Clinical Practice Guideline: **Spinal Manipulative Therapy for Non-Musculoskeletal Conditions and Related Disorders**

Date of Implementation: **July 16, 2009**

Product: **Specialty**

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GUIDELINES

American Specialty Health – Specialty (ASH) considers spinal manipulation not medically necessary for the treatment of non-musculoskeletal conditions and related disorders including, but not limited to:

- Asthma
- ADHD
- Autism spectrum disorders
- Dysmenorrhea
- Hypertension
- Infantile colic
- Nocturnal enuresis
- Otitis media

The set of conditions above represents those non-musculoskeletal conditions which have been found in the literature relative to spinal manipulation either through randomized controlled studies, systematic reviews, or both.

This guideline applies to all patient populations, demographic and clinical variables. This guideline does not preclude the possibility of there being intervention within the scope of practice other than spinal manipulation which may be found to be medically necessary for non-musculoskeletal conditions.

EVIDENCE REVIEW

Asthma

Several reviews have examined the effectiveness of spinal manipulation for the treatment of asthma. Ferrance and Miller (2010) reported that asthma is the most common chronic disease of childhood and in the United States effects more than 6 million children. In children older than age 3, it is the most common cause of chronic cough. It is hypothesized that spinal manipulation may aid in reducing restriction of the thoracic cage, but no substantial evidence supports this theory.

Ferrance and Miller (2010) reported on 6 studies of chiropractic care for the treatment of asthma. These studies were not evaluated for bias or quality, nor were exclusion/inclusion criteria for the studies provided. The authors concluded that in general, there is little evidence for improvement in objective measures, such as lung function, but patients do report improvement in subjective symptoms and overall quality of life.

Hondras et al. performed a Cochrane review which was most recently updated in 2005. Of the 3 studies included in the review, 2 were randomized controlled studies of pediatric populations with ages from 6-16 years. However, only 1 of these studies had spinal manipulation as a treatment. While there were slight increases in objective measures, they were not clinically significant and there were no statistically significant changes from baseline measurements. The authors concluded that given the small number of studies found, there is inconclusive evidence regarding the efficacy of spinal manipulation for asthma (Hondras et al., 2005).

Kaminskyj et al. (2010) reviewed 8 articles regarding chiropractic treatment of asthma. The articles were scored with a modified Down's and Black checklist as they ranged from surveys, questionnaires and case reports, to randomized controlled trials and cross-over trials. One article received a score of 22 out of 27 possible points, which was 'Good.' Three articles received scores from 20 to 15 points, which were 'Moderate', and the remaining 4 articles scored less than 11 points, which were 'Poor.' Objective measures, such as spirometry readings of lung function, showed some improvement, but none were statistically significant. Subjective measures, such as quality of life, number of asthma attacks, and medication use had noticeable trends in improvement, but again were not

statistically significant. The authors did note that some positive clinical changes were seen in a number of children who were having spinal manipulation to treat asthma. Problems that the authors identified with the current literature is a lack of cohesiveness in reporting the exact type of treatment provided and a wide variety of outcome measures. While more evidence of a high quality is needed to make definitive statements recharging chiropractic treatment of asthma, the authors concluded that spinal manipulation may be considered as an adjunct to concurrent medical treatment and recommended a trial of care to determine the overall benefit of chiropractic care to manage their condition (Kaminskyj et al., 2010).

While performing their search for pediatric health conditions that utilize spinal manipulative therapy, Gleberzon et al. (2012) found 2 studies that used spinal manipulation for the treatment of asthma. Studies were evaluated with the Sackett instrument and scored very high (45 and 48 points out of a possible 50 points). One of the studies found significant improvements in quality of life, even after 1 year of follow-up, but no changes in lung function. The other study showed no statistical changes in subjective or objective measurements. The authors suggest that a potential reason for a lack of literature regarding pediatric populations involves the complications of research with this specific age group as they are usually excluded from larger scale trials. The authors suggest future studies investigating spinal manipulation and asthma focus more on daily activity outcomes, such as reductions in medications, and less on lung functions. The authors stated there is inconclusive evidence for the efficacy of spinal manipulation and the treatment of asthma (Gleberzon et al., 2012).

