in the combined group, and intensity improved in the
38 OAA, combined and control group at treatment conclusion and at follow-up. MT and
39 manipulation, alone and in combination, were effective in reducing pain perception, but
40 manipulation seemed to fare the best. The manipulation and combination treatments were
41 effective in reducing frequency and intensity. Mesa-Jimenez et al. (2015) conducted a
42 meta-analysis to evaluate the efficacy of manual therapies compared to pharmacological

1 drugs in the management of TTH. Five studies were included with methodological quality
2 scores ranging from fair to excellent. Manual therapy (MT) involving SMT/mobilization,
3 soft tissue therapy or exercise or a combination of these was shown to be more effective in
4 reducing headache frequency and intensity immediately following treatment. Additionally,
5 MT was associated with a statistically significant reduction in the number of headache days
6 per month as well as number of hours per day with a headache when compared to
7 medication. However, at long-term follow-up (24 weeks), there were no differences
8 between the treatments on headache intensity.

9
10 In a pragmatic RCT, Vernon et al. (2015) studied patients with TTH and cervicogenic
11 headaches. They compared one group who received 5 weeks of usual chiropractic treatment
12 to another group who received the same treatment in addition to 4 weeks of a self-
13 acupressure pillow. Usual chiropractic treatment consisted of SMT to the cervical and
14 upper thoracic spine, and could include mobilizations, soft tissue therapy or postural
15 exercises, and the groups received nearly the same levels of all interventions. The pillow
16 was prescribed to be used 2x/day for 5 minutes and during a headache episode up to
17 3x/episode. Although a true comparison between the groups could not be made due to a
18 failure in randomization, post hoc analysis revealed statistically and clinically significant
19 reductions in headache frequency (>40% reduction) in the chiropractic-only group (71%).
20

21 Dunning et al. (2016) compared the effects of manipulation to mobilization and exercise
22 in individuals with cervicogenic headache (CH). One hundred and ten participants ($n =$
23 110) with CH were randomized to receive both cervical and thoracic manipulation ($n = 58$)
24 or mobilization and exercise ($n = 52$). The primary outcome was headache intensity as
25 measured by the Numeric Pain Rating Scale (NPRS). Secondary outcomes included
26 headache frequency, headache duration, disability as measured by the Neck Disability
27 Index (NDI), medication intake, and the Global Rating of Change (GRC). The treatment
28 period was 4 weeks with follow-up assessment at 1 week, 4 weeks, and 3 months after
29 initial treatment session. Results demonstrated that individuals with CH who received both
30 cervical and thoracic manipulation experienced significantly greater reductions in
31 headache intensity ($p < 0.001$) and disability ($p < 0.001$) than those who received
32 mobilization and exercise at a 3-month follow-up. Individuals in the upper cervical and
33 upper thoracic manipulation group also experienced less frequent headaches and shorter
34 duration of headaches at each follow-up period ($p < 0.001$ for all). Additionally, patient
35 perceived improvement was significantly greater at 1 and 4-week follow-up periods in
36 favor of the manipulation group ($p < 0.001$). Authors concluded that six to eight sessions
37 of upper cervical and upper thoracic manipulation were shown to be more effective than
38 mobilization and exercise in patients with CH, and the effects were maintained at 3 months.
39

40 Côté et al. (2019) developed an evidence-based guideline for the non-pharmacological
41 management of persistent headaches associated with neck pain (i.e., tension-type or
42 cervicogenic). Authors concluded that when managing patients with headaches associated

