JAOA SPECIAL COMMUNICATION

American Osteopathic Association Guidelines for Osteopathic Manipulative Treatment (OMT) for Patients With Low Back Pain

Clinical Guideline Subcommittee on Low Back Pain

Background: Osteopathic manipulative treatment (OMT) is a distinctive modality commonly used by osteopathic physicians to complement conventional treatment of musculoskeletal disorders, including those that cause low back pain. Osteopathic manipulative treatment is defined in the *Glossary of Osteopathic Terminology* as: "The therapeutic application of manually guided forces by an osteopathic physician (US Usage) to improve physiologic function and/or support homeostasis that has been altered by somatic dysfunction. OMT employs a variety of techniques." Somatic dysfunction is defined as: "Impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial and myofascial structures, and their related vascular, lymphatic, and neural elements. Somatic dysfunction is treatable using osteopathic manipulative treatment." Previous published guidelines have been based on literature reviews and meta-analyses of spinal manipulation for low back pain. They have not specifically addressed OMT and generally have focused on spinal manipulation as an alternative to conventional treatment. The purpose of this study was to assess the efficacy of OMT for somatic dysfunction associated with low back pain by osteopathic physicians and osteopathic practitioners trained in osteopathic palpatory diagnosis and manipulative treatment.

Methods: Computerized bibliographic searches of MEDLINE, OLDMEDLINE, EMBASE, AMED, MANTIS, OSTMED (OSTMED.DR), and the Cochrane Central Register of Controlled Trials were supplemented with additional database and manual searches of the literature. Six trials, involving eight OMT vs control treatment comparisons, were included because they were randomized controlled trials of OMT that involved blinded assessment of low back pain in ambulatory settings. Data on trial methodology, OMT and control treatments, and low back pain outcomes were abstracted by two independent reviewers. Effect sizes were computed using Cohen *d* statistic, and meta-analysis results were weighted by the inverse variance of individual comparisons. In addition to the overall meta-analysis, subgroup meta-analyses were performed according to control treatment, country where the trial was conducted, and duration of follow-up. Sensitivity analyses were performed for both the overall and subgroup meta-analyses.

Results: Osteopathic manipulative treatment significantly reduced low back pain (effect size, -0.30; 95% confidence interval, -0.47 to -0.13; *P*=.001). Subgroup analyses demonstrated significant pain reductions in trials of OMT vs active treatment or placebo control and OMT vs no treatment control. There were significant pain reductions with OMT regardless of whether trials were performed in the United Kingdom or the United States. Significant pain reductions were also observed during short-, intermediate-, and long-term follow-up.

Conclusions: Osteopathic manipulative treatment significantly reduces low back pain. The level of pain reduction is clinically important, greater than expected from placebo effects alone, and may persist through the first year of treatment. Additional research is warranted to elucidate mechanistically how OMT exerts its effects, to determine if OMT benefits extend beyond the first year of treatment, and to assess the cost-effectiveness of OMT as a complementary treatment for low back pain.

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Michael A. Seffinger, DO, was the chair of the Clinical Guideline Subcommittee on Low Back Pain of the Bureau of Osteopathic Clinical Education and Research. He is also the vice-chair of the AOA Bureau of Osteopathic Clinical Education and Research. Additional subcommittee participants were Boyd R. Buser, DO; John C. Licciardone, DO, MBA; James A. Lipton, DO, FAAO; John K. Lynch, DO, MPH; Michael M. Patterson, PhD; Richard Snow, DO, MPH; and Monte E. Troutman, DO. Funding for these guidelines was provided by the American Osteopathic Association.

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Address correspondence to Michael A. Seffinger, DO, Western University of Health Sciences College of Osteopathic Medicine of the Pacific, 309 E 2nd St, Pomona, CA 91766-1854.

E-mail: mseffinger@westernu.edu

Editor's Note: To enhance the readability of this special feature to *JAOA—The Journal of the American Osteopathic Association*, these guidelines have been edited for grammar and basic *JAOA* style. The content of this contribution has not been modified.

Executive Summary

The American Osteopathic Association (AOA) recommends that osteopathic physicians use osteopathic manipulative treatment (OMT) in the care of patients with low back pain. Evidence from systematic reviews and meta-analyses of randomized clinical trials (Evidence Level 1a) supports this recommendation.

The format used for this guideline is based on recommendations made in the following article: Shiffman RN, Shekelle P, Overhage JM, Slutsky J, Grimshaw J, Deshpande AM. Standardized reporting of clinical practice guidelines: a proposal from the Conference on Guideline Standardization. *Ann Intern Med*. 2003;1(39):493-498.

1. Overview material: Provide a structured abstract that includes the guideline's release date, status (original, revised, updated), and print and electronic sources.

Released June 2010. This Guideline is available through the AOA Web site and National Guideline Clearinghouse through the Agency for Healthcare Research and Quality. The guideline is partially based upon the following study: Licciardone JC, Brimhall AK, King LN. Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials. *BMC Musculoskelet Disord*. 2005;6:43.[1]

2. Focus: Describe the primary disease/condition and intervention/service/technology that the guideline addresses. Indicate any alternative preventive, diagnostic or therapeutic interventions that were considered during development.

These guidelines are intended to assist osteopathic physicians in appropriate utilization of OMT for patients with low back pain. Other alternative preventive, diagnostic, and therapeutic interventions considered during development of these guidelines were those noted in the following published guidelines for physicians caring for patients with low back pain:

- Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians, American College of Physicians, American Pain Society Low Back Pain Guidelines Panel. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society [published correction appears in *Ann Intern Med*. 2008;148(3):247-248]. *Ann Intern Med*. 2007; 147(7):478-91.
- *Low Back Pain or Sciatica in the Primary Care Setting*. Washington, DC: VA/DoD Evidence-Based Clinical Practice Guideline Working Group, Veterans Health Administration, Department of Veterans Affairs, and Health Affairs, Department of Defense, November 1999. Office of Quality and Performance publication 10Q-CPG/LBP-99.