Clar et al. (2014) also found 3 studies investigating the effectiveness of chiropractic for the treatment of asthma in children. The studies reported no significant effects of spinal manipulation in any of the outcomes measured. However, the authors note the quality of evidence of the studies was poor, which led them to conclude there was inconclusive evidence for using spinal manipulation in the treatment of asthma (Clar et al., 2014).

Attention Deficit Hyperactivity Disorder (ADHD)

In 2010, Karpouzis et al. performed a systematic review investigating whether chiropractic care was able to reduce symptoms of ADHD. The authors used the definition of ADHD found in the Diagnostic and Statistical Manual of Mental Disorders 4th Edition Text Revision (DSM-IV-TR); inappropriate, chronic levels of inattention, hyperactivity and impulsivity. Parents with children who have been diagnosed with ADHD seek CAM therapies in varying rates across the world, from 12% in Florida to 68% in Melbourne Australia. Most cite concerns with appropriateness of medication for ADHD treatment as a reason to seek CAM therapies for their children. The authors found 58 initial citations, but upon review none of the studies met the pre-determined inclusion criteria. The authors suggest several reasons for this, including studies not being high enough quality of evidence to meet inclusion criteria, non-uniform reporting guidelines of results, and studies with high levels of bias. Thus, the authors classified their systematic review as an ‘empty

review,' meaning there is no current high-quality evidence to support chiropractic treatment for pediatric and adolescent ADHD. The authors do note that limitations for their study include only searching for articles in English and possible publication bias as unpublished literature and abstracts from conference proceedings were not searched. The authors also mention that although there have been no randomized controlled trials for ADHD treatment with chiropractic care, there have been 15 case studies and 3 case series reporting some success. Lastly, the authors suggest that guidelines such as those in place by the CONSORT group are followed for chiropractors who wish to conduct research in pediatric and adolescent ADHD (Karpouzis et al., 2010).

Ferrance and Miller also investigated ADHD in their 2010 review of chiropractic management of non-musculoskeletal conditions in children and adolescents. They also cite a lack of high-quality evidence of the effectiveness of chiropractic manipulation for ADHD but note that larger and more rigorous studies are needed before conclusive recommendations can be made (Ferrance and Miller, 2010). Holuszko et al. performed a systematic review in 2015 examining chiropractic treatment and neurodevelopmental disorders. According to Pediatric Chiropractic, by Anrig and Plaugher, neurodevelopmental disorders are disabilities associated primarily with the functioning of the neurological system and brain and include but are not limited to Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity Disorder (ADHD), and a variety of other learning and sensory processing disorders. The authors found 51 total articles, of which 37 were case files and or commentaries. The authors also comment that the predominant neurodevelopmental disorders associated with chiropractic care were ADHD and ADD and are the focus of 2 of the 3 randomized controlled studies that were found. While theories regarding mechanisms of how chiropractic treatment affects the central nervous system are mentioned as support for chiropractic treatment of ADHD and ADD, there still remains a lack of quality evidence to support this statement.

Dysmenorrhea

A systematic review by Proctor et al. (2006) performed under the Cochrane Collaboration evaluated the evidence for SMT for primary and secondary dysmenorrhea. The review identified four trials. Three of these trials were very small (*N*s = 44, 26, 10). These smaller trials did show some evidence in favor of SMT compared to sham treatment. The larger trial (*N* = 138) did not show such an effect.

Hypertension

An RCT on spinal manipulation and hypertension that was not included in the systematic reviews warrants attention (Bakris et al., 2007). This pilot study (*N* = 50) compared a low force, upper cervical manipulation to a sham procedure for the treatment of hypertension. The study results indicate a very large reduction (17 mm Hg vs. 3 mm Hg) in systolic blood pressure at a highly statistically significant level (P<0.0001). The study is self-described as a "double-blinded" study. The publication describes how patients were blinded as to

their treatment assignment—the patient's perception of the very low force administered in the active treatment is easily replicated by a sham procedure that alters slightly the positioning of the contact hand. The publication does not describe if or how the treating doctor was blinded as to the procedure he was administering, presumably the second part of the double-blinding. More importantly, the publication does not indicate whether or not the outcomes assessment (the measurement of blood pressure) was blinded. Mangum et al. (2012) performed a qualitative literature review on the efficacy of SMT for treating hypertension. They concluded that given the risk of bias, there is currently a lack of evidence to support the use of SMT as a therapy for the treatment of hypertension.

