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Chiropractic management of older adults with musculoskeletal disorders: a clinical practice guideline

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Title: Chiropractic management of older adults with musculoskeletal disorders: a clinical practice guideline

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Abstract

BACKGROUND:

To meet the needs of an aging population, this guideline provides whole encounter guidance consistent with the age-specific 4Ms and 5Ms frameworks (What Matters Most, Medications, Mind/Mentation, Mobility, and Multicomplexity), especially for common musculoskeletal conditions that are frequent in the older adult population.

METHODS:

Informed by prior best practices guidance, an interdisciplinary research team completed a multi-phased, IRB-approved project consisting of systematic reviews on the efficacy and adverse events of chiropractic spinal manipulation, targeted literature searches, development of seed statements, a modified Delphi consensus process, and a 30-day public comment period. Statements were refined and rated iteratively until consensus was achieved with 80% of panelists rating appropriateness as ≥7 out of 9 on a Likert scale. Following the public comment period, an additional round of revision and rating occurred.

RESULTS:

An interdisciplinary panel of 53 practitioners comprised the Delphi panel and completed three rounds of modified Delphi were completed to reach consensus on 148 recommendations and 61 associated sub-recommendations. Public comment from an additional 8 individuals prompted revision of five statements and the generation of two new statements. A fourth round of Delphi was initiated with all statements reaching consensus. The final recommendations covered patient communication, informed consent, identifying *what matters most*, history and evaluation

including subsections on identifying dependent abuse and cognitive and mental health decline, diagnostic imaging, management and treatment recommendations (general recommendations, care planning, precautions and contraindications, co-management, manual therapy, rehabilitative exercise), and lifestyle interventions. Specific guidance was provided for common musculoskeletal conditions, including low back pain, neck pain, lumbar spinal stenosis with neurogenic claudication, hip osteoarthritis, and degenerative cervical myelopathy. Recommendations were provided on disease and risk factor screening for related disorders impacting older adults, including abdominal aortic aneurysm, osteoporosis/osteopenia, chronic compression deformity, sarcopenia, and falls.

CONCLUSIONS:

This clinical practice guideline provides updated evidence-based consensus statements on the chiropractic management of older adults with chronic musculoskeletal disorders. The recommendations reflect contemporary chiropractic practice with expanded guidance on contraindications, common musculoskeletal disorders, and disease screening. The recommendations align with chiropractic training, yet disparities in the healthcare system may limit patient access and implementation.

Keywords: Consensus Statement; Chiropractic; Geriatrics; Musculoskeletal Diseases; Pain Management; Manipulation, Chiropractic; Healthy Aging; Health Services for the Aged; Multimorbidity

BACKGROUND

In the next several decades, the world population of individuals over 60 years of age will nearly double (1). In the United States (U.S.), approximately a quarter of the population is expected to be 65 years or older by 2060, necessitating more effective strategies for healthy aging (2). Chronic musculoskeletal conditions, including spinal pain, extremity joint pain, and arthritis, impede healthy aging. Musculoskeletal conditions are the leading causes of years lived with disability (3), prompting calls to orient global healthy aging initiatives around functional ability (4). Maintaining function and the ability to age in place is a public health imperative, as the incidence and prevalence of musculoskeletal conditions continue to rise (5,6), with population aging accounting for the largest contribution to these increases (6). Older adults have the highest level of disability due to musculoskeletal conditions (7) and are at increased risk of complications such as falls, fractures, and dislocations (8).

Pain management for older individuals is challenging, as pharmacologic treatments such as oral analgesics and corticosteroids are often insufficient (9), and clinical presentation is frequently complicated by the presence of comorbidities. Likewise, the risk of adverse events from treatment can be elevated for individuals with age-related physical and cognitive disabilities resulting from chronic medical conditions, such as heart and vascular disease, stroke, neurological disorders, cancer, and dementia, along with social and environmental factors (10).Comorbidities like diabetes, obesity, dementia, and stroke can produce a chronic inflammatory state, which may worsen the progression of musculoskeletal disease and delay recovery (11). Given these complicating factors, clinical practice guidelines (CPG) have are vital tools to support practitioners in the comprehensive management of musculoskeletal and other

conditions in an aging population. Two frameworks have been developed to further improve health care for older individuals: the *4Ms of Age-Friendly Health Systems* and the *Geriatrics 5Ms* (12,13). The implementation of these frameworks can optimize care of older adults and may be appropriate in clinical settings that address musculoskeletal conditions (13,14).

Approximately 20% of chiropractic patients are older adults, most of whom present with spine-related pain and disability (15). Spinal manipulation is a recommended treatment for this population, and is included in the majority of chiropractic encounters (16). Patient education, soft tissue therapy, therapeutic exercise, acupuncture/dry needling, physical modalities, and nutritional advice are also commonly incorporated into chiropractic practice (17,18). The range of evidence-based interventions offered, a focus on disease prevention, health and wellbeing (19,20), and the frequency of visits position chiropractic well to deliver person-centered care and contribute to whole health.

Unfortunately, insufficient insurance and disparity of coverage commonly act as barriers to the delivery of chiropractic services, limiting older adults' access to these effective nonpharmacologic treatment approaches (21–25). Limited research on extra-spinal conditions commonly managed in chiropractic practice contributes to a lack of coverage (15,26). Across professions, however, there are notable gaps between best practice guidelines and real-world practice regarding musculoskeletal management (27–29). These barriers and the complexity of presentation of older adult patients necessitate that up-to-date, evidence-based guidelines are available to chiropractic clinicians, students, educators, researchers, advocates, health care professionals, health system administrators, policy makers, payors, and patients.

This CPG helps address these gaps by expanding on the scope of the best practices published in 2010 and 2017 (30,31). The purpose of this study was to develop an evidence- and consensus-based CPG on the appropriate approaches to providing chiropractic care to older adults with chronic musculoskeletal disorders through a modified Delphi process. The primary aims were to 1) provide whole encounter guidance that was consistent with the 4M and 5M frameworks, and 2) provide guidance on common musculoskeletal conditions that are frequent in the older adult population.

METHODS

This guideline is the product of Clinical Compass, a 501(c)(3) non-profit, chiropractic evidence-synthesis think-tank. The process of developing recommendations was designed to address the domains of the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument for assessing the quality of a CPG; scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence (32,33). Work was overseen by a multidisciplinary Steering Committee (SC) of members with relevant training and experience with spine-related musculoskeletal disorders, older adults, and evidence-based practice. The SC fulfilled the following steps, developed over the course of previous projects (34–38):

- Examine current CPGs related to key aspects of the clinical encounter related to chiropractic care of older adult patients.
- Identify gaps in the CPG(s) compiled.
- Perform targeted literature searches to identify individual studies to address gaps.

- Make initial recommendations based on the best available evidence for chiropractic management.
- Organize and conduct a modified Delphi consensus process with a multidisciplinary panel of experienced clinicians, educators, and researchers to review and refine recommendations.
- Collect public feedback via a website, which included a survey for comments.

Human subject considerations

Prior to communicating with the modified Delphi panelists, the Texas College of Chiropractic Institutional Review Board approved the study design and procedures (2025_03_Hawk_01_R1). A written informed consent form was emailed to potential panelists explaining the purpose of the study, anticipated timeline, and that their participation was voluntary and without compensation. Participation in the panel was contingent upon returning the signed consent form to the study coordinator. Panelists also signed a separate permission-to-acknowledge form prior to manuscript submission, agreeing to be acknowledged by name in the publication.

Steering committee

The SC, recruited by the Clinical Compass Scientific Commission Chair (CD), was made up of clinicians and academicians from multiple health professions with extensive clinical, education, and/or research experience. Its responsibilities were to identify, examine, and evaluate the evidence; develop recommendations based on the best available evidence; revise the recommendations based on the modified Delphi panelists' ratings and comments to reach consensus; incorporate feedback from the public comment period; and contribute to the final

manuscript. A project director (CD) organized and oversaw the entire project, and a project coordinator (CE) coordinated communications and data management.