1 with neck pain, clinicians should (a) rule out major structural or other pathologies, or
2 migraine as the cause of headaches; (b) classify headaches associated with neck pain as
3 tension-type headache or cervicogenic headache once other sources of headache pathology
4 has been ruled out; (c) provide care in partnership with the patient and involve the patient
5 in care planning and decision making; (d) provide care in addition to structured patient
6 education; (e) consider low-load endurance craniocervical and cervicospinal exercises
7 for tension-type headaches (episodic or chronic) or cervicogenic headaches >3 months
8 duration; (f) consider general exercise, multimodal care (spinal mobilization,
9 craniocervical exercise and postural correction) or clinical massage for chronic tension-
10 type headaches; (g) do not offer manipulation of the cervical spine as the sole form of
11 treatment for episodic or chronic tension-type headaches; (h) consider manual therapy
12 (manipulation with or without mobilization) to the cervical and thoracic spine for
13 cervicogenic headaches >3 months duration. However, there is no added benefit in
14 combining spinal manipulation, spinal mobilization, and exercises; and (i) reassess the
15 patient at every visit to assess outcomes and determine whether a referral is indicated. Neck
16 pain and headaches are very common comorbidities in the population. Authors Tension-
17 type and cervicogenic headaches can be treated effectively with specific exercises. Manual
18 therapy can be considered as an adjunct therapy to exercise to treat patients with
19 cervicogenic headaches. The management of tension-type and cervicogenic headaches
20 should be patient-centered.

21
22 Fernandez et al. (2020) evaluated the effectiveness of SMT for cervicogenic headache
23 (CGHA). Seven trials were eligible. At short-term follow-up, there was a significant, small
24 effect favoring SMT for pain intensity and small effects for pain frequency. There was no
25 effect for pain duration. There was a significant, small effect favoring SMT for disability.
26 At intermediate follow-up, there was no significant effects for pain intensity and a
27 significant, small effect favoring SMT for pain frequency. At long-term follow-up, there
28 were no significant effects for pain intensity and for pain frequency. Authors concluded
29 that for CGHA, SMT provides small, superior short-term benefits for pain intensity,
30 frequency, and disability, but not pain duration, however, high-quality evidence in this field
31 is lacking. The long-term impact is not significant. Hawk et al. (2020) developed an
32 evidence-based clinical practice guideline through a broad-based consensus process on best
33 practices for chiropractic management of patients with chronic musculoskeletal (MSK)
34 pain. Delphi process was conducted January-February 2020. The 62-member Delphi panel
35 reached consensus on chiropractic management of five common chronic MSK pain
36 conditions: low-back pain, neck pain, tension headache, osteoarthritis (knee and hip), and
37 fibromyalgia. Recommendations were made for nonpharmacological treatments, including
38 acupuncture, spinal manipulation/mobilization, and other manual therapy; modalities such
39 as low-level laser and interferential current; exercise, including yoga; mind-body
40 interventions, including mindfulness meditation and cognitive behavior therapy; and
41 lifestyle modifications such as diet and tobacco cessation. Authors concluded that
42 clinicians should consider multiple approaches for chronic tension headache. Both active

1 and passive, and both physical and mind–body interventions should be considered in the
2 management plan. Spinal manipulation/mobilization was included in this recommendation
3 for chronic tension headache.

4
5 Núñez-Cabaleiro et al. (2022) aimed to identify the manual therapy (MT) methods and
6 techniques that have been evaluated for the treatment of cervicogenic headache (CH) and
7 their effectiveness. Of a total of 14 articles selected, 11 were randomized control trials and
8 three were quasi-experimental studies. The techniques studied were spinal manipulative
9 therapy, Mulligan's Sustained Natural Apophyseal Glides, muscle techniques, and
10 translatory vertebral mobilization. In the short-term, the Jones technique on the trapezius
11 and ischemic compression on the sternocleidomastoid achieved immediate improvements,
12 whereas adding spinal manipulative therapy to the treatment can maintain long-term
13 results. Authors concluded that manual therapy techniques could be effective in the
14 treatment of patients with CH. The combined use of MT techniques improved the results
15 compared with using them separately. This review has methodological limitations, such as
16 the inclusion of quasi-experimental studies and studies with small sample sizes that
17 reduced the generalizability of the results obtained.