Background

Historically, low back pain has been the most common reason for visits to osteopathic physicians.[2] More recent data from the Osteopathic Survey of Health Care in America have confirmed that a majority of patients visiting osteopathic physicians continue to seek treatment for musculoskeletal conditions.[3,4] A distinctive element of low back care provided by osteopathic physicians is OMT. A comprehensive evaluation of spinal manipulation for low back pain undertaken by the Agency for Healthcare Research and Quality (formerly the Agency for Health Care Policy and Research) in the United States concluded that spinal manipulation can be helpful for patients with acute low back problems without radiculopathy when used within the first month of symptoms.[5] Nevertheless, because most studies of spinal manipulation involve chiropractic or physical therapy,[6] it is unclear if such studies adequately reflect the efficacy of OMT for low back pain.

Although the professional bodies that represent osteopaths, chiropractors, and physiotherapists in the United Kingdom developed a spinal manipulation package consisting of three common manual elements for the UK Back pain Exercise And Manipulation (UK BEAM) trial,[7] there are no data on the comparability of profession-specific outcomes.[8,9] It is well known that OMT comprises a diversity of techniques.[10] These OMT techniques are not adequately represented by the UK BEAM trial package. Professional differences in spinal manipulation are more pronounced in research studies, in which chiropractors have focused almost exclusively on high-velocity, low-amplitude techniques.[11] For example, a major trial of chiropractic manipulation as adjunctive treatment for childhood asthma used a high-velocity, low-amplitude thrust as the active treatment.[12] The simulated treatment provided in the sham manipulation arm of this chiropractic trial, which ostensibly was used to provide no therapeutic effect, bore a marked similarity to OMT.[11,13]

Because differences in professional background and training lend themselves to diverse manipulation approaches, clinicians have been warned about generalizing the findings of systematic reviews to practice.[14] In addition to professional differences in the manual techniques themselves, osteopathic physicians in the United States, unlike allopathic physicians or chiropractors, can treat this condition simultaneously using both conventional primary care approaches and complementary spinal manipulation. This represents a unique philosophical approach in the treatment of patients with low back pain. Consequently, there is a need for empirical data that specifically address the efficacy of OMT for conditions such as low back pain.[15]

These guidelines are based on a systematic review of the literature on OMT for patients with low back pain and a meta-analysis of all randomized controlled trials of OMT for patients with low back pain in ambulatory settings.

3. Goal: Describe the goal that following the guideline is expected to achieve, including the rationale for development of a guideline on this topic.

The goal of these guidelines is to enable osteopathic physicians, as well as other physicians, other health professionals, and third party payers, to understand the evidence underlying recommendations for appropriate utilization of OMT, which is not detailed in the current sets of guidelines developed by other physicians. The AOA does not believe it is appropriate for other professionals to create guidelines for utilization of OMT because it is not a procedure or approach used by those physicians. It is, however, the purview and duty of the American Osteopathic Association to inform its members and the public about the appropriate utilization of OMT.

4. Users/setting: Describe the intended users of the guideline (eg, provider types, patients) and the settings in which the guideline is intended to be used.

These guidelines are to be used by osteopathic physicians in application of OMT to patients with low back pain in the ambulatory setting.

Methods

5. Target population: Describe the patient population eligible for guideline recommendations and list any exclusion criteria.

Patients with low back pain of musculoskeletal origin are eligible for guideline recommendations. Patients with visceral disease conditions that refer pain to the low back are excluded from these guidelines. Other conditions of exclusion are when the following are the identified source of the low back pain: vertebral fracture; vertebral joint dislocation; muscle tears or lacerations; spinal or vertebral joint ligament rupture; inflammation of intervertebral disks, spinal zygapophyseal facets joints, muscles, or fascia; skin lacerations; sacroiliitis; ankylosing spondylitis; or masses in or from the low back structures that are the source of the pain. Exclusion from this guideline does not imply that OMT is contraindicated in these conditions.

6. Developer: Identify the organization(s) responsible for guideline development and the names/credentials/potential conflicts of interest of individuals involved in the guideline's development.

The AOA, Bureau of Osteopathic Clinical Education and Research, Clinical Guideline Subcommittee on Low Back Pain: Michael A. Seffinger, DO (chair); Boyd R. Buser, DO; John C. Licciardone, DO, MBA; James A. Lipton, DO, FAAO; John K. Lynch, DO, MPH; Michael M. Patterson, PhD; Richard Snow, DO, MPH; Monte E. Troutman, DO.

7. Funding source/sponsor: Identify the funding source/sponsor and describe its role in developing and/or reporting the guideline. Disclose potential conflict of interest.

This project was funded by the AOA. A subcommittee under the direction of Michael Seffinger, DO, vice-chair of the AOA Bureau of Osteopathic Clinical Education and Research, was convened to explore the issue and make recommendations to the AOA Board of Trustees and the AOA House of Delegates, with input from the AOA Bureau of Osteopathic Specialists, AOA Bureau of Scientific Affairs and Public Health, AOA Bureau on Socioeconomic Affairs, American Academy of Osteopathy, American College of Osteopathic Family Physicians, American College of Osteopathic Internists, and the AOA Council on Research. Upon approval of these recommendations, the AOA Board of Trustees submitted them to the National Guideline Clearinghouse for public record and access. As the guidelines were developed based on the peer-reviewed scientific literature, no conflict of interest is claimed by the developers. A well-rounded, objective perspective is presented. Any views from an osteopathic perspective that is not supported by the scientific literature is stated and clearly identified so the reader is able to discern any potential for bias.

8. Evidence collection: Describe the methods used to search the scientific literature, including the range of dates and databases searched, and criteria applied to filter the retrieved evidence.

A search of the English-language literature was performed through 2006 to identify reports of randomized controlled trials of OMT. Based on the systematic review by Licciardone et al,[1] we searched MEDLINE, OLDMEDLINE, EMBASE, AMED, MANTIS, OSTMED (OSTMED.DR), CINAHL, EMBASE, and the Cochrane Central Register of Controlled Trials. The search strategies for these databases are presented in *Appendix 1*.[1] We also searched Alt Health Watch, SciSearch, ClinicalTrials.gov, and CRISP. Additionally, reports were sought from relevant reviews or meta-analyses of spinal manipulation,[10,16-33] manual searches of reference citations in the reviewed literature sources, systematic manual searches of key osteopathic journals, and consultation with other osteopathic investigators for identification of other reports of OMT trials.

Terminology used in the study is defined in *Appendix 2*.