Literature search

To inform the consensus process, two members of the SC (AS and CD) organized separate teams to conduct two systematic review searches. Reported elsewhere, one review analyzed the efficacy of spinal manipulation for older adults (39), and the other evaluated adverse events relevant to chiropractic practice (40). Additional targeted searches (see figure 1 for an example) identified CPGs and systematic reviews for interventions, procedures, and conditions not included in these two reviews. Lower-level studies were considered if higher levels of evidence were not available. The searches were performed by the SC librarian (SW) and project director (CD).

Hip Osteoarthritis
(("hip"[MeSH Terms] OR "hip"[All Fields]) AND ("osteoarthritis"[MeSH Terms] OR "osteoarthritis"[All Fields] OR "osteoarthritides"[All Fields])) AND ((y_5[Filter]) AND (guideline[Filter] OR practiceguideline[Filter]))"

Figure 1. Example target search string.

Seed document development

The 2017 set of recommendations for chiropractic management of older adult patients was used as a seed document(31). The structure of the reporting was modeled on two recent CPGs, one on the chiropractic management of adult patients with chronic musculoskeletal pain (7) and another

on the role of chiropractic care in providing health promotion and clinical preventive services for adult patients with musculoskeletal pain (6). The SC used results of the literature searches to further update and refine draft recommendations through an iterative process. The SC based revisions on the best available evidence, as well as clarity and completeness of draft recommendations.

Modified Delphi Panel

The panelists were comprised primarily of U.S. chiropractors but also other health professions relevant to the care of musculoskeletal disorders and aging individuals (e.g., family physician, physical therapists, occupational therapists, etc.). The panel also included academic faculty and researchers. All panelists were experienced with the use of scientific evidence in support of clinical practice. For this guideline, invited participants included a combination of established panelists from prior CPGs conducted by this group (31,35,36,38,41–43), as well as additional potential panelists nominated by the SC who have specific expertise in clinical care of older adults with musculoskeletal complaints. Nominees completed a practice characteristic form to return along with their curriculum vitae for the SC to review. Individuals were invited to participate with the goal of including those with expertise (e.g. teaching, practice experience, publishing), diversity of professional degrees, geography, gender, and race/ ethnicity. SC members did not participate in the modified Delphi rating process.

Delphi process

Once the panelists were confirmed, we provided them with background materials explaining the process in detail. The process was implemented completely online, via email. The project

coordinator assigned each panelist an identification (ID) number so that their ratings and comments were de-identified. At the conclusion of a modified Delphi round, the project coordinator and director compiled the ratings and comments for the SC to evaluate and use to revise if there was disagreement on recommendations or when comments warranted. The Delphi process ran from October 10, 2025 through July 13, 2026.

Rating of seed statements

We used the RAND/UCLA methodology for rating the appropriateness of the recommendations for clinical practice. The methodology manual states that this "generally involves multiple rounds, in which a questionnaire is sent to a group of experts who answer the questions anonymously. The results of the survey were then tabulated and reported back to the group, and each person was asked to answer the questionnaire again. This iterative process continues until there was a convergence of opinion on the subject or no further substantial changes in the replies are elicited." (44).

Each recommendation was rated using an ordinal scale of 1-9 (highly inappropriate to highly appropriate) (44). The numeric code was 1-3=highly inappropriate; 4-6= uncertain; and 7-9= highly appropriate. Immediately below each rating was a space for specific comments and suggested supporting references. Panelists were also welcome to suggest additional recommendations, accompanied by supporting evidence.

We used the RAND/UCLA methodology definition of "appropriateness" to mean that the patient's expected health benefit is greater than any expected negative consequences by a

sufficiently wide margin that it is worth doing, without consideration of cost (44). If the panelist rated a recommendation as inappropriate (i.e., rating 1-3), we instructed them to explain why and, if available, give a citation from the published literature to support their rating.

Data management and analysis

The project coordinator key-entered ratings by panelist ID into an SPSS file. Comments were organized by ID code number, recommendation number, and rating into a Word table. The project director computed the percent agreement and median ratings for each recommendation. Consensus was defined as at least 80% agreement with median ratings ≥7 (i.e., highly appropriate). The SC reviewed the results and comments for all recommendations. Those that failed to reach 80% agreement were eliminated for lack of evidence or revised based on the panelists' comments and suggested references. Among recommendations that did achieve consensus but included comments that warranted change, revisions were made and the statements were recirculated to the panelists for review. Steering committee members MM, CD, and AS lead efforts to draft revisions as informed by the Delphi panelists ratings and comments. The drafted revisions were then shared with the full SC and additional edits occurred through an iterative process. Once the SC agreed on the revisions, the statements were then re-circulated to the modified Delphi panelists for a new round of ratings. The process was repeated until the panel reached at least 80% agreement on all recommendations. Statements revised solely for grammatical or wordsmithing edits were not recirculated.

Public comments/external review

As recommended by the AGREE Enterprise (32), we established a method to disseminate the draft recommendations agreed upon by the SC and Delphi panel to the public. This process was designed to achieve transparency and facilitate involvement from interested individuals in the development of the guideline. We considered the broad-based modified Delphi panel as one aspect of stakeholder representation. Facilitating comments from members of the public further enhanced opportunities for input. We replicated the dissemination process used in previous projects as follows (34–36):

- Group email blast via Flodesk, Inc. to the Clinical Compass email list; this comprised over 900 representatives of U.S. state chiropractic organizations, national chiropractic professional and academic organizations, and vendors (which includes informed laypersons).
- Posts to Clinical Compass' Facebook, LinkedIn, and Instagram pages; accessible to the general public, including health professionals.
- Direct email invitations to chiropractic organizations such as ChiroCongress, a professional organization that includes over 35,000 chiropractors.
- Notification to the Chiropractic Summit, a U.S. organization of chiropractic associations, institutions, and individuals.

The presence of some overlap in these sources was expected to increase exposure to the disseminated materials in the 30-day comment period.

The invitations included a link to a dedicated page on the Clinical Compass website (45). The page posted the following: 1) an invitation for comments; 2) summary of the methods, including

the credentials and identity of the SC, to maintain transparency; 3) draft consensus statements with references; and 4) a written comment form. Comment forms were sent via email directly to the project director, who deidentified them (if commenters had identified themselves) before copying them to the SC. The SC considered each comment and decided whether it required a substantive change, in which case they would revise and conduct an additional Delphi round(s) until consensus was reached.

RESULTS

Modified Delphi Process

Of 71 persons invited to participate on the panel, 54 (76%) agreed to participate. One person who agreed to participate did not respond; thus, 53 individuals comprised the modified Delphi panel (Table 1). In round 1 of the modified Delphi, the panel reached consensus on 178 of 190 statements. Based on comments, the SC substantially revised 10 additional statements that had reached consensus and re-initiated them through the modified Delphi process; 3 new statements were also generated. In round 2, 17 of those 23 statements reached consensus. Two statements about passive therapeutic modalities were stricken from recommendations after round 2, because of lack of consensus or conclusive evidence. The remaining 4 statements were revised and went through the modified Delphi. All statements in round 3 achieved panelists' consensus.

Table 1. Modified Delphi Panelists Characteristics (n=53)

Gender	
Female	11 (21%)
Race	
Asian/Pacific Islander	2 (4%)
Black	4 (8%)
White	46 (87%)
Ethnicity	

Hispanic	1 (2%)
Profession	
Chiropractor	45 (85%)
Medical Doctor	3 (6%)
Naturopathic Doctor	1 (2%)
Occupational Therapist	1 (2%)
Pharmacist	2 (4%)
Physical Therapist	1 (2%)
Psychologist	1 (2%)
Speech Language Pathologist	1 (2%)
Non-Chiropractic Advanced Degrees	
Doctor of Philosophy	9 (17%)
Doctor of Physical Therapy	3 (6%)
Master's degree	24 (44%)
Other non-chiropractic doctoral degrees	10 (19%)
Years in Profession	
Mean years (range)	21.5 (1-47)
Setting/Affiliations	
DC Program Faculty	21 (40%)
Non-DC Program Faculty	16 (31%)
Hospital	20 (38%)
Insurance industry/managed care organization	1 (2%)
Practitioners	n=37
Years in practice (range)	20.5 (3-47)
Mean patients per week (range)	56.1 (10-175)
Estimated % older adult patients	58% (10-100)
Location of primary/work practice	
U.S. East	11 (30%)
U.S. Midwest	12 (32%)
U.S. South	13 (35%)
U.S. West	13 (35%)
Australia	1 (3%)
Canada	2 (5%)
Germany	1 (3%)

Public Comment

There were 18 public comments received from 8 individuals (all DCs) during the 30-day public comment period. The project director (CD) de-identified the comments, then shared them with the SC for review. Several statements regarded language choice and recommended typographical edits, including the addition of "M2" to the medication section, tempering the manual therapy

recommendation language, and adding locus of control discussion to the *What matters most* statement. Two statements endorsed adding language to highlight subpopulations, including neurodivergent patients and practitioners functioning in Federally Qualified Health Centers. Several statements recommended additional examples to be provided across an array of existing statements (i.e., fluoroquinolone antibiotics, initial trial of care length, cervical radiculopathy, instrument-assisted soft tissue manipulation, high-intensity interval training). A screening instrument was recommended for assessing older adult loneliness. Lastly a citation was provided to support updates in the dietary protein intake recommendation to align with new guidelines from the Department of Health and Human Services and the U.S. Department of Agriculture.