Infantile Colic

Ferrance and Miller discussed 'infant crying' in their 2010 review of non-musculoskeletal conditions in children. They acknowledge anecdotal accounts of babies with excess crying being successfully treated by chiropractors, but because there is not yet a mechanism of what caused excessive crying it is difficult to research what will best resolve excessive crying. A possible solution the authors suggest is to develop a classification system. This would allow infants with excessive crying to be grouped, which could demonstrate improved clinical outcomes, as infants with gastrointestinal distress may need different treatments than infants crying due to nerve irritation or other possible causes of crying. The authors found one study that attempted to do this but note that sample sizes were small, and caregivers were not blinded from the treatments the infants received. The authors concluded that chiropractic care appears to provide some benefit to reducing crying but are unsure if it is due to a reduction in parental anxiety, or due to an actual change to the infant's condition and recommend further research in this area (Ferrance and Miller, 2010).

Alcantara et al. performed a systematic review of chiropractic care for infants with colic in 2011. Upon searching databases and gray literature, the authors found 26 studies that met their inclusion criteria: 3 clinical trials, 2 survey studies, 6 case reports, 2 case series, 4 cohort studies, 5 commentaries, and 4 reviews of the literature. These studies, however, used various definitions of what colic was and how to determine if the infant actually had colic. A classic definition of colic comes from Wessel and is defined as 'crying during at least 3 hours per day on at least 3 days of at least 3 weeks.' Some studies simply reported 'excessive crying' and some studies included infants who were younger than 3 weeks of age. Other obstacles the authors found in assessing the literature include non-randomization into treatment groups, varying treatments used as comparisons to chiropractic care, and varying types of chiropractic care. While the authors did not perform a formal measurement of bias in the articles that were reviewed, they did comment on the fact that bias likely existed in several articles due to poor methods. The authors also commented on the safety of chiropractic care for infants with colic; no adverse events were reported for chiropractic care, but several side effects were reported for treatments such as medications and changes to infant formulas. In conclusion, Alcantara et al. support chiropractic for infants with colic as a safe and effective treatment but also recognize that

there is a lack of high-quality evidence in this area and encourage more rigorous investigation (Alcantara et al., 2011).

A Cochrane review was performed in 2012 by Dobson et al. to evaluate the results of manipulative therapies for infantile colic. Articles included in the review were randomized trials evaluating the effectiveness of chiropractic care, osteopathy or cranial osteopathy alone or in conjunction with other infantile colic treatments. The authors propose several mechanisms for why manipulation may reduce colic including high pressure on the infant head from the birth process, somatovisceral reflex involvement, or irritation of the vagus nerve. The authors identified 6 studies for inclusion representing 325 infants. Daily hours of crying were used as the primary outcome measurement for 5 of the 6 studies. All studies reported a high drop-out rate, and adverse events were only investigated in 1 study (none occurred). A combined data analysis of the studies suggested a benefit from receiving manual therapy but only 2 of these studies were evaluated as having a low risk of bias. Another study used infant sleeping time as the primary outcome measurement and found statistically significant improvement in infants who received manipulative therapy. Age of infants in the studies varied as did type and duration of treatment. The authors also worried about bias; when parents were blinded to the treatment their infant received there was no statistical significance between treatment groups. While there appears to be an overall positive effect of chiropractic manipulation to reduce the amount of crying time in infants with colic, not enough quality evidence is available to make a definitive recommendation. The authors suggest more rigorous research with random allocation to treatment groups and follow up assessments performed by individuals who are blinded to the treatment the infant receives (Dobson et al., 2012). Lucassen (2015) conducted a systematic overview aiming to answer what the effects of treatments for colic in infants are. According to their review, spinal manipulation does not appear to reduce the duration of crying associated with infantile colic, nor does it appear to facilitate recovery.