Selection

The search bibliographies and relevant reports were reviewed by a series of trained reviewers to identify randomized controlled trials involving OMT in human subjects. To validly assess the efficacy of OMT in primary care, eligibility was limited to randomized controlled trials

of OMT that included blinded assessment of low back pain in ambulatory settings. Trials that involved manipulation under anesthesia, industrial settings, or hospitalized patients were not included. Because there is potential confusion regarding the type of manipulation performed in some trials,[34] the reported methods in each trial were carefully reviewed to assess eligibility for the meta-analysis. Consequently, 7 studies known or purported to involve OMT for low back pain were reviewed and excluded for not meeting eligibility criteria.[35-41] A subsequent source[42] indicated that an osteopathic manipulation technique was used in the Irvine study.[43]

Although several of the 6 included OMT trials were identified in multiple bibliographic databases, 5[43-47] were identified through MEDLINE. The Cleary[48] trial was identified exclusively through the Cochrane Central Register of Controlled Trials. Another identified an OMT trial that involved treatment of spinal pain, including neck pain, upper back pain, lower back pain, and combinations thereof, did not present anatomic site specific data for review.[49] The doctoral dissertation that served as the basis for this research and publication was successfully acquired in March 2007; however, this document did not provide the low back–specific data necessary for meta-analysis.

Data Extraction

Each eligible trial was independently evaluated by two reviewers to abstract data on methodologic characteristics, OMT and control treatments, and low back pain outcomes. Conflicting data were resolved by consensus.

9. Recommendation grading criteria: Describe the criteria used to rate the quality of evidence that supports the recommendations and the system for describing the strength of the recommendations.
Recommendation strength communicates the importance of adherence to a recommendation and is based on both the quality of the evidence and the magnitude of anticipated benefits or harms.

Quantitative Data Synthesis

10. Method for synthesizing evidence: Describe how evidence was used to create recommendations, eg, evidence tables, meta-analysis, decision analysis.
We used the effect size, computed as Cohen *d* statistic, to report all trial results.[50] A negative effect size represented a greater decrease in pain among OMT subjects relative to control treatment subjects. Dichotomous pain measures were transformed to effect sizes by first computing the relevant *P* value and then determining the effect size and 95% confidence interval (CI) that would obtain under the assumption of a two-tailed *t* test for measuring the standardized mean difference between OMT and control treatments in the relevant number of subjects.[50] The meta-analysis results were weighted by the inverse variance for each OMT vs control treatment comparison. The *Q* statistic was used to test the homogeneity of trials included in each analysis.[51] The overall meta-analysis included the 8 OMT vs control treatment comparisons. Four of the 6 trials, involving 6 of the 8 OMT vs control treatment comparisons, each reported 3 contrasts.[43,44,46,47] The median contrast was used to represent the pain outcome for each of these 6 comparisons (the median contrast refers to the intermediate effect size among the 3 reported pain outcomes for a given OMT vs control treatment comparison). These median contrasts were then combined with the lone contrasts reported in each of the 2 remaining OMT vs control treatment comparisons.[45,48] Based on the similarity among trials, a fixed effects model initially was used to perform meta-analysis and the results were then compared with those of a random-effects model. A series of sensitivity analyses were then performed.

First, to address the possibility of bias by using the median contrasts method, analyses were repeated using the best-case and worst-case scenarios for the 6 relevant OMT vs control treatment comparisons.[43,44,46,47] Second, to address the possibility of bias by including comparisons involving the same OMT group vs 2 different control treatment groups in 2 trials,[44,47] analyses were repeated using only 1 OMT vs control treatment comparison for each of these trials. Each of the 4 possible combinations of contrasts was analyzed. Third, the analysis was repeated after excluding the Cleary[48] trial. Finally, an analysis was performed using all 20 low back pain contrasts.

Similar analyses were performed after stratifying trials according to control treatment, country where the trial was performed, and duration of follow-up. There were 43 analyses performed, including the overall meta-analysis, 7 subgroup meta-analyses, and 35 sensitivity analyses. Meta-analysis was performed only when there were at least 3 contrasts available for data synthesis. Database management and analyses were performed using the Comprehensive Meta-Analysis software package (version 1.0.23; Biostat Inc, Englewood, New Jersey).

Results

Overall Analyses

A total of 525 subjects with low back pain were randomized in the eligible trials. There was a highly significant reduction in pain associated with OMT (effect size, -0.30; 95% CI, -0.47 to -0.13; *P*=.001). The *Q* statistic was nonsignificant, thus supporting the assumption of homogeneity among trials. Using a random-effects model, the results were virtually identical to those observed with a fixed-effects model. There were 729 (36×12) possible combinations of contrasts for analysis based on 3 contrasts for each of 6 OMT vs control treatment comparisons[43,44,46,47]

and 1 contrast for each of the 2 remaining OMT vs control treatment comparisons.[45,48] The efficacy of OMT for low back pain was supported in both the best-case (effect size, -0.37; 95% CI, -0.55 to -0.20; $P<.001$) and worst-case (effect size, -0.18; 95% CI, -0.35 - 0.00; $P=.046$) scenarios. Similarly, when each trial was limited to 1 OMT vs control treatment comparison, OMT was found to be efficacious in each of the 4 analyses. OMT also demonstrated significantly greater low back pain reduction than control treatment in analyses with the Cleary[48] trial excluded and with all 20 contrasts included.

Subgroup Analyses

There was a significant reduction in low back pain associated with OMT in trials vs active treatment or placebo control (effect size, -0.26; 95% CI, -0.48 to -0.05; $P=.02$), independent of fixed-effects or random-effects model specification. There were 243 (35×11) possible contrast combinations based on 3 contrasts for each of 5 OMT vs control treatment comparisons[43,44,46,47] and 1 contrast for another remaining OMT vs control treatment comparison.[48] Both the best-case and worst-case scenarios demonstrated a greater reduction in pain with OMT than active treatment or placebo control, although the worst-case results did not achieve statistical significance. Osteopathic manipulative treatment was found to significantly reduce pain in the remaining analyses that limited OMT vs active treatment or placebo control comparisons to 1 per trial, excluded the Cleary[48] trial, and included all 16 contrasts. The OMT vs no treatment control comparisons were observed in trials in which all subjects received usual low back care in addition to their allocated treatment (ie, OMT and usual care vs only usual care).[45,48] For these trials, the all-contrasts model (ie, the only model with sufficient contrasts for data synthesis) demonstrated a highly significant reduction in pain with OMT. Trials in both the United Kingdom (effect size, -0.29; 95% CI, -0.58 to 0.00; $P=.050$) and the United States (effect size, -0.31; 95% CI, -0.52 to -0.10; $P=.004$) demonstrated significant reductions in low back pain. In the sensitivity analyses, effects sizes were generally of comparable magnitude in both countries, though results in US trials consistently achieved statistical significance as a consequence of the larger sample sizes in these trials.