After review, the SC revised 7 statements, prompting a fourth round of modified Delphi panel review for consensus. All of these statements achieved consensus and were adopted.

Frameworks to Support Delivery of Age-Friendly Chiropractic Care(46)

Two recent multidisciplinary frameworks, the *4Ms of Age-Friendly Health Systems* and the *Geriatrics 5Ms* (12,13), were developed to improve healthcare for older adults and by making healthcare encounters more patient-centered, safe, reliable, and high quality across care settings. Healthcare professionals, including chiropractors, are encouraged to adopt these evidence-based frameworks when working with older patients. The 4Ms, What Matters Most, Medication, Mind/Mentation, and Mobility organize healthcare to align with individuals' strengths and goals, regardless of diseases, functional problems, or background. Health professionals are encouraged to apply the 4Ms consistently when engaged in shared decision-making with older adults (47). The *Geriatric 5Ms* adds Multicomplexity to remind health professionals that older adults often

live with many health conditions simultaneously when making their recommendations. Table 2 provides a brief overview of the 4M/5M Frameworks. Recommendations in this guideline that specifically address one of the 4M/5M categories are designated (M1, M2, M3, M4, M5).

Table 2. 4M/5M Frameworks

When caring for older adults, chiropractors should…	
What **M**atters Most **(M1)**	• Ask each patient about treatment goals, specific health outcomes, and care preferences. • Document 'what matters most' conversations in the health record, using the patient's own words as much as possible. • Establish a plan of care that takes 'what matters most' into account. • Evaluate concordance between 'what matters most' goals and care delivery.
Medications **(M2)**	• Ask about changes to the patient's medication list. • Recognize polypharmacy and monitor for adverse effects from medication. • Contact the prescribing practitioner about any medication-related issues. • Use nonpharmacologic approaches to pain to mitigate risks and reduce reliance on pharmacologic treatment. • Identify medications that may necessitate modifications to the delivery of chiropractic treatments (e.g., long-term corticosteroids, fluoroquinolone antibiotics, anticoagulants).
Mind/**M**entation **(M3)**	• Recognize changes in an older adult's mentation, particularly related to cognitive decline or signs of dementia. • Screen older adults for depression or anxiety as indicated. • Refer older adults with changes in mental status to the appropriate healthcare professional(s) in a timely manner.
Mobility **(M4)**	• Assess mobility, physical function, gait, and balance. • Recommend methods for safe movement to help maintain mobility and meet patient goals. • Screen for and prevent injuries from falls.
Multicomplexity **(M5)**	• Offer advice and treatments that address the whole person in a biopsychosocial context. • Understand that many health concerns and treatments may affect several of the 5Ms. • Triage and focus on the most urgent or serious health concern first, keeping in mind "what matters most" to the patient.

Clinical Practice Guidelines

1. Patient Engagement

1.1 Communication with patients

1. Provide information in plain, everyday language and avoid jargon (48).

    1a. Arrange translation services, when appropriate.

2. Age-based stereotypes (thoughts), prejudices (feelings or beliefs), and discrimination (actions) are communicated through language and may negatively impact a person's health and well-being. When working with older adults, avoid using elderspeak, age-biased terms, and words that are potentially offensive (e.g., condescending or infantilizing terms such as ‘young lady’ or ‘sweetie’, and outdated terms like “elderly”, "geriatric", and “senior”) (49–52).

3. Recognize and address sensory impairments (i.e., hearing, vision) that could interfere with the patient’s ability to provide informed consent and safely engage in treatment.

    3a. For hearing impaired, minimize ambient noise, make eye contact when speaking, and/or consider assistive devices (e.g., pocket talker, amplifying devices, or written materials) (53).

    3b. For visually impaired, provide information along with magnifying aids and/or in alternative format(s), such as large print or video (54).

    3c. To accommodate neurodivergence, consider using images, tables, or other visual aids in an unhurried environment with minimal distractions (55).

4. For patients who lack cognitive capacity to make informed decisions and to safely engage in treatment, arrange for involvement of a legal representative or substitute (proxy) decision-maker (e.g., family member) (31). (M3)

4a. Seek permission to engage family and caregivers when discussing diagnoses, care plans, and treatment progress.

1.2 Informed consent (shared decision-making) (56)

1. Explain benefits of all procedures (examination and treatment), alternatives—including no treatment—and material risks.
2. Ask the patient and/or their representative if they understand, have any questions, and respond to them and confirm that they are satisfied with the explanations (57).
3. Record that the patient, or representative, granted consent in the medical record in compliance with local regulations and institutional policies (58).
4. Throughout the trial of care, take an iterative approach to informed consent with continuous opportunity to educate, revise, and document ongoing consent as appropriate (59).

1.3 What matters most (60) ***(M1)***

1. During care touchpoints (e.g., first appointments, annual or progress visits, change in health status or life transitions [e.g., retirement, starting Medicare, death of a spouse or other family members, or transition to assisted living]), talk with the patient about their health expectations, concerns, hopes, priorities, people or events important to them, treatment goals and preferences.

2. For those with a new diagnosis, hospitalization, or other life changes, discuss how this change impacts their health and if there might be changes in how their chiropractic care is delivered.
3. During routine visits, inquire with the patient about 'what matters most' to optimize the focus of the clinical encounter.
4. Encourage patients to connect their 'what matters most' to the clinical care and self-management recommendations offered during the treatment visit.
5. Document 'what matters most' to the patients (e.g., goals, values) and update accordingly.
    5a. Consider using a validated instrument to track and measure change relative to 'what matters most', such as What Matters Most (61) or Patient Specific Functional Scale (62).

2. History and Evaluation

2.1 Health History

1. Include the usual components of history: review of systems, health care and family and social history, details of chief concern including duration, symptoms, and past and concurrent care.
2. Review prescription and nonprescription medications including over-the-counter supplements, herbs and nutraceuticals. (M2)
    2a. If medications, polypharmacy, or substance use may be contributing to a health issue, or an adverse medication effect is identified, consult with or refer to the patient's primary care, pharmacists, or prescribing clinician (63,64).
    2b. Identify medications that may increase fall risks (e.g., central nervous system depressants) (65) or require modifications to the delivery of chiropractic treatments (e.g., long-term corticosteroids, fluoroquinolone antibiotics, anticoagulants) and act accordingly (66–69).

2c. During routine visits, inquire about changes in medication use. Engage the patient and their health care team, including prescribers, in conversations about safety concerns or alterations in treatment plan due to changes in medication use.

3. Inquire about social history of risky substances, such as tobacco, alcohol, marijuana, cannabidiol (CBD)/tetrahydrocannabinol (THC), and illicit/illegal drugs.

4. Inquire about potential contraindications or precautions to manual therapy or other interventions (57). (See Table 3.)

5. Gather information on health habits such as diet, sleep, and physical activity including activities of daily living (34).

6. Pay attention to health conditions that are more prevalent in older adults such as increased fall risk, osteoporosis/osteopenia, atypical presentation of some conditions (e.g., loss of height or spinal deformity rather than severe pain in spinal compression fractures), sarcopenia, degenerative cervical myelopathy, lumbar spinal stenosis, lack of awareness of cognitive decline, and ageist attitudes of the patient or their family, caregivers and clinicians (31,49,70).