18
19 McDevitt et al. (2022) sought to determine if thoracic spine manipulation (TSM) improves
20 pain and disability in individuals with cervicogenic headache (CeH). A randomized
21 controlled crossover trial was conducted on 48 participants (mean age: 34.4 years) with
22 CeH symptoms. Participants were randomized to 6 sessions of TSM or no treatment (Hold)
23 and after 4-weeks, groups crossed over. Outcomes were collected at 4, 8 and 12 weeks and
24 included: headache disability inventory (HDI), neck disability index (NDI), and the global
25 rating of change (GRC). Scores at 4 weeks represent the only timepoint where 1 group is
26 fully treated and other group has not received any treatment. Comparing hold to active
27 treatment, HDI were not significantly different between groups at any timepoint; the NDI
28 was significant at 4 weeks. Odds of achieving the +4 MCID on the GRC favored TSM at
29 4 weeks. Authors concluded that TSM had no effect on headache-related disability but
30 resulted in significant improvements in neck-related disability and participant reported
31 perceived improvement.

32
33 Nambi et al. (2024) sought to find and compare the clinical effects of cervical spine over
34 thoracic spine manipulation and conventional physiotherapy in patients with Cervicogenic
35 Headache (CgH) given no technique can be singled as the best available treatment for
36 patients with CgH. This prospective, randomized controlled study was conducted between
37 July 2020 and January 2023 at the University hospital. Ninety-six eligible patients with
38 CgH were selected based on selection criteria and they were divided into cervical spine
39 manipulation (CSM; n = 32), thoracic spine manipulation (TSM; n = 32) and conventional
40 physiotherapy (CPT; n = 32) groups, and received the respective treatment for four weeks.
41 Primary (CgH frequency) and secondary CgH pain intensity, CgH disability, neck pain
42 frequency, neck pain intensity, neck pain threshold, cervical flexion rotation test (CFRT),

1 neck disability index (NDI) and quality of life (QoL) scores were measured. The reports of
 2 the CSM, TSM and CPT groups were compared between the groups. Four weeks following
 3 treatment CSM group showed more significant changes in primary (CgH frequency) and
 4 secondary (CgH pain intensity, CgH disability, neck pain frequency, pain intensity, pain
 5 threshold, CFRT, NDI and QoL) than the TSM and CPT groups. The same gradual
 6 improvement was seen in the CSM group when compared to TSM and CPT groups in the
 7 above variables at 8 weeks and 6 months follow-up. The reports of this randomized clinical
 8 study found that CSM resulted in significantly better improvements in pain parameters
 9 (intensity, frequency and threshold) functional disability and quality of life in patients with
 10 CgH than thoracic spine manipulation and conventional physiotherapy.

11 **SAFETY**

13 A RCT by Maiers et al. (2015) collected data on adverse events that occurred as a result of
 14 cervical SMT and exercise interventions in a senior population. Of those who received
 15 SMT with home exercise, 74 out of 78 reported non-serious adverse events that were
 16 mostly musculoskeletal in nature such as muscle soreness, stiffness, headache, and joint
 17 pain. Aggravated neck pain was the most reported symptom. It was noted that no subjects
 18 withdrew from study participation due to these events. Also, in this group, three serious
 19 adverse events were reported but deemed as likely unrelated due to the nature and absence
 20 of a temporal association. These included bradycardia and arrhythmia ($n=2$) and
 21 myocardial infarction ($n=1$).

23 Overall, no causal relationship between SMT and cervical artery dissection or stroke has
 24 been established. Cervical artery dissection is a rare event in itself and has been associated
 25 with SMT, other treatments disparate from any manual therapy, and general movements of
 26 the neck. Prior to delivering an intervention such as SMT, clinicians are advised to attempt
 27 to identify a potential arterial or ischemic event in progress. The primary appropriate
 28 screening method seems to be taking an effective history to recognize conjunctive features.