There were significant reductions in low back pain associated with OMT during the short-term (effect size, -0.28; 95% CI, -0.51 to -0.06; $P=.01$), intermediate-term (effect size, -0.33; 95% CI, - 0.51 to -0.15; $P<.001$), and long-term (effect size, -0.40; 95% CI, -0.74 to -0.05; $P=.03$) follow-up periods. Sensitivity analyses for temporal outcomes demonstrated that intermediate-term results consistently achieved statistical significance, generally because of the greater number of subjects in these analyses.

Comment

Efficacy of OMT

The overall results clearly demonstrate a statistically significant reduction in low back pain with OMT. Subgroup meta-analyses to control for moderator variables demonstrated that OMT significantly reduced low back pain vs active treatment or placebo control and vs no treatment control. If it is assumed, as shown in a review,[52] that the effect size is -0.27 for placebo control vs no treatment in trials involving continuous measures for pain, then the results of our study are highly congruent (ie, effect size for OMT vs no treatment [-0.53] = effect size for OMT vs active treatment or placebo control [-0.26] + effect size for placebo control vs no treatment [-0.27]). It has been suggested that the therapeutic benefits of spinal manipulation are largely due to placebo effects.[53] A preponderance of results from our sensitivity analyses supports the efficacy of OMT vs active treatment or placebo control and therefore indicates that low back pain reduction with OMT is attributable to the manipulation techniques, not merely placebo effects. Also, as indicated above, OMT vs no treatment control demonstrated pain reductions twice as great as previously observed in clinical trials of placebo vs no treatment control.[52]

The clinical significance of our findings is readily evident when compared with nonsteroidal anti-inflammatory drugs, including cyclo-oxygenase-2 inhibitors. A recent meta-analysis of the efficacy of these drugs included 23 randomized placebo-controlled trials for osteoarthritic knee pain, representing more than 10,000 subjects, and measured pain outcomes up to 3 months following randomization.[54] This study found an overall effect size of - 0.32 (95% CI, -0.24 to -0.39) and effect size of -0.23 (95% CI, -0.16 to -0.31) when drug non-responders were not excluded from the analyses. Thus, our effect size of -0.26 (95% CI, -0.48 to - 0.05) for OMT in trials vs active treatment or placebo control suggests that OMT provides an analgesic effect comparable to nonsteroidal anti-inflammatory drugs, including cyclo-oxygenase-2 inhibitors. Unlike the meta-analysis of nonsteroidal anti-inflammatory drugs,[54] however, Licciardone et al[47] found that OMT also significantly reduced pain during the 3- to 12-month period following randomization. Thus, OMT for low back pain may eliminate or reduce the need for drugs that can have serious adverse effects.[45]

Because osteopathic physicians provide OMT to complement conventional treatment for low back pain, they tend to avoid substantial additional costs that would otherwise be incurred by referring patients to chiropractors or other practitioners.[55] With regard to back pain, osteopathic physicians make fewer referrals to other physicians and admit a lower percentage of patients to hospitals than allopathic physicians,[2] while also treating back pain episodes

with substantially fewer visits than chiropractors.[56] Although osteopathic family physicians are less likely to order radiographs or prescribe nonsteroidal anti-inflammatory drugs, aspirin, muscle relaxants, sedatives, and narcotic analgesics for low back pain than their allopathic counterparts, osteopathic physicians have a substantially higher proportion of patients returning for follow-up back care than allopathic physicians.[57] In the United Kingdom, where general practitioners may refer patients with spinal pain to osteopaths for manipulation, it has been shown that OMT improved physical and psychological outcomes at little extra cost.[49]

11. Prerelease review: Describe how the guideline developer reviewed and/or tested the guidelines prior to release.

Guidelines were reviewed by the AOA Board of Trustees, Bureau of Osteopathic Specialists, Bureau of Osteopathic Clinical Education and Research, Council on Research, Bureau of Scientific Affairs and Public Health, Bureau of Socioeconomic Affairs, Department of Quality and Research, American College of Osteopathic Family Physicians, American Academy of Osteopathy, American College of Osteopathic Internists, and the AOA House of Delegates.

12. Update plan: State whether or not there is a plan to update the guideline and, if applicable, an expiration date for this version of the guideline.

Strength of Evidence	Type of Study	Comment
1a	Systematic review with homogeneity of randomized controlled trials	Individual trials should be free of substantial variations in the directions and magnitudes of results
1b	Individual randomized controlled trial with narrow confidence interval	Confidence interval should indicate a clinically important OMT effect
1c	Differential frequency of adverse outcomes	An adverse outcome was frequently observed in patients who did not receive OMT, but was infrequently observed in patients who did receive OMT (equivalent to a small number needed to treat)
2a	Systematic review with homogeneity of cohort studies	Individual studies should be free of substantial variations in the directions and magnitudes of OMT effects
2b	Individual cohort study or low-quality randomized controlled trial	Low quality may be indicated by such factors as important differences in baseline characteristics between groups, lack of concealment of treatment allocation, and excessive losses to follow-up
3a	Systematic review with homogeneity of case-control studies	Individual studies should be free of substantial variations in the directions and magnitudes of OMT effects
3b	Individual case-control study	These should be free of substantial evidence of selection bias, information bias, or confounding variables
4	Case series and low-quality cohort and case-control studies	Low quality of cohort and case control studies may be indicated by such factors as important sources of selection bias, information bias, or confounding variables
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research, or "first principles"	These generally will have limited empirical data relevant to OMT effects in human populations

Figure 1. *Levels of evidence.* ***Source:*** *Adapted from Straus SE, Richardson WS, Glasziou P, Haynes RB.* Evidence-Based Medicine: How to Practice and Teach EBM*. 3rd ed. London, England: BMJ Publishing Group; 2005.*