Table 3. Precautions and contraindications for the application of nonpharmacologic interventions in the affected region when managing musculoskeletal conditions (40).

Intervention / Condition	HVLA manipulation[a]	Spinal mobilization[b]	Soft tissue techniques[c]	Needling therapy[d]	Therapeutic exercise	TENS
Active spinal infection	C	C	C	C	C	C
Active inflammatory arthritis	C	C	✓	✓	✓	✓
Anticoagulation therapy	P	✓	P	P	✓	✓
Cervical artery dysfunction[e]	C	P	P	✓	P	✓

Degenerative cervical myelopathy	C	P	✓	✓	P	✓
Implantable devices[f]	P	P	✓	P	P	C
Osteoporosis or osteopenia	P	P	✓	✓	✓	✓
Spinal fusion	P	P	✓	✓	P	✓
Spinal ligamentous instability	C	C	✓	✓	P	✓
Spinal metastasis	C	P	P	P	P	P

Abbreviations: C represents contraindication, defined as a condition or factor for which the intervention should be avoided; P indicates precaution, defined as a case in which the intervention should be applied with special care or limitations (72); and ✓ indicates there is typically no contraindication in this context.

[a] Application of high-velocity, low-amplitude biomechanical force to a joint in the region of condition (73)

[b] Application of low-velocity biomechanical force to a joint in the region of condition (73)

[c] Including instrument-assisted soft tissue techniques

[d] Use of acupuncture or dry needling

[e] Examples include history of aneurysm, stenosis, dissection, thrombosis and vascular anomalies. If acute concern, then immediate transfer to emergency care is appropriate.

[f] Examples include pacemaker, implantable cardiac defibrillator (ICD), and spinal cord stimulator (74)

2.2 Dependent adult abuse awareness (M5)

1. Be alert to key features suggesting elder abuse: (75)

1a. Physical abuse: bruises, injuries in different healing stages, signs of malnutrition, poor oral hygiene.

1b. Psychological abuse: personality changes or excessive apologizing.

1c. Financial exploitation: unable to afford care despite previous financial stability.

1d. Neglect or abandonment: being left alone despite needs.

1e. Sexual abuse: fear or being withdrawn when a certain person is around, fear of touch or being alone in the treatment room with the provider (76).

1f. Self-neglect: poor hygiene, inappropriate or inadequate clothing, significant weight loss or dehydration (77).

2. Follow local jurisdictional guidelines and institutional policies for mandatory reporting of abuse of vulnerable older adults (78).

3. Consider providing contact information or referral to local support services or elder abuse hotlines such as National Adults Protective Services Association (79) and Domestic Violence Support and Hotline (80).

2.3 Cognitive and mental health issues (M3)

1. Observe and document indications of cognitive decline and consider the patient's or family members' observations as well (e.g., difficulty following instructions, memory problems, confusion, agitation) (81,82).

1a. Consider assessing or referring for assessment of mental status using validated tools such as the Montreal Cognitive Assessment (MoCA) or the Mini-Mental State Examination (MMSE) (83).

2. Be alert for signs of anxiety, depression, grief, loneliness, self-harm, suicidal ideation, or mental health conditions (84–87)**.**

2a. When depressive symptoms are suspected, consider screening or referring for assessment with validated tools such as the Geriatric Depression Scale, Columbia-Suicide Severity Rating Scale and/or Patient Health Questionnaire-9 (PHQ-9) (88).

2b. When anxiety is suspected, consider screening or referring for assessment with the General Anxiety Disorder-7 (GAD-7) (89).

2c. When loneliness is suspected, consider screening with a rapid screening tool (e.g., ALONE Scale, UCLA 3-Item Loneliness Scale, or De Jong Gierveld Loneliness Scale) (87,90).

3. For patients presenting with safety concerns secondary to acute confusion (delirium), signs of self-harm, or active suicidal ideation, arrange immediate emergent care, such as calling 911 (31).

4. For patients with suspected cognitive impairment or mental health needs, refer as needed to the patient's primary care provider, geriatrician, adult protective services, or a mental health professional as appropriate (91).

2.4 Examination (31)

1. Conduct the initial physical examination in sufficient depth to evaluate for potentially serious pathology, gait, balance and strength deficiencies, and to develop an appropriate management plan, based on the patient's presentation, 'What matters most' goals, and care preferences (60).

1a. Assess for red flag signs or symptoms (Table 4) (31).

1b. In patients with suspected sensory deficits, fall history, or communication barriers, perform or recommend vision or hearing assessment (92).

1c. For patients with suspected orthostatic hypotension and other cardiovascular disorders, consider serial blood pressure measurements and heart rate measurements, and/or referral for further cardiovascular workup (92).

1d. For patients with positional dizziness, consider positional semicircular canal testing for benign paroxysmal positional vertigo and/or referral for additional investigation as needed (92).

1e. In patients with gait and balance disturbances, assess for loss of hand dexterity, sensory disturbances, hyperreflexia, upper motor neuron signs, and other potential signs of cervical cord compression (93,94).

1f. In patients with exertional lower extremity symptoms, signs of vascular insufficiency (e.g., skin discoloration) or vascular claudication, assess vascular function or refer for vascular assessment (e.g., distal pulses, ankle-brachial index, or doppler ultrasound).

2. Consider utilization of validated patient-reported outcome measures to assess for pain, functional ability, quality of life, and disability (95).

2a. Be aware of nonverbal signs of pain (e.g., wincing, groaning), particularly for patients with cognitive impairments, and consider using visual pain scales such as the Faces Pain Scale (96).

2b. Consider utilization of validated pain assessment tools specific to patients with cognitive impairment, such as Pain Assessment in Advanced Dementia (PAINAD) (97).

3. Consider screening for yellow flags, such as fear-avoidance behaviors, kinesiophobia, catastrophizing, perceived injustice and other psychological obstacles to recovery (98–100).

4. Conduct a condition-specific neurologic and orthopedic examination.

5. As appropriate, consider the need for referral for comprehensive geriatric assessment, which typically includes evaluation of physical function, cognition, special senses (i.e., sight, hearing, sensory), peripheral artery disease, podiatric, and oral/dental issues (101,102).

2.5 Diagnostic imaging (conventional radiography) (31,103)

1. Do not perform routine diagnostic imaging and/or repeat radiographs unless there are clear clinical indications; age alone is not a clinical indication for diagnostic imaging. Clinical indicators include, but may not be limited to, the following patient presentations (57,104):
    1a. Direct trauma.
    1b. Acute spinal deformity or suspicion for acute compression fracture.
    1c. Concern for fracture in the presence of known factors that may indicate low bone density (e.g. osteopenia, osteoporosis, long-term corticosteroid use).
    1d. History of prior surgery (such as lumbar fusion, total hip arthroplasty, etc.), and new or progressing symptoms or clinical findings.
2. Consider plain film radiography for patients who do not respond to an initial 6-week treatment trial (104).
3. Do not perform serial radiographs for uncomplicated spine pain, as they are not associated with improved outcomes (105,106).
4. Do not use diagnostic imaging to identify degeneration as a prognostic indicator (107).

2.6 Advanced diagnostic imaging (computed tomography [CT] scan, magnetic resonance imaging [MRI]) (31)

1. Consider obtaining or referring for advanced imaging in cases of suspected myelopathy, cauda equina syndrome, persistent spinal pain or associated neurologic deficits after spine surgery, suspicion of cancer, infection, and frank or progressive neurologic deficits (104).

3. Management and Treatment

3.1 General recommendations for management of spinal pain (57)

1. Base clinical decisions on the three principles of evidence-based practice: 1) application of the best available evidence, 2) contextualized by clinical experience, and 3) the patient's values and treatment goals.
2. Prioritize self-management and nonpharmacological interventions in a stepped care approach (91,108).
3. When clinically indicated, consider providing manual therapy for pain management and functional improvement (109).
4. Emphasize active interventions wherever feasible (such as mobility, stability, strength, balance, cardiorespiratory exercises targeting specific physical deficits) (57). (M4)

   4a. Consider using graded exposure, graded activity, and other psychologically informed rehabilitation approaches to address fear-avoidance behavior and kinesiophobia (110). (M3)
5. Assist patients in developing or referring for exercise programs that prioritize independence in everyday living and socialization, such as: (91) (M4)
   - Strength training
   - Yoga
   - Tai Chi
   - Walking, pool/aqua therapy and other cardiovascular exercise (111–114)
   - Group training (e.g., Silver Sneakers, GeroFit)
6. Consider incorporating mind-body interventions such as stress management with physical interventions (115). (M3/M4)

7. Consider providing or referring for acupuncture or dry needling as an another (nonpharmacological) treatment option for pain and disability (109).