Nocturnal Enuresis

A Cochrane review of complementary and miscellaneous interventions for nocturnal enuresis in children was performed by Huang et al. in 2011. Nocturnal enuresis occurs when there is involuntary loss of control of the bladder at night when the child otherwise has daytime bladder control and there is a lack of an organic disease (such as diabetes mellitus). While enuresis is usually self-resolving and pathologically benign, the inability to control the bladder may cause psychological distress for both the child and the care giver. The exact cause of nocturnal enuresis is unclear, but there is a possible genetic component which may affect the physical and physiological maturity of the bladder. Other factors may include sleep disorders, constipation, and diet. Numerous interventions have been reported as treatments for nocturnal enuresis including those from allopathic and complementary and alternative medicine approaches. The authors performed a literature search of complementary and alternative treatments and found 3 trials using chiropractic as treatment, but small sample size and flawed methods give these studies a high risk of bias.

There appears to be weak evidence for the effectiveness of chiropractic care for the treatment of nocturnal enuresis, but the authors encourage more quality research in this area (Huang et al., 2011).

Otitis Media

Ferrance and Miller briefly discuss otitis media in their 2010 review of chiropractic management of non-musculoskeletal conditions in children. The primary treatment of otitis media had been the use of antibiotics, but recently the recommended treatment has changed to a 'wait and see' approach. Ferrance and Miller found 1 randomized trial using full spine osteopathic manipulation for treatment of otitis media. While there did seem to be improvement in the treatment group and the evaluating physicians were blinded to treatment, mothers of the participants were not which is a source of bias. The authors conclude there is a lack of evidence to make a recommendation for chiropractic care in the treatment of otitis media (Ferrance and Miller, 2010).

In 2012 Pohlman and Holton-Brown performed a literature review of otitis media (OM) in children to outline the diagnosis of otitis media, type of spinal manipulative therapy (SMT) used to treat OM, and any adverse events associated with the manipulation. Pohlman and Holton-Brown (2012) discuss several possible reasons listed by both the chiropractic and osteopathic professions for why SMT may resolve OM. One theory is that SMT causes biomechanical changes in sympathetic or parasympathetic nerve activity. Another is that anatomical structures that directly affect the Eustachian tube may become restricted and prevent proper lymphatic flow and drainage; SMT may reduce hypertonicity on these structures and allow for proper function. Since it was already determined there were few randomized controlled trials examining OM and SMT, the authors included all levels of evidence in their literature review as long as they were in participants 6 years or younger and addressed SMT or osteopathic manipulative therapy to spinal segments or cranial bones. The authors' search revealed 17 commentaries, 15 case reports, 5 case series, 8 reviews and 4 clinical trials. The authors reviewed the quality of the articles and determined there appears to be a benefit from SMT in pediatric patients with OM and relatively low risk of adverse advents. However, the authors also note that the majority of the literature found was in items lower on the evidence pyramid and more high-quality evidence needs to be done. The authors suggest a pragmatic study to explore the effect of SMT on OM in a 'real-world' setting and using established protocols for both diagnosis as well as treatment of OM. Thus, there is currently no evidence to support or refute using SMT for OM and no evidence that adverse events occur as a result of SMT (Pohlman and Holton-Brown, 2012).

Driehuis et al. (2019) conducted a systematic review of the evidence for effectiveness and harms of specific SMT techniques for infants, children, and adolescents. Of the 1,236 identified studies, 26 studies were eligible. Infants and children/adolescents were treated for various (non) musculoskeletal indications, hypothesized to be related to spinal joint

dysfunction. Studies examining the same population, indication and treatment comparison were scarce. Due to very low-quality evidence, it is uncertain whether gentle, low-velocity mobilizations reduce complaints in infants with colic or torticollis, and whether high-velocity, low-amplitude manipulations reduce complaints in children/adolescents with autism, asthma, nocturnal enuresis, headache, or idiopathic scoliosis. Five case reports described severe harms after HVLA manipulations in four infants and one child. Authors found the evidence was of very low-quality that prevented drawing any conclusions about the effectiveness of specific SMT techniques in infants, children, and adolescents.