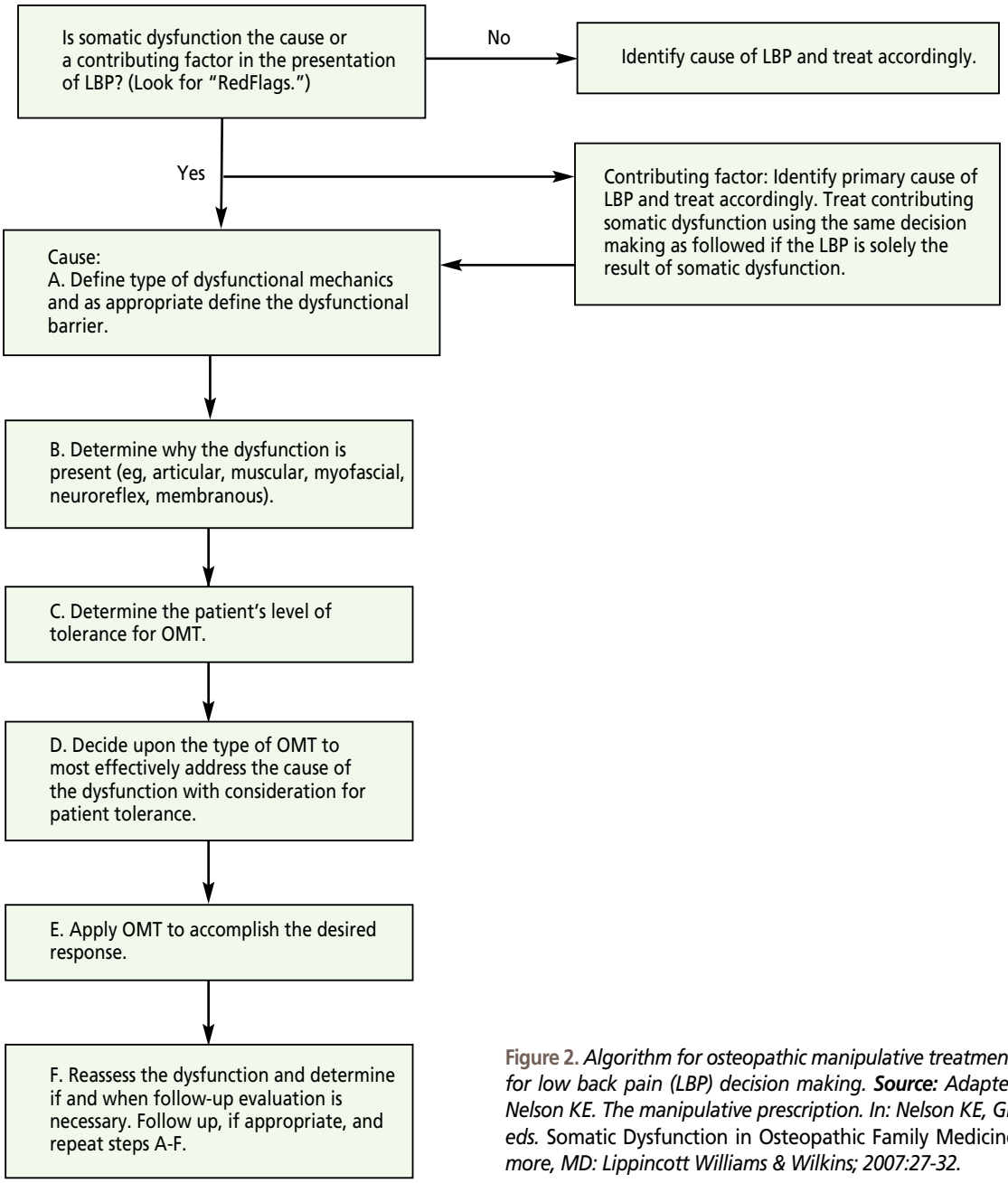

Figure 2. *Algorithm for osteopathic manipulative treatment (OMT) for low back pain (LBP) decision making.* ***Source:*** *Adapted from: Nelson KE. The manipulative prescription. In: Nelson KE, Glonek T, eds.* Somatic Dysfunction in Osteopathic Family Medicine. *Baltimore, MD: Lippincott Williams & Wilkins; 2007:27-32.*

The guidelines will be updated every 5 years.

13. Definitions: Define unfamiliar terms and those critical to correct application of the guideline that might be subject to misinterpretation.

Osteopathic manipulative treatment referred specifically to manual treatment provided by osteopathic physicians, or other physicians who had demonstrated training and proficiency in OMT, such as those practitioners in Europe who may have undertaken osteopathic conversion programs.

14. Recommendations and rationale: State the recommended action precisely and the specific circumstances under which to perform it. Justify each recommendation by describing the linkage between the recommendation and its supporting evidence. Indicate the quality of evidence and the recommendation strength, based on the criteria described in 9.

Based on this meta-analysis (evidence level 1a—see *Figure 1*) of randomized controlled trials on OMT for patients with low back pain, it is recommended that OMT be utilized by osteopathic physicians for musculoskeletal causes

of low back pain, ie, to treat patients with the diagnoses of somatic dysfunctions related to the low back pain. Subgroup meta-analyses to control for moderator variables demonstrated that OMT significantly reduced low back pain vs active treatment or placebo control and vs no treatment control.

15. Potential benefits and harms: Describe anticipated benefits and potential risks associated with implementation of guideline recommendations.

Potential benefits include but are not limited to improved care for patients seeing osteopathic physicians or practitioners for somatic dysfunctions causing low back pain. Harms have not been identified in randomized clinical trials on OMT for patients with low back pain. Osteopathic manipulative treatment for somatic dysfunction has not demonstrated harm in any clinical trials to date.

16. Patient preferences: Describe the role of patient preferences when a recommendation involves a substantial element of personal choice or values.

Patients have a choice of provider and services when they suffer from low back pain. Osteopathic manipulative treatment offers another option for care for low back pain from somatic dysfunction and can be provided by osteopathic physicians. It is utilized as an adjunct or complementary to conventional or alternative methods of treatment.

17. Algorithm: Provide (when appropriate) a graphical description of the stages and decisions in clinical care described by the guideline.

Once a patient with low back pain is diagnosed with somatic dysfunction as the cause, or contributing factor, of the low back pain, OMT should be utilized by the osteopathic physician (*Figure 2*). The diagnosis of somatic dysfunction entails a focal or complete history and physical examination, including an osteopathic structural examination that provides evidence of asymmetrical anatomic landmarks, restriction or altered range of joint motion, and palpatory abnormalities of soft tissues. Osteopathic manipulative treatment for somatic dysfunction is utilized after other potential causes of low back pain are ruled out or considered improbable by the treating physician (ie, vertebral fracture; vertebral joint dislocation; muscle tears or lacerations; spinal or vertebral joint ligament rupture; inflammation of intervertebral disks, spinal zygapophyseal facets joints, muscles or fascia; skin lacerations; sacroiliitis; ankylosing spondylitis; masses in or from the low back structures; or organic [visceral] disease referring pain to the back or causing low back muscle spasms).