3.2 Care planning (116,117)

1. In designing a management plan, consider factors that affect the patient's ability to adhere to it, such as living alone; difficulty with activities of daily living; the availability of a competent caregiver, if needed; financial and insurance coverage; and access to transportation and other necessary resources (91).
2. Consider an initial trial of care, recognizing that appropriate duration may vary based on acuity, complexity, patient goals, and shared-decision making (57,118).
3. Perform periodic evaluations and modify treatment plan accordingly (91).
4. Continue treatment to maximum therapeutic benefit, as per clinician and patient agreed treatment goals, monitoring progress to re-evaluate status (118).
5. As response to care plateaus, attempt a therapeutic withdrawal (reduction or discontinuation of care) to evaluate the durability of treatment benefit (118).
6. If symptoms worsen following a therapeutic withdrawal of care, consider resuming or modifying care, and tapering to facilitate a supportive care plan and/or interdisciplinary approaches on a case-by-case basis (57,118).
7. When patient has achieved maximum therapeutic benefit, discuss options including discharge from active care, self-management strategies, maintenance care, lifestyle medicine, or coordination for other health care services (118,119).

3.3 Co-management (31)

1. When indicated by patient presentation and goals, provide patient support through co-management with other health care professionals (91,120,121).

2. When co-managing a patient, communicate with their other providers so that clinical information can be shared to the patient's benefit.

2a. Adhere to standards for patient confidentiality and protected health information.

2b. As appropriate, communicate with the patient's primary care provider and request medical records relevant to the patient's musculoskeletal disorder(s) (91)

3. For patients with limited mobility and substantial challenges navigating public spaces, consider coordinating with primary care provider for referral to home skilled services. (M4)

4. As appropriate, perform or refer to physical or occupational therapy for a mobility needs assessment (e.g., cane, walker, mobility chair) (91,122). (M4)

3.4 Manual procedures(31)

1. Spinal manipulative therapy is recommended for low back pain, lumbar spinal stenosis, and neck pain (39).

2. Minimize or modify biomechanical force delivery or avoid high-velocity, low-amplitude (HVLA) manipulation techniques as clinically indicated by patient presentation and preferences (123–125).

3. In cases contraindicating use of HVLA spinal manipulation (Table 3), consider use of low-force procedures (e.g., mobilization) (40) and other manual therapies (e.g., massage, instrument assisted soft-tissue manipulation) (113,114).

4. For patients with a history of easy bruising or skin fragility, minimize forces when applying manual therapy (126).

3.5 Rehabilitative exercise (127)

1. Rehabilitative exercises should be patient-centered and goal-oriented to promote a return to activity and 'what matters most' to the patient (128).
2. Age alone is not a contraindication to exercise; however, pre-participation screening in older adults is essential to evaluate safety and maximize benefit.
    2a. Screening should evaluate the current level of physical activity, signs or symptoms suggestive of disease, such as known cardiovascular/metabolic/renal disease, functional limitations or disability, fall risks, psychological barriers (e.g., self-efficacy, fear of falling), medications, and the intended exercise intensity (129).
3. To guide selection, dosing, and safe progression of exercise activities, consider using the FITT-VP (frequency, intensity, time, type, volume, and progression) framework (129–131).
4. Consider the incorporation of the following activities into an exercise prescription plan: (132–134)
    4a. Resistance exercises to patient tolerance, especially focusing on building or maintaining bone density and muscle mass/strength.
    4b. Fall prevention and recovery exercises such as strength for floor recovery and balance activities.
    4c. Flexibility and mobility exercises to maintain range of motion and functional movement.
5. Encourage physical activity in ways that promote adherence and integration into daily life (135).

4. Considerations for Common Musculoskeletal Conditions

4.1 Low back pain (39,114,118)

Diagnostic considerations

1. See 2. History and Evaluation section.
2. Providers should consider clinical classification of physiologic pain type (i.e., nociceptive, neuropathic, neuroplastic) to guide low back pain clinical decision making (57,136–138).

Diagnostic imaging

1. See sections *2.5 Diagnostic imaging and 2.6 Advanced diagnostic imaging.*
2. Consider appropriate circumstances for imaging according to the American College of Radiology Appropriateness Criteria® Low Back Pain (104):
    - 2a. Routine imaging is not recommended in the absence of trauma or red flags. (Table 4)
    - 2b. Lumbar MRI without contrast is usually appropriate in the presence of progressive symptoms or with persistent symptoms following six weeks of management.
    - 2c. Lumbar radiography, MRI without contrast, or CT without contrast is usually appropriate as initial imaging with the presence of osteoporosis, older individual, chronic steroid use, or following low-velocity trauma.
    - 2d. Lumbar radiography or MRI with or without contrast are usually appropriate for increasing low back pain or radiculopathy with prior lumbar spine surgery.
    - 2e. Lumbar MRI is usually appropriate for suspicion of cauda equina syndrome, cancer, infection, or immunosuppression.

Intervention considerations

1. Consider spinal manipulative therapy (39,139–141).

2. Consider other evidence-based non-pharmacological options including superficial heat, physical activity, supervised exercise, acupuncture, or massage therapy (118,142,143).
3. Consider psychological (e.g., cognitive behavioral therapy) or mind-body interventions (e.g., yoga, tai chi, progressive relaxation, mindfulness-based stress reduction) (144,145).
4. Refer for surgical evaluation for patients with lumbar instability, radiculopathy, neurogenic claudication with lumbar spinal stenosis, when these are disabling, progressive, associated with neurological deficit or intractable pain, or persist despite three months of conservative care (118).
5. Refer for emergent surgical evaluation for patients with suspected cauda equina syndrome (e.g., acute saddle anesthesia, bowel and bladder dysfunction, sexual dysfunction, and lower extremity symptoms).

Table 4. **Red flags with older adult patients.**

"Red flags" are signs and/or symptoms suggestive of serious underlying pathology which require additional evaluation, referral, and/or emergent care, depending upon clinical context." (74,146–151)

Red flags include but are not limited to those listed here.

- Acute or recent alteration in sensorium including confusion, memory loss, personality change or change in level of consciousness
- History of cancer with new onset of spinal pain
- History of corticosteroid use and recent onset of new symptoms suggestive of complication (i.e., pain or other symptoms related to avascular necrosis, compression fracture, or infection)
- Intractable pain, especially at night
- Motor deficits at multiple levels
- New onset of gait disturbance
- New onset of neurological signs such as pathologic reflexes and/or hyperreflexia
- New or progressive symptoms suggestive of cerebrovascular accident (such as dysarthria, ataxia, hemiparesis, visual field deficits)
- Progressive motor weakness or spasticity
- Signs of cauda equina syndrome (e.g., urinary/fecal incontinence or urinary retention, saddle anesthesia)

- Signs suggestive of fracture (e.g. recent trauma, sudden stooped posture, acute spinal tenderness)
- Spinal deformity or loss of height
- Suicidal ideation or self-harm
- Suspected substance use disorder
- Unexplained injuries
- Unexplained or recurrent fevers
- Unexplained weight loss

4.2 Neck pain (39,43)

Diagnostic considerations

1. See section 2. History and Evaluation section.
2. Assess for radiculopathy and degenerative cervical myelopathy (43)

    2a. See section *4.6 Degenerative Cervical Myelopathy*

Diagnostic imaging

1. See sections *2.5 Diagnostic imaging and 2.6 Advanced diagnostic imaging.*
2. Consider appropriate circumstances for imaging according to the American College of Rheumatology Appropriateness Criteria® Cervical Pain or Cervical Radiculopathy: (152,153)

    2a. In the absence of trauma or red flags routine imaging is not recommended.

    2b. Cervical radiography may be appropriate initial imaging for acute or increasing neck pain without radiculopathy.

    2c. Cervical MRI may be appropriate with radiculopathy.