Immune System Function

Chow et al. (2021) sought to identify, appraise, and synthesize the scientific literature on the efficacy and effectiveness of SMT in preventing the development of infectious disease or improving disease-specific outcomes in patients with infectious disease and to examine the association between SMT and selected immunological, endocrine, and other physiological biomarkers. Claims that spinal manipulative therapy (SMT) can improve immune function have increased substantially during the COVID-19 pandemic and may have contributed to the rapid spread of both accurate and inaccurate information (referred to as an infodemic by the World Health Organization). Randomized clinical trials and cohort studies were included. Eligible studies were critically appraised, and evidence with high and acceptable quality was synthesized. A total of 2,593 records were retrieved; after exclusions, 50 full-text articles were screened, and 16 articles reporting the findings of 13 studies comprising 795 participants were critically appraised. The literature search found no clinical studies that investigated the efficacy or effectiveness of SMT in preventing the development of infectious disease or improving disease-specific outcomes among patients with infectious disease. Eight articles reporting the results of 6 high- and acceptable-quality RCTs comprising 529 participants investigated the effect of SMT on biomarkers. Spinal manipulative therapy was not associated with changes in lymphocyte levels or physiological markers among patients with low back pain or participants who were asymptomatic compared with sham manipulation, a lecture series, and venipuncture control groups. Spinal manipulative therapy was associated with short-term changes in selected immunological biomarkers among asymptomatic participants compared with sham manipulation, a lecture series, and venipuncture control groups. Authors concluded that based on this systematic review of 13 studies, no clinical evidence was found to support or refute claims that SMT was efficacious or effective in changing immune system outcomes. Although there were limited preliminary data from basic scientific studies suggesting that SMT may be associated with short-term changes in immunological and endocrine biomarkers, the clinical relevance of these findings is unknown. Given the lack of evidence that SMT is associated with the prevention of infectious diseases or improvements in immune function, further studies should be completed before claims of efficacy or effectiveness are made.

Non-musculoskeletal Disorders

Côté et al. (2021) convened a Global Summit of international scientists to conduct a systematic review of the literature to determine the efficacy and effectiveness of SMT for the primary, secondary and tertiary prevention of non-musculoskeletal disorders. The summit was attended by 50 researchers from 8 countries and 28 observers from 18 chiropractic organizations. At the summit, participants critically appraised the literature and synthesized the evidence. The methodological quality of eligible studies was assessed independently by reviewers using the Scottish Intercollegiate Guidelines Network (SIGN) criteria for randomized controlled trials. The final risk of bias and evidence tables were reviewed by researchers who attended the Global Summit and 75% (38/50) had to approve the content to reach consensus. Of the 3,874 articles screened, the eligibility of 32 articles was evaluated at the Global Summit and 16 articles were included in the systematic review. The synthesis included six randomized controlled trials with acceptable or high methodological quality (reported in 7 articles). These trials investigated the efficacy or effectiveness of SMT for the management of infantile colic, childhood asthma, hypertension, primary dysmenorrhea, and migraine. None of the trials evaluated the effectiveness of SMT in preventing the occurrence of non-musculoskeletal disorders. Consensus was reached on the content of all risk of bias and evidence tables. All randomized controlled trials with high or acceptable quality found that SMT was not superior to sham interventions for the treatment of these non-musculoskeletal disorders. Six of 50 participants (12%) in the Global Summit did not approve the final report. The systematic review included six randomized clinical trials (534 participants) of acceptable or high quality investigating the efficacy or effectiveness of SMT for the treatment of non-musculoskeletal disorders. Authors concluded there no evidence exists of an effect of SMT for the management of non-musculoskeletal disorders including infantile colic, childhood asthma, hypertension, primary dysmenorrhea, and migraine. This finding challenges the validity of the theory that treating spinal dysfunctions with SMT has a physiological effect on organs and their function. Governments, payers, regulators, educators, and clinicians should consider this evidence when developing policies about the use and reimbursement of SMT for non-musculoskeletal disorders.