18. Implementation considerations: Describe anticipated barriers to application of the recommendations. Provide reference to any auxiliary documents for providers or patients that are intended to facilitate implementation. Suggest review criteria for measuring changes in care when the guideline is implemented.

One of the barriers to application of the recommendations cited by osteopathic physicians has been poor reimbursement for OMT.[58] However, Medicare has reimbursed osteopathic physicians for this procedure (ICD-9 code: 98926-9) for more than 30 years. Many osteopathic physicians apparently do not utilize OMT in clinical practice because of a number of barriers, including time constraints, lack of confidence, loss of skill over time from disuse, and inadequate office space.[58] Some specialists (ie, pathologists and radiologists) do not use OMT as it is not applicable to their duties within their specialty. The AOA believes patients with low back pain should be treated with OMT given the high level of evidence that supports its efficacy. Changes in care when this guideline is implemented will be determined by physician and patient surveys, billing and coding practice patterns among osteopathic physicians, data gathered from osteopathic physicians via the AOA's Clinical Assessment Program, and other registry data gathering tools currently being developed by researchers.

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Appendix 1

Computerized database search strategies. A literature search for all patient-oriented research involving osteopathic manipulative treatment was conducted in the following databases: MEDLINE, OLDMEDLINE, OSTMED, AMED, MANTIS, CINAHL, EMBASE, and Cochrane Center Register of Controlled Trials. The following thesis and dissertation databases and Web sites were searched: Osteopathic Research Web, WorldCat Dissertations and Theses, and Digital Dissertation Abstracts, Canadian College of Osteopathy Research Titles, and the International Academy of Osteopathy. ***Abbreviations:*** *MeSH, medical subject heading; OMT, osteopathic manipulative treatment.* ***Source:*** *Licciardone JC et al. Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials.* BMC Musculoskelet Disord. *2005;6:43.*[1]

Search Strategy for MEDLINE
1. Manipulation, osteopathic (MeSH)
2. OMT (text word)
3. Osteopathic medicine (MeSH)
4. 1 or 2 or 3
5. Biomedical Research (MeSH)
6. Clinical Trials (MeSH)
7. Randomized Control Trials (MeSH)
8. Epidemiologic Studies (MeSH)
9. 5 or 6 or 7 or 8
10. 4 and 9
11. Limit 10 to human
12. Manual Therapy (text word)
13. Manual Medicine (text word)
14. 12 or 13
15. 14 and 9
16. Limit 15 to human

Search Strategy for OLDMEDLINE
1. Osteopath
2. Osteopathy
3. Osteopathic Medicine
4. 1 or 2 or 3
5. Research
6. Clinical Trials
7. Epidemiologic Studies
8. 5 or 6 or 7
9. 4 and 8
10. Limit 9 to human

Search Strategy for OSTMED (OSTMED.DR)
1. Osteopathic Medicine
2. Manipulation, Osteopathic
3. OMT
4. 1 or 2 or 3
5. Biomedical Research
6. Clinical Trials
7. Epidemiologic Studies
8. 5 or 6 or 7
9. 4 and 8
10. Limit 9 to human

Search Strategy for AMED and MANTIS
1. Osteopathy
2. Manipulation, Osteopathic
3. 1 or 2
4. Clinical Trials
5. Research
6. 4 or 5
7. 3 and 6
8. Limit 7 to human

Search Strategy for CINAHL
1. Osteopathy
2. Manipulation, Osteopathic
3. Medicine, Osteopathic
4. 1 or 2 or 3
5. Clinical Trials
6. Research
7. 4 or 5
8. 4 and 6
9. Limit 7 to human

(continued)

Appendix 1 (continued)

Search Strategy for EMBASE (where ? is a truncation symbol)

10. Osteopath? AND manipulat? AND (clinical OR patient AND research)
11. OMT AND (clinical OR patient AND research)
12. Osteopath? AND manipulat? AND epidemiolog?(w)stud?
13. OMT AND epidemiolog?(w)stud?
14. Limit to human

Search Strategy for Cochrane Center Register of Controlled Trials

1. Osteopath$ (where $ is a truncation symbol)
2. OMT
3. 1 or 2

Search Strategy for the Osteopathic Research Web and WorldCat Dissertations and Theses

1. Osteopathic OR OMT
2. AND research OR study OR trial
3. Order by "Date Descending"

Search Strategy for Digital Disseertation Abstracts, Canadian College of Osteopathy Research Titles, and the International Academy of Osteopathy

1. Scanning research Web pages for appropriate titles and abstracts

List of Osteopathic Core Journals Utilized at the Gibson D. Lewis Health Sciences Library University of North Texas Health Science Center

AAO Journal
ACOEP Newsletter
AOMA Digest
Australasian Chiropractic & Osteopathy
Australasian Osteopathic Medicine Review
Australian Journal of Osteopathy
British Osteopathic Journal
Chiropractic & Osteopathy
Clinical Biomechanics
Clinical Journal of Doctors Hospitals
Clinical Journal of Sports Medicine
Compendium
Cranial Letter (and all variant titles)
DO
DO Net Guide
Hawkeye Osteopathic Journal
Health: An Osteopathic Publication
JAOA—The Journal of the American Osteopathic Association
Journal of Osteopathic Education
Journal of Osteopathic Education & Clinical Practice
Journal of Osteopathic Medicine (JOM)
Journal of Osteopathic Sports Medicine
Journal of Osteopathy
Journal of Podiatric Medicine
Journal of the American Osteopathic College of Dermatologists
Journal of the American Osteopathic Colleges of Ophthalmology & Otolaryngology (and variant titles)
Journal of the Osteopathic Physicians & Surgeons of California
Journal of the Pennsylvania Osteopathic Medical Association
Maternal & Child Health
Michigan Osteopathic Journal (and variant titles)
Newsletter of the American Osteopathic College of Anesthesiologists
NJAOPS Journal
Ohio Research & Clinical Review
Orthopod (and variant titles)
Osteopath
Osteopathic Annals
Osteopathic Family Physician News (and variant titles)
Osteopathic Internist
Osteopathic Journal of Obstetrics & Gynecology
Osteopathic Magazine
Osteopathic Medical News
Osteopathic Medicine
Osteopathic News
Osteopathic Physician
Osteopathic Profession
Osteopathic Symposium
Osteopathische Medizin
Osteopathy Today
Texas Osteopathic Physicians Journal
Yearbook of the American Academy of Osteopathy