    2d. Cervical radiography with flexion extension lateral views, MRI, or CT are usually appropriate for increasing neck pain or radiculopathy with prior cervical spine surgery.

Intervention considerations

1. Consider spinal manipulative therapy (39,117,154).

2. Consider other evidence-based non-pharmacological options including physical activity, supervised exercise, acupuncture, or massage therapy (117,154,155).
3. Consider mind-body interventions (e.g., yoga, tai chi) (156,157).
4. Caution should be exercised regarding providing SMT to individuals with prior cervical spine surgery (158).
5. Refer for surgical evaluation for patients with cervical radiculopathy when these are disabling, progressive, associated with neurological deficit or intractable pain, or persist despite three months of conservative care (155).

4.3 Lumbar spinal stenosis with neurogenic claudication (159,160)

Diagnostic considerations

1. Symptomatic lumbar spinal stenosis includes neurogenic claudication with unilateral or bilateral buttock and/or lower extremity pain, cramping, paresthesia, weakness, or heaviness.
2. Symptoms are precipitated by walking and/or sustained standing and alleviated by forward flexion or sitting.
3. Functional limitations in walking capacity (with walking <100 meters being considered severe).

Diagnostic imaging (159,160)

1. Magnetic resonance imaging is preferred given its ability to evaluate the bony and soft tissue elements of the spine cross-sectionally (161).

Intervention considerations (39,116,162–164)

1. Emphasize consistent active care with individualized exercise (e.g., recumbent bicycle, flexion-based stretches, core strengthening). (M4)

2. Give personalized advice to minimize symptom provocation in context of daily activities.
3. Consider SMT as part of a multimodal management plan, combined with other evidence-based interventions (57).

4.4 Hip osteoarthritis (OA) (57,113)

Diagnostic considerations

1. Pain in the hip, groin, anterior or medial thigh, worsened by climbing stairs or walking down slopes; possible family history of OA (165).
2. Possible exam findings may include a limp, inguinal or lateral hip tenderness, restricted hip movement in multiple planes, pain with squatting, groin pain with adduction or abduction, pain with scour test, or abductor weakness (165).

Diagnostic Imaging

1. See 2.5 Diagnostic imaging and 2.6 Advanced diagnostic imaging
2. Consider appropriate circumstances for imaging according to the ACR Appropriateness Criteria® Chronic Hip Pain: (166)

    2a. Plain film radiographs of the hip and pelvis are usually appropriate initial imaging for chronic hip pain.

    2b. Hip MRI without contrast is usually appropriate as next imaging if radiographs are negative or nondiagnostic.

Intervention Considerations

1. Offer or refer for a multimodal exercise program targeting strength, aerobic capacity, flexibility, and/or neuromotor exercise (e.g., balance, coordination, gait, agility,

proprioceptive training) of adequate dosage with progression, tailored to the patient's presentation and preferences (167,168). (M4)

2. Consider incorporating manual therapies, such as long-axis hip distraction, mobilization and/or thrust manipulation to a multimodal treatment plan (169).
3. Offer advice regarding maintaining a healthy weight and/or refer patients who are overweight or obese for additional weight loss support (167,168). (M5)
4. Consider recommending walking aids, appropriate footwear, or assistive devices and home/work adaptations at home to minimize symptoms, or refer patients for additional consideration of these factors (167). (M4)
5. Refer patients for surgical evaluation who have severe hip OA, moderate to severe pain and dysfunction, and for whom nonsurgical treatments are ineffective (168,170).

4.5 Degenerative cervical myelopathy (DCM) (171–173)

Diagnostic considerations (174,175)

1. Symptoms may include neck pain, loss of dexterity, altered hand sensation, upper extremity weakness, lower extremity weakness, or gait imbalance.
2. Examination findings may include the presence of pathological reflexes (e.g., Hoffmann, Trömner, Babinski, or inverted supinator signs), upper or lower extremity hyperreflexia, clonus, upper extremity atrophy, and bilateral motor and/or sensory deficits of the upper and/or lower extremities.

Diagnostic imaging

1. Cervical spine MRI is preferred to assess canal diameter and potential cervical cord compression, intramedullary signal changes, and/or foraminal narrowing (176).

Intervention considerations

1. Do not perform HVLA cervical spinal manipulation (155,173,177,178).
2. Refer for consultation with an orthopedic or neurosurgical spine surgeon.
3. For those with DCM which is mild, nonsurgical, or preoperative, as appropriate, consider management with soft tissue techniques, manipulation of non-cervical regions, exercise, advice, and other modalities (173,179–183).
    3a. Counsel patient on the potential risks of condition progression and relevant signs and symptoms of myelopathy.
    3b. Co-manage with primary care, pain, rehabilitation, or other specialty providers.

5. Disease and Risk Factor Screening

5.1 Abdominal aortic aneurysm (AAA) (184) *(M5)*

Diagnostic considerations

1. Assess for risk factors for AAA such as smoking history, older age, and family history of AAA, and refer for screening as indicated.
2. Signs of symptomatic AAA include abdominal or lower back pain, fever, syncope, and pulsatile mass in the abdomen or groin (185).

Screening

1. Screening ultrasound is recommended for males 65-75 years old who have ever smoked.
2. Screening may be appropriate for women and men 65-75 years old who never smoked if they have other risk factors.
3. Refer to the U.S Preventive Services Task Force recommendations for frequency of AAA repeat screening for surveillance (186).

Intervention considerations

1. When indicated, refer for consultation with a vascular surgeon (184,187).
2. There is an increased likelihood of blood vessel injury for individuals with a history of AAA, and caution should be exercised regarding providing SMT in the region of the aneurysm (67,118).
3. When managing patients with spinal pain and stable nonsurgical AAA, avoid torsional movements and consider prioritizing low force techniques such as flexion-distraction or instrument manipulation (188,189).

5.2 Osteoporosis/osteopenia (M5)

Diagnostic considerations

1. Reduced bone mass resulting in bone weakness and increased susceptibility to fractures (190).
2. Common risk factors for osteoporosis include menopausal status, low body weight, family history of hip fracture, smoking, excess alcohol consumption, corticosteroid use, and diabetes treated with insulin (191,192).

Screening

1. Consider using risk assessment tools such as The Fracture Risk Assessment Tool (FRAX), the Fracture Risk Calculator, the Garvan Fracture Risk Calculator or the Osteoporosis Risk Assessment Instrument and the Osteoporosis Self-assessment Tool (191).
2. Screen for osteoporosis using dual-energy x-ray absorptiometry (DXA) to assess fracture risk in women 65 years or older and postmenopausal women under age 65 at increased risk (191).

3. There is insufficient evidence to routinely screen men for osteoporosis. Consider screening if risk factors are present or if clinical suspicion exists (191).

Intervention Considerations

1. There is an increased likelihood of injury, particularly fracture, for individuals with osteoporosis, and caution should be exercised regarding providing SMT (40,57,67,193).
2. When managing patients with spinal pain and osteoporosis, consider low force techniques such as mobilization or instrument manipulation (194–196).
3. As indicated, refer for consideration of pharmacologic therapy (197).
4. As appropriate, recommend lifestyle changes to support bone health, such as avoiding or stopping smoking, avoiding or limiting alcohol intake, maintaining an active lifestyle, and dietary intake of Vitamin D3 and calcium (197). Dietary supplements alone do not prevent fractures (198).
5. Recommend weight bearing exercise, such as supervised high-intensity resistance and impact training (197,199).

5.3 Chronic compression deformity *(M5)*

Diagnostic considerations (200)

1. Vertebral body compression fractures in older adults are often due to decreased bone density secondary to osteoporosis.
2. May or may not be symptomatic, but pain may be axial and/or radicular in nature.
3. May or may not result in clinically significant deformity or neurological deficit.

Diagnostic Imaging (201)

1. Confirm diagnosis with radiographs or CT of the suspected region, although two-thirds of vertebral compression fractures are detected incidentally (201).
2. When history and radiographs are inconclusive, consider advanced imaging (e.g., MRI, CT) to help differentiate between acute and chronic vertebral compression fracture.