Goertz et al. (2021) discussed the findings of a recent systematic review of non-musculoskeletal disorders (Côté et al. (2021) that demonstrates the potential for faulty conclusions and misguided policy implications, and to offer an alternate interpretation of the data using present models and criteria. These authors participated in a chiropractic meeting (Global Summit) that aimed to perform a systematic review of the literature on the efficacy and effectiveness of mobilization or spinal manipulative therapy (SMT) for the primary, secondary, and tertiary prevention, and treatment of non-musculoskeletal disorders. After considering an early draft of the resulting manuscript, these authors identified points of concern and therefore declined authorship. This article was developed to describe those concerns about the review and its conclusions. Goertz et al. (2021) identified three main concerns: the inherent limitations of a systematic review of 6 articles

on the topic of SMT for non-musculoskeletal disorders, the lack of biological plausibility of collapsing 5 different disorders into a single category, and considerations for best practices when using evidence in policymaking. These authors propose that the following conclusion is more consistent with a review of the 6 articles. The small cadre of high- or moderate-quality randomized controlled trials reviewed in this study found either no or equivocal effects from SMT as a stand-alone treatment for infantile colic, childhood asthma, hypertension, primary dysmenorrhea, or migraine, and found no or low-quality evidence available to support other non-musculoskeletal conditions. Therefore, further research is needed to determine if SMT may have an effect in these and other non-musculoskeletal conditions. Until the results of such research are available, the benefits of SMT for specific or general non-musculoskeletal disorders should not be promoted as having strong supportive evidence. Further, a lack of evidence cannot be interpreted as counterevidence, nor used as evidence of falsification or verification. Authors concluded that based on the available evidence, some statements generated from the Summit were extrapolated beyond the data, have the potential to misrepresent the literature, and should be used with caution. Given that none of the trials included in the literature review were definitively negative, the current evidence suggests that more research on non-musculoskeletal conditions is warranted before any definitive conclusions can be made. Governments, insurers, payers, regulators, educators, and clinicians should avoid using systematic reviews in decisions where the research is insufficient to determine the clinical appropriateness of specific care.

Milne et al. (2022) sought to identify and map the available evidence regarding effectiveness and harms of spinal manipulation and mobilization for infants, children and adolescents with a broad range of conditions; and identify and synthesize policies, regulations, position statements and practice guidelines informing their clinical use. Infants, children, and adolescents (birth to < 18 years) with any childhood disorder/condition who received an intervention of spinal manipulation and mobilization were included as participants. Eighty-seven articles were included. Methodological quality of articles varied. Spinal manipulation and mobilization may be utilized clinically to manage pediatric populations with adolescent idiopathic scoliosis (AIS), asthma, attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), back/neck pain, breastfeeding difficulties, cerebral palsy (CP), dysfunctional voiding, excessive crying, headaches, infantile colic, kinetic imbalances due to suboccipital strain (KISS), nocturnal enuresis, otitis media, torticollis and plagiocephaly. This descriptive synthesis revealed: no evidence to explicitly support the effectiveness of spinal manipulation or mobilization for any condition in pediatric populations. Mild transient symptoms were commonly described in randomized controlled trials and on occasion, moderate-to-severe adverse events were reported in systematic reviews of randomized controlled trials and other lower quality studies. There was strong to very strong evidence for 'no significant effect' of spinal manipulation for managing asthma (pulmonary function), headache and nocturnal enuresis, and inconclusive or insufficient evidence for all other conditions explored. There is

insufficient evidence to draw conclusions regarding spinal mobilization to treat pediatric populations with any condition. Authors concluded that their descriptive synthesis of the collective findings does not provide support for spinal manipulation or mobilization in pediatric populations for any condition. Increased reporting of adverse events is required to determine true risks. Randomized controlled trials examining effectiveness of spinal manipulation and mobilization in pediatric populations are warranted.