(continued)

Appendix 2

Definitions of terms used. ***Source:*** Glossary of Osteopathic Terminology*, Revised April 2009. Reprinted with permission from the American Association of Colleges of Osteopathic Medicine. All rights reserved.*

osteopathic manipulative treatment (OMT): The therapeutic application of manually guided forces by an osteopathic physician (US Usage) to improve physiologic function and/or support homeostasis that has been altered by somatic dysfunction. OMT employs a variety of techniques including, but not limited to:

active method, technique in which the person voluntarily performs an osteopathic practitioner-directed motion.

articulatory treatment, (archaic). See *osteopathic manipulative treatment, articulatory treatment system*.

articulatory treatment system (ART), a low velocity/moderate to high amplitude technique where a joint is carried through its full motion with the therapeutic goal of increased range of movement. The activating force is either a repetitive springing motion or repetitive concentric movement of the joint through the restrictive barrier.

balanced ligamentous tension (BLT), 1. According to Sutherland's model, all the joints in the body are balanced ligamentous articular mechanisms. The ligaments provide proprioceptive information that guides the muscle response for positioning the joint and the ligaments themselves guide the motion of the articular components. (Foundations) 2. First described in "Osteopathic Technique of William G. Sutherland", that was published in the *1949 Year Book of Academy of Applied Osteopathy*. See also *ligamentous articular strain*.

Chapman reflex, See *Chapman reflex*.

combined method, 1. A treatment strategy where the initial movements are indirect; as the technique is completed the movements change to direct forces. 2. A manipulative sequence involving two or more different osteopathic manipulative treatment systems (eg, Spencer technique combined with muscle energy technique). 3. A concept described by Paul Kimberly, DO.

combined treatment, (archaic). See osteopathic manipulative treatment, combined method.

compression of the fourth ventricle (CV-4), a cranial technique in which the lateral angles of the occipital squama are manually approximated slightly exaggerating the posterior convexity of the occiput and taking the cranium into sustained extension.

counterstrain (CS), 1. A system of diagnosis and treatment that considers the dysfunction to be a continuing, inappropriate strain reflex, which is inhibited by applying a position of mild strain in the direction exactly opposite to that of the reflex; this is accomplished by specific directed positioning about the point of tenderness to achieve the desired therapeutic response. 2. Australian and French use: Jones technique, (correction spontaneous by position), spontaneous release by position. 3. Developed by Lawrence Jones, DO in 1955 (originally "Spontaneous Release by Positioning," later termed "strain-counterstrain").

cranial treatment (CR), See *primary respiratory mechanism*. See *osteopathy in the cranial field*.

CV-4, Abbreviation for compression of the fourth ventricle. See *osteopathic manipulative treatment, compression of the fourth ventricle*.

Dalrymple treatment, See *osteopathic manipulative treatment, pedal pump*.

direct method (D/DIR), an osteopathic treatment strategy by which the restrictive barrier is engaged and a final activating force is applied to correct somatic dysfunction.

exaggeration method, an osteopathic treatment strategy by which the dysfunctional component is carried away from the restrictive barrier and beyond the range of voluntary motion to a point of palpably increased tension.

exaggeration technique, an indirect procedure that involves carrying the dysfunctional part away from the restrictive barrier, then applying a high velocity/low amplitude force in the same direction.

facilitated oscillatory release technique (FOR), 1. A technique intended to normalize neuromuscular function by applying a manual oscillatory force, which may be combined with any other ligamentous or myofascial technique. 2. A refinement of a long-standing use of oscillatory force in osteopathic diagnosis and treatment as published in early osteopathic literature. 3. A technique developed by Zachary Comeaux, DO.

facilitated positional release (FPR), a system of indirect myofascial release treatment. The component region of the body is placed into a neutral position, diminishing tissue and joint tension in all planes, and an activating force (compression or torsion) is added. 2. A technique developed by Stanley Schiowitz, DO.

fascial release treatment, See *osteopathic manipulative treatment, myofascial release*.

fascial unwinding, a manual technique involving constant feedback to the osteopathic practitioner who is passively moving a portion of the patient's body in response to the sensation of movement. Its forces are localized using the sensations of ease and bind over wider regions.

functional method, an indirect treatment approach that involves finding the dynamic balance point and one of the following: applying an indirect guiding force, holding the position or adding compression to exaggerate position and allow for spontaneous readjustment. The osteopathic practitioner guides the manipulative procedure while the dysfunctional area is being palpated in order to obtain a continuous feedback of the physiologic response to induced motion. The osteopathic practitioner guides the dysfunctional part so as to create a decreasing sense of tissue resistance (increased compliance).

Galbreath treatment, See *osteopathic manipulative treatment, mandibular drainage*.

Appendix 2 (continued)

hepatic pump, rhythmic compression applied over the liver for purposes of increasing blood flow through the liver and enhancing bile and lymphatic drainage from the liver.

high velocity/low amplitude technique (HVLA), An osteopathic technique employing a rapid, therapeutic force of brief duration that travels a short distance within the anatomic range of motion of a joint, and that engages the restrictive barrier in one or more planes of motion to elicit release of restriction. Also known as *thrust technique*.

Hoover technique, 1. A form of functional method. 2. Developed by H.V. Hoover, DO. See also *osteopathic manipulative treatment, functional technique*.

indirect method (I/IND), a manipulative technique where the restrictive barrier is disengaged and the dysfunctional body part is moved away from the restrictive barrier until tissue tension is equal in one or all planes and directions.

inhibitory pressure technique, the application of steady pressure to soft tissues to reduce reflex activity and produce relaxation.

integrated neuromusculoskeletal release (INR), a treatment system in which combined procedures are designed to stretch and reflexly release patterned soft tissue and joint-related restrictions. Both direct and indirect methods are used interactively.