30 Cervical mobilization and manipulation have been suspected of creating a cervical artery
 31 dissection (CAD) as an adverse event. However, these assumptions are based on case
 32 studies which are unable to establish direct causality. Chaibi and Bjørn Russel (2019)
 33 conducted a literature review to provide clinicians with an updated step-by-step risk–
 34 benefit assessment strategy tool to (a) facilitate clinicians understanding of CAD, (b)
 35 appraise the risk and applicability of cervical manual-therapy, and (c) provide clinicians
 36 with adequate tools to better detect and exclude CAD in clinical settings. Cervical artery
 37 dissection refers to a tear in the internal carotid or the vertebral artery that results in an
 38 intramural haematoma and/or aneurysmal dilatation. Although cervical artery dissection is
 39 thought to occur spontaneously and is rare, physical trauma to the neck, especially
 40 hyperextension and rotation, has been reported as a trigger. Headache and/or neck pain is
 41 the most common initial symptom of cervical artery dissection. Other symptoms include
 42 Horner’s syndrome and lower cranial nerve palsy. Both headache and/or neck pain are

1 common symptoms and leading causes of disability. Because manual-therapy interventions
2 can alleviate headache and/or neck pain, many patients seek manual therapists, such as
3 chiropractors and physiotherapists to help them manage symptoms. There is debate as to
4 whether CAD symptoms lead the patient to seek cervical manual-therapy or whether the
5 cervical manual therapy provoked CAD along with the non-CAD presenting complaints.
6 Thus, practitioners need to be diligent with subjective and objective evaluations of patients
7 to understand the risk for CAD and whether to address its potential existence.

8
9 Chu et al. (2022) examined the incidence and severity of adverse events (AEs) of patients
10 receiving chiropractic spinal manipulative therapy (SMT), with the hypothesis that < 1 per
11 100,000 SMT sessions results in a grade ≥ 3 (severe) AE. A secondary objective was to
12 examine independent predictors of grade ≥ 3 AEs. They identified patients with SMT-
13 related AEs from January 2017 through August 2022 across 30 chiropractic clinics in Hong
14 Kong. AE data were extracted from a complaint log, including solicited patient surveys,
15 complaints, and clinician reports, and corroborated by medical records. AEs were
16 independently graded 1-5 based on severity (1-mild, 2-moderate, 3-severe, 4-life-
17 threatening, 5-death). Among 960,140 SMT sessions for 54,846 patients, 39 AEs were
18 identified, two were grade 3, both of which were rib fractures occurring in women age >
19 60 with osteoporosis, while none were grade ≥ 4 , yielding an incidence of grade ≥ 3 AEs
20 of 0.21 per 100,000 SMT sessions (95% CI 0.00, 0.56 per 100,000). There were no AEs
21 related to stroke or cauda equina syndrome. The sample size was insufficient to identify
22 predictors of grade ≥ 3 AEs using multiple logistic regression. In this study, severe SMT-
23 related AEs were reassuringly very rare.

24
25 Whedon et al. (2022) evaluated the association between cervical spinal manipulation and
26 cervical artery dissection among older Medicare beneficiaries in the United States. The
27 primary exposure was cervical spinal manipulation; the secondary exposure was a clinical
28 encounter for evaluation and management for neck pain or headache. They created a 3-
29 level categorical variable, (1) any cervical spinal manipulation, 2) evaluation and
30 management but no cervical spinal manipulation and (3) neither cervical spinal
31 manipulation nor evaluation and management. The primary outcomes were occurrence of
32 cervical artery dissection, either (1) vertebral artery dissection or (2) carotid artery
33 dissection. The cases had a new primary diagnosis on at least one inpatient hospital claim
34 or primary/secondary diagnosis for outpatient claims on at least two separate days. Cases
35 were compared to 3 different control groups: (1) matched population controls having at
36 least one claim in the same year as the case; (2) ischemic stroke controls without cervical
37 artery dissection; and (3) case-crossover analysis comparing cases to themselves in the time
38 period 6-7 months prior to their cervical artery dissection. Comparison across three
39 different time frames occurred: up to (1) 7 days; (2) 14 days; and (3) 30 days prior to index
40 event. The odds of cervical spinal manipulation versus evaluation and management did not
41 significantly differ between vertebral artery dissection cases and any of the control groups
42 at any of the timepoints (odds ratio 0.84 to 1.88; $p > 0.05$). Results for carotid artery

1 dissection cases were similar. Authors concluded that among Medicare beneficiaries aged
2 65 and older who received cervical spinal manipulation, the risk of cervical artery
3 dissection is no greater than that among control groups.