Kovanur Sampath et al. (2024) synthesized the current level of evidence for spinal manipulation (SM) in influencing the autonomic nervous system (ANS) in healthy and/or symptomatic population in a systematic review. Overall, there was low quality evidence that SM did not influence any measure of ANS including heart rate variability (HRV), oxy-hemoglobin, blood pressure, epinephrine, and nor-epinephrine. However, there was low quality evidence that cervical spine manipulation may influence high frequency parameter of HRV, indicating its influence on the parasympathetic nervous system. Authors concluded that when compared with control or sham interventions, SM did not alter the ANS. Due to invalid methodologies and the low quality of included studies, findings must be interpreted with great caution.

Gross et al. (2024) developed evidence-based practice position statements directing physiotherapists clinical reasoning for the safe and effective use of spinal manipulation and mobilization for pediatric populations (<18 years) with varied musculoskeletal or non-musculoskeletal conditions. A three-stage guideline process using validated methodology was completed: 1. Literature review stage (one scoping review, two reviews exploring psychometric properties); 2. Delphi stage (one 3-Round expert Delphi survey); and 3. Refinement stage (evidence-to-decision summative analysis, position statement development, evidence gap map analyses, and multilayer review processes). Evidence-based practice position statements were developed to guide the appropriate use of spinal manipulation and mobilization for pediatric populations. All were predicated on clinicians using biopsychosocial clinical reasoning to determine when the intervention was appropriate.

1. It is not recommended to perform:
    a. Spinal manipulation and mobilization on infants.
    b. Cervical and lumbar spine manipulation on children.
    c. Spinal manipulation and mobilization on infants, children, and adolescents for non-musculoskeletal pediatric conditions including asthma, attention deficit hyperactivity disorder, autism spectrum disorder, breastfeeding difficulties, cerebral palsy, infantile colic, nocturnal enuresis, and otitis media.
2. It may be appropriate to treat musculoskeletal conditions including spinal mobility impairments associated with neck-back pain and neck pain with headache utilizing:
    a. Spinal mobilization and manipulation on adolescents;

b. Spinal mobilization on children; or
c. Thoracic manipulation on children for neck-back pain only.

3. No high certainty evidence to recommend these interventions was available. Reports of mild to severe harms exist; however, risk rates could not be determined.

SAFETY

The potential risk of a major complication due to spinal manipulation is rare (Clar et al., 2014; Hurwitz, et al., 1996). A summary of the literature reviewed, including a systematic review by Hawk et al. (2007) and Clar et al. (2014), concluded that adverse events were rare, transient, and mild. Not all of the reviews addressed the question of adverse events or safety, but those that did noted that SMT did not represent a safety risk to patients. Without clear evidence to support SMT for the treatment of non-musculoskeletal and related disorders, the potential for substitution harm must be considered by the patient and clinician.

Cervical mobilization and manipulation have been suspected of creating a cervical artery dissection (CAD) as an adverse event. However, these assumptions are based on case studies which are unable to establish direct causality. Chaibi and Bjørn Russel (2019) conducted a literature review to provide clinicians with an updated step-by-step risk–benefit assessment strategy tool to (a) facilitate clinicians understanding of CAD, (b) appraise the risk and applicability of cervical manual-therapy, and (c) provide clinicians with adequate tools to better detect and exclude CAD in clinical settings. Cervical artery dissection refers to a tear in the internal carotid or the vertebral artery that results in an intramural hematoma and/or aneurysmal dilatation. Although cervical artery dissection is thought to occur spontaneously and is rare, physical trauma to the neck, especially hyperextension and rotation, has been reported as a trigger. Headache and/or neck pain is the most common initial symptom of cervical artery dissection. Other symptoms include Horner's syndrome and lower cranial nerve palsy. Both headache and/or neck pain are common symptoms and leading causes of disability. Because manual-therapy interventions can alleviate headache and/or neck pain, many patients seek manual therapists, such as chiropractors and physiotherapists to help them manage symptoms. There is debate as to whether CAD symptoms lead the patient to seek cervical manual-therapy or whether the cervical manual therapy provoked CAD along with the non-CAD presenting complaints. Thus, practitioners need to be diligent with subjective and objective evaluations of patients to understand the risk for CAD and whether to address its potential existence.

PRACTITIONER SCOPE AND TRAINING

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

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

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

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

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