Jones technique, See *osteopathic manipulative treatment, counterstrain*.

ligamentous articular strain technique (LAS), 1. A manipulative technique in which the goal of treatment is to balance the tension in opposing ligaments where there is abnormal tension present. 2. A set of myofascial release techniques described by Howard Lippincott, DO, and Rebecca Lippincott, DO. 3. Title of reference work by Conrad Speece, DO, and William Thomas Crow, DO.

liver pump, See *hepatic pump*.

lymphatic pump, 1. A term used to describe the impact of intrathoracic pressure changes on lymphatic flow. This was the name originally given to the thoracic pump technique before the more extensive physiologic effects of the technique were recognized. 2. A term coined by C. Earl Miller, DO.

mandibular drainage technique, soft tissue manipulative technique using passively induced jaw motion to effect increased drainage of middle ear structures via the eustachian tube and lymphatics.

mesenteric release technique (mesenteric lift), technique in which tension is taken off the attachment of the root of the mesentery to the posterior body wall. Simultaneously, the abdominal contents are compressed to enhance venous and lymphatic drainage from the bowel.

muscle energy, a form of osteopathic manipulative diagnosis and treatment in which the patient's muscles are actively used on request, from a precisely controlled position, in a specific direction and against a distinctly executed physician counterforce. First described in 1948 by Fred Mitchell, Sr, DO.

myofascial release (MFR), a system of diagnosis and treatment first described by Andrew Taylor Still and his early students, which engages continual palpatory feedback to achieve release of myofascial tissues.

direct MFR, a myofascial tissue restrictive barrier is engaged for the myofascial tissues and the tissue is loaded with a constant force until tissue release occurs.

indirect MFR, the dysfunctional tissues are guided along the path of least resistance until free movement is achieved.

myofascial technique, any technique directed at the muscles and fascia. See also osteopathic manipulative treatment, myofascial release. See also *osteopathic manipulative treatment, soft tissue technique*.

myotension, a system of diagnosis and treatment that uses muscular contractions and relaxations under resistance of the osteopathic practitioner to relax, strengthen or stretch muscles, or mobilize joints.

osteopathy in the cranial field (OCF), 1. A system of diagnosis and treatment by an osteopathic practitioner using the primary respiratory mechanism and balanced membranous tension. See also primary respiratory mechanism. 2. Refers to the system of diagnosis and treatment first described by William G. Sutherland, DO. 3. Title of reference work by Harold Magoun, Sr, DO.

passive method, based on techniques in which the patient refrains from voluntary muscle contraction.

pedal pump, a venous and lymphatic drainage technique applied through the lower extremities; also called the pedal fascial pump or Dalrymple treatment.

percussion vibrator technique, 1. A manipulative technique involving the specific application of mechanical vibratory force to treat somatic dysfunction. 2. An osteopathic manipulative technique developed by Robert Fulford, DO.

positional technique, a direct segmental technique in which a combination of leverage, patient ventilatory movements and a fulcrum are used to achieve mobilization of the dysfunctional segment. May be combined with springing or thrust technique.

progressive inhibition of neuromuscular structures (PINS), 1. A system of diagnosis and treatment in which the osteopathic practitioner locates two related points and sequentially applies inhibitory pressure along a series of related points. 2. Developed by Dennis Dowling, DO.

range of motion technique, active or passive movement of a body part to its physiologic or anatomic limit in any or all planes of motion.

soft tissue (ST), A system of diagnosis and treatment directed toward tissues other than skeletal or arthrodial elements.

Appendix 2 (continued)

soft tissue technique, a direct technique that usually involves lateral stretching, linear stretching, deep pressure, traction and/or separation of muscle origin and insertion while monitoring tissue response and motion changes by palpation. Also called myofascial treatment.

Spencer technique, a series of direct manipulative procedures to prevent or decrease soft tissue restrictions about the shoulder. See also *osteopathic manipulative treatment (OMT), articulatory treatment (ART)*.

splenic pump technique, rhythmic compression applied over the spleen for the purpose of enhancing the patient's immune response. See also osteopathic manipulative treatment (OMT), lymphatic pump.

spontaneous release by positioning, See *osteopathic manipulative treatment, counterstrain*.

springing technique, a low velocity/moderate amplitude technique where the restrictive barrier is engaged repeatedly to produce an increased freedom of motion. See also *osteopathic manipulative treatment, articulatory treatment system*.

Still Technique, 1. Characterized as a specific non-repetitive articulatory method that is indirect then direct. 2. Attributed to A.T. Still. 3. A term coined by Richard Van Buskirk, DO, PhD.

Strain-Counterstrain, an osteopathic system of diagnosis and indirect treatment in which the patient's somatic dysfunction, diagnosed by (an) associated myofascial tenderpoint(s), is treated by using a passive position, resulting in spontaneous tissue release and at least 70 percent decrease in tenderness. 2). Developed by Lawrence H. Jones, DO, in 1955. See *osteopathic treatments, counterstrain*.

thoracic pump, 1. A technique that consists of intermittent compression of the thoracic cage. 2. Developed by C. Earl Miller, DO

thrust technique (HVLA), See *osteopathic manipulative treatment, high velocity/low amplitude technique (HVLA)*.

toggle technique, short lever technique using compression and shearing forces.

traction technique, a procedure of high or low amplitude in which the parts are stretched or separated along a longitudinal axis with continuous or intermittent force.

v-spread, technique using forces transmitted across the diameter of the skull to accomplish sutural gapping.

ventral techniques, See *osteopathic manipulative treatment, visceral manipulation*.

visceral manipulation (VIS), a system of diagnosis and treatment directed to the viscera to improve physiologic function. Typically, the viscera are moved toward their fascial attachments to a point of fascial balance. Also called *ventral techniques*.

Somatic dysfunction: Impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodial and myofascial structures, and their related vascular, lymphatic, and neural elements. Somatic dysfunction is treatable using osteopathic manipulative treatment.

Editor's Note: The *Glossary of Osteopathic Terminology* uses the term *osteopathy in the cranial field* to describe the palpatory techniques and osteopathic manipulative treatment used to assess cranial dysfunction and to treat patients for such dysfunction. This term is more universally used than *cranial osteopathic manipulative medicine* and *osteopathic medicine in the cranial field*, which are the terms preferred by the style guidelines of *JAOA—The Journal of the American Osteopathic Association*.

The *Glossary* also uses the term *high velocity/low amplitude* to describe the osteopathic manipulative treatment thrust technique. However, *high-velocity, low-amplitude* is the term preferred by the *JAOA* style guidelines.