Intervention considerations

1. Be aware that for acute osteoporotic vertebral compression fractures treated without surgery, the timeline to improvement varies from 3-12 months and that pain persists for approximately 1/3 of patients more than 6 months (200).
2. Be vigilant for subsequent fracture because there is a 5-fold increase in risk for similar fractures and 2-3-fold risk for hip and other fractures (202).
3. Consider modifying manual procedures to incorporate low force techniques such as mobilization, flexion-distraction, or instrument manipulation.
4. Consider appropriate physical exercise for pain control, physical function and quality of life (203).

5.4 Sarcopenia (204,205) ***(M5)***

Diagnostic considerations

1. Progressive and generalized skeletal muscle disorder typically defined as an age-associated loss of skeletal muscle function and muscle mass, but low muscle strength is a principal determinant (206,207).
2. Sarcopenia is associated with increased likelihood of adverse outcomes including falls, fractures, physical disability, and mortality.

Screening

1. Consider screening when symptoms or signs of sarcopenia such as falling, feeling weak, slow walking speed, difficulty rising from a chair or weight loss/muscle wasting are present, either by patient report or direct observation (207).
2. Screen for sarcopenia annually for those 65 years and older or after the occurrence of major health events (206).
    2a. Consider formal assessment with the SARC-F questionnaire (Strength, Assistance with walking, Rise from a chair, Climb stairs, and Falls) (204,206).
    2b. Physical performance and muscle strength tests can assist in sarcopenia diagnosis (e.g., grip strength, chair stand test, timed-up-and-go test, short physical performance battery and gait speed) (204,206,207).
    2c. Consider the SarQoL (Sarcopenia - Quality of Life) questionnaire to assess impact to quality of life (207,208).
3. As indicated, refer patients with suspected sarcopenia to primary care or geriatrician for further evaluation and management.
    3a. In cases where careful monitoring of sarcopenia is warranted, consider the evaluation of appendicular skeletal muscle mass by DXA or Bioelectrical impedance analysis (although less accurate) (205–209).

Intervention considerations

1. Refer or co-manage with the patient's primary care provider, a geriatrician, physical therapist, occupational therapist, and/or nutritionist, for holistic review of etiology and treatment planning coordination.
2. Recommend resistance-based exercise. (M4)
3. Consider recommending a protein-rich diet and adequate caloric intake (206,209).

4. Use caution with regard to manual therapy force delivery in the presence of sarcopenia (123–125).

5.5 Fall prevention (M4/M5)

Diagnostic Considerations

1. Screen older adults for falls at least annually, including number of falls, resulting injuries and presence of issues with balance or gait (210).
2. Ask about symptoms such as dizziness, lightheadedness, syncope, or imbalance, which may suggest cardiovascular or vestibular disorders or drug side effects (92).

Screening

1. Consider assessing fall risk using validated tools such as those provided by the Centers for Disease Control and Prevention's STEADI program (Stopping Elderly Accidents, Deaths, and Injuries) (211,212).

Intervention considerations

1. Do not recommend single interventions in isolation, especially for frail patients (e.g., resistance training, exercise, or education alone) (213,214).
2. Recommend exercise interventions to improve balance, such as Tai Chi (92,213–219).
3. Refer or deliver exercise interventions to train gait, balance, resistance and muscle strengthening through individual instruction or group exercise classes (191).
4. Consider assessment of home hazard and other environmental factors (92,213,215–219).
5. Provide information on important nutritional factors and lifestyle habits (92,215).
6. Advise patients to schedule periodic vision, hearing and footcare checks (92).

7. Offer patients readily accessible community resources for appropriate exercise and other fall risk programs (92,215,216,218).
8. Consider using telehealth, and recommending smart phone systems or wearable technology, to support management of patients at risk of falling (92).
9. Refer to primary care provider or a specialist when recommended interventions are unavailable or outside chiropractic scope of practice (213,215).

6. Lifestyle Intervention

6.1 General lifestyle recommendations for older adults

1. Advise older adults to do moderate intensity physical activity that emphasizes balance and strength at least 3 days per week to maintain and/or improve function and prevent falls (220,221).
2. Advise older adults to adopt a healthy diet emphasizing whole foods, such as the Mediterranean diet, to improve physical performance and cognitive function (222–225).
    2a. Focus on nutrient-dense foods like fruits, vegetables, whole grains and a variety of high-quality animal and plant-based protein, while limiting sugars, saturated fats, and sodium (226).
    2b. Prioritize adequate water intake, calcium, vitamin D, fiber, vitamin B12 and protein (227,228).
3. Advise on strategies to get sufficient quality sleep, acknowledging that sleep patterns naturally shift with age, including timing and shortened nocturnal sleep duration (229).
    3a. Advice may include maintaining a regular sleep schedule, creating a bedtime routine, optimizing a dark, cool sleep environment, avoiding evening stimulants (e.g. caffeine,

electronic devices), using aromatherapy, and engaging in regular physical activity (230,231).

4. Encourage stress management, including mindfulness meditation or relaxation techniques, yoga or other physical activity, engaging in hobbies and activities, and financial planning (232,233).

5. For caregivers, discuss engaging support from family, friends, or support groups.

6. Discuss the importance of social connections to improve physical and mental health, reduce risk of dementia, and increase lifespan. This may include maintaining existing relationships, seeking out new opportunities for social interaction, and actively participating in community activities (234).

7. As appropriate, counsel against the use of high-risk substances, including tobacco, recreational drugs, and unhealthy alcohol consumption, defined as more than 3 drinks/day or 7 drinks/week (235).

7a. Consider evidence-based approaches like SBIRT (Screening, Brief Intervention, Referral to Treat) for patients with or at risk of substance use disorder.

7b. Identify a network of local, state and national resources for referral and support services. See Substance Abuse and Mental Health Services Administration (SAMHSA) for more information (236).

DISCUSSION

Older adults comprise a steadily increasing proportion of patients presenting for chiropractic evaluation and management, and the research base to guide evidence-informed decision making for some interventions common to chiropractic practice is nascent (15,237). This clinical practice guideline helps mitigate that gap, and informs best practice standards of care for a population

disproportionately disabled by musculoskeletal conditions and chronic disease (7). These recommendations aligns with a recent systematic review concluded that SMT may offer comparable or modestly greater efficacy for older adults with chronic low back or neck pain, and symptoms associated with lumbar spinal stenosis, when compared to other treatments (39). Comparators included medical care, multimodal physical therapy exercise, non-thrust manipulation plus a home exercise program, and sham treatment, as well as different combinations of supervised, home-based, and group-based exercise. No comparators were superior to SMT. The certainty of these findings, however, ranged from moderate to very low due to relatively few trials and risk of bias. While additional high-quality RCTs are needed to refine the evidence in this space, SMT can currently be considered an efficacious treatment option for patients and clinicians, provided no contraindications to care (16).

While SMT and other recommended manual therapies are generally regarded as safe for older adults (238), safety research and a professional culture around patient safety continue to grow within the chiropractic profession (239). A systematic review of the peer-reviewed literature found no report of catastrophic adverse events (AEs) among the studies which included 1,120 older adults receiving chiropractic treatment, including SMT (40). Six instances of severe AE were identified in case reports, four of which were vascular in nature. Mild-to-moderate AEs were not uncommon, and included muscle soreness and stiffness. While the lack of standardized AE definitions, severity classifications, and data collection processes across reports limit certainty, clinicians should be aware of and regularly monitor for AEs.

Exercise, advice on lifestyle modifications, and collaborative care referrals, are also common components to chiropractic care and supported by the evidence (15,240–242). Recommendations on these interventions were also included in this CPG, more broadly reflecting the breadth of

967 contemporary chiropractic clinical practice. Patient safety, clinical appropriateness,
968 professionalism, and scope of practice may influence the extent to which these therapies are
969 utilized in individual chiropractic practices. Practice analyses suggest that what was once
970 considered ‘adjunctive’ interventions by DCs are being delivered with increasing regularity
971 (15,237).

972 This clinical practice guideline represents a considerable expansion from prior versions (31).
973 Notably, growth in the evidence base has facilitated guidance on conditions impacting older
974 adults aside from back pain, including other musculoskeletal conditions, vascular, metabolic, and
975 neurological disorders. Recommendations for fall prevention, a significant public health risk,
976 have also been included. This more accurately reflects the range of patient presentations typical
977 to chiropractic practice and, when combined with general lifestyle recommendations, instructs
978 practitioners to deliver more comprehensive care of older adults.