4
5 Gorrell et al. (2023) sought to describe if there has been a change in the reporting of adverse
6 events associated with spinal manipulation in randomized clinical trials (RCTs) since 2016
7 in a systematic review. There were 5,399 records identified by the electronic searches, of
8 which 154 (2.9%) were included in the analysis. Of these, 94 (61.0%) reported adverse
9 events with only 23.4% providing an explicit description of what constituted an adverse
10 event. Reporting adverse events in the abstract has increased ($n=29$, 30.9%) while reporting
11 in the results section has decreased ($n=83$, 88.3%) over the past 6 years. Spinal
12 manipulation was delivered to 7,518 participants in the included studies. No serious
13 adverse events were reported in any of these studies. Authors concluded that while the
14 current level of reporting of adverse events associated with spinal manipulation in RCTs
15 has increased since the 2016 publication on the same topic, the level remains low and
16 inconsistent with established standards.

17
18 Pankrath et al. (2024) extracted available information from RCTs to synthesize the
19 comparative risk of AEs following cervical manipulation to that of various control
20 interventions in a systematic review and meta-analysis due to the unclear risk level of AEs
21 associated with high-velocity, low-amplitude (HVLA) cervical manipulation. Studies
22 finding an association between cervical manipulation and serious AEs such as artery
23 dissections are mainly case control studies or case reports. These study designs are not
24 appropriate for investigating incidences and therefore do not imply causal relationships.
25 Randomized controlled trials (RCTs) are considered the gold standard study designs for
26 assessing the unconfounded effects of benefits and harms, such as AEs, associated with
27 therapies. Fourteen articles were included in the systematic review and meta-analysis. The
28 pooled IRR indicates no statistically significant differences between the manipulation and
29 control groups. All the reported AEs were classified as mild, and none of the AEs reported
30 were serious or moderate. In summary, HVLA manipulation does not impose an increased
31 risk of mild or moderate AEs compared to various control interventions. However, these
32 results must be interpreted with caution, since RCTs are not appropriate for detecting the
33 rare serious AEs. In addition, future RCTs should follow a standardized protocol for
34 reporting AEs in clinical trials.

35 36 **PRACTITIONER SCOPE AND TRAINING**

37 Practitioners should practice only in the areas in which they are competent based on their
38 education, training, and experience. Levels of education, experience, and proficiency may
39 vary among individual practitioners. It is ethically and legally incumbent on a practitioner
40 to determine where they have the knowledge and skills necessary to perform such services
41 and whether the services are within their scope of practice.

1 It is best practice for the practitioner to appropriately render services to a member only if
 2 they are trained, equally skilled, and adequately competent to deliver a service compared
 3 to others trained to perform the same procedure. If the service would be most competently
 4 delivered by another health care practitioner who has more skill and training, it would be
 5 best practice to refer the member to the more expert practitioner.

6
 7 Best practice can be defined as a clinical, scientific, or professional technique, method, or
 8 process that is typically evidence-based and consensus driven and is recognized by a
 9 majority of professionals in a particular field as more effective at delivering a particular
 10 outcome than any other practice (Joint Commission International Accreditation Standards
 11 for Hospitals, 2020).

12
 13 Depending on the practitioner’s scope of practice, training, and experience, a member’s
 14 condition and/or symptoms during examination or the course of treatment may indicate the
 15 need for referral to another practitioner or even emergency care. In such cases it is prudent
 16 for the practitioner to refer the member for appropriate co-management (e.g., to their
 17 primary care physician) or if immediate emergency care is warranted, to contact 911 as
 18 appropriate. See the *Managing Medical Emergencies (CPG 159 – S)* clinical practices
 19 guideline for information.

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