979 Of note, this guideline indicates crosswalks to the 4Ms of Age-Friendly Health Systems and the
980 Geriatrics 5Ms where appropriate, grounding recommendations in a holistic context of health for
981 the older adult patient. An approach to care based on the needs of the individual is emphasized
982 and, further, orients care around shared decision making and ‘what matters most’ (M1). This
983 expansion reflects the chiropractic profession’s awareness and efforts to contribute to a whole
984 person health paradigm shift in the healthcare delivery system, focused on disease prevention,
985 health and wellbeing (19,20). According to one study, while DCs report frequently discussing
986 self-care, lifestyle changes, and psychosocial factors with patients, only about half of patients
987 recalled talking about treatment goals, and fewer recalled discussing self-care, psychosocial
988 factors influencing pain, or health promotion (243).While communication is commonly cited as
989 an important aspect of the healthcare process among older chiropractic patients (244,245),

patient-provider gaps highlight opportunities to improve communication (Recommendation 1.1), ask what matters most (Recommendation 1.3), and provide lifestyle recommendations (Recommendation 6.1).

Older adults with spine-related pain and disability have reported favorable experiences with chiropractic care, not only for improving pain and controlling symptoms, but also for facilitating more active self-management strategies and self-efficacy (246,247). Lack of awareness and accessibility have been identified as barriers to chiropractic services (21,22), which may impede not only symptomatic treatment, but longer term management of recurrent musculoskeletal conditions. Uneven or insufficient insurance coverage for chiropractic services, including coverage in national health plans like Medicare in the U.S., limit access to effective, nonpharmacologic interventions for pain and the implementation of evidence-informed health care (23–25). Clinical practice guidelines such as this can support efforts to increase access to chiropractic services by directing resources toward high-value, evidence-based treatments. The majority of SC members and panelist live or work in the U.S. and international regulations or laws may supersede the recommendations provided.

Several recommendations in this CPG may challenge conventional wisdom based on new evidence. Of note, no recommendations could be made for the use of passive modalities, such as electrical stimulation, therapeutic ultrasound, or cold therapy due to conflicting evidence and lack of consensus among the expert panel. This aligns with other guidelines that do not support their use as first line interventions (143,248,249). Recommendation 3.5.2. highlights that age alone is not a contraindication for exercise, and in fact, weight bearing and high-intensity exercise improve bone mineral density in individuals with osteoporosis/osteopenia (199). Table 2 provides guidance on precautions and contraindications to several commonly used treatment

approaches utilized by chiropractors (e.g., SMT, soft-tissue techniques, therapeutic exercise). Notable contraindications to SMT include conditions with infectious, inflammatory, neurological conditions, as well as presentations or comorbidities suggestive of bone integrity and structural instability concerns. While history of a surgical fusion is a precaution, the evidence does not support that a prior, fully healed fusion is negatively impacted by SMT in the region (250,251). Recommendation 5.2.4 notes insufficient evidence supporting dietary supplements for fracture prevention, and some research has questioned whether calcium supplementation increases cardiovascular disease and stroke risk (252). Although a meta-analysis found no clear increase in risk, further research is needed to confirm calcium safety (252). The U.S. Preventative Services Task Force recommends against daily calcium supplementation in postmenopausal women because of limited evidence for fracture prevention and potential harms such as kidney stones (198). Instead, vitamin D and calcium intake from dietary sources, combined with healthy lifestyle behaviors including avoiding smoking and alcohol and remaining physically active, are recommended to prevent fractures.

This CPG benefited from the perspective of a multidisciplinary panel, following a methodologically rigorous modified Delphi process to evaluate and adjudicate seed statements. The consensus process was completed anonymously through an electronic iterative ranking process, which reduces cognitive bias through the potential of groupthink and peer pressure. This study served as the newest iteration of guidance for chiropractic management of older adults by updating and building upon two prior best practices documents. While recommendations were based on a methodologically rigorous process and the best available evidence, these are intended as guidance only. Clinical judgement should be made based on individual case presentation, following an evidence informed practice model.

One limitation of this work is the omission of strength of evidence ratings for each recommendation. However, strength of evidence ratings are not a required process of the RAND/UCLA Appropriateness Method, used here to complete this Delphi process, or for the Conducting and REported DElphi Studies (CREDES) checklist (44,253). Instead, systematic reviews, meta-analyses, and other CPGs that reported on quality were relied on as sources for seed statements, and lower-level evidence was only consulted in their absence. While the Delphi process is rigorous, it is subject to bias in interpretations and variability. We did not assess for stability of ratings across rounds, as statements that achieved consensus were not rated a second time, and statements not reaching consensus were revised and recirculated until they achieved consensus or were deleted. The panelists in this study were under representative of chiropractors who are female or from racial/ethnic minority populations. Efforts were made to recruit chiropractors from these populations, but additional efforts at outreach and relationship building are needed to improve representativeness in future guidelines. Further, we did not inquire about the age of participants; therefore, it is unclear how many panelists were older adults themselves. While the average years in profession was more than 20 years, it remains possible that older adults were not sufficiently represented.

CONCLUSION

This CPG provides updated evidence-based consensus statements on the chiropractic management of older adults with chronic musculoskeletal disorders. The recommendations outlined were approved by a multidisciplinary panel and are consistent with the *4Ms of Age-Friendly Health Systems* and the *Geriatrics 5Ms* frameworks. The scope of the work expanded on previously published best practices to specifically address common musculoskeletal conditions, and disease and risk factor screening relevant to chiropractors. The expansion

included new guidance on the chiropractic management of low back pain, neck pain, lumbar spinal stenosis with neurogenic claudication, hip osteoarthritis, degenerative cervical myelopathy, abdominal aortic aneurysm, osteoporosis/osteopenia, chronic compression deformity, sarcopenia, and fall prevention. Further, we expannded on precautions and contraindications for nonpharmacologic interventions and, to promote healthy aging, provided new guidance on lifestyle interventions. All the recommendations are within the training and scope of practice of chiropractors in the US. However, disparities in the healthcare delivery system and insurance coverage limit patient access and present barriers to implementation.

ABBREVIATIONS

4Ms: 4Ms Age-Friendly Health Systems (What Matters, Medication, Mentation, Mobility)

5Ms: Geriatric 5Ms (Mind, Mobility, Medications, Multicomplexity, Matters Most to Me)

AAA: Abdominal aortic aneurysm

ACR: American College of Radiology

AE: Adverse events

AGREE II: Appraisal of Guidelines for Research & Evaluation (AGREE)

C: Contraindication

CBD: cannabidiol

CPG: Clinical practice guideline

CREDES: Conducting and REported DElphi Studies

CT: Computed tomography

DC: Doctor of Chiropractic

DCM: Degenerative cervical myelopathy

DXA: dual-energy x-ray absorptiometry

FITT-VP: frequency, intensity, time, type, volume, and progression

FRAX: The Fracture Risk Assessment Tool

GAD-7: General Anxiety Disorder-7

HVLA: high-velocity, low-amplitude

ICD: implantable cardiac defibrillator

ID: identification number

M1: What Matters Most

M2: Medications

M3: Mind/Mentation

M4: Mobility

M5: Multicomplexity

MeSH: medical subject headings

MoCA: Montreal Cognitive Assessment

MMSE: Mini-Mental State Examination

MRI: magnetic resonance imaging

OA: osteoarthritis

P: precaution

PAINAD: Pain Assessment in Advanced Dementia

PHQ-9: Patient Health Questionnaire-9

RCT: Randomized controlled trial

SAMHSA: Substance Abuse and Mental Health Services Administration

SarQoL: Sarcopenia - Quality of Life

SBIRT: Screening, Brief Intervention, Referral to Treat

SC: steering committee

SMT: spinal manipulative therapy

STEADI: Stopping Elderly Accidents, Deaths, and Injuries

THC: tetrahydrocannabinol

TENS: transcutaneous electrical nerve stimulation

U.S.: United States

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Institutional review board approval was granted by Texas Chiropractic College, 2025_03_ Hawk_01_R1. All participants in the modified Delphi process provided written consent to participate.

Following manuscript drafting, the program Grammarly was used to assess for grammatical errors. Generative artificial intelligence was not used to draft any part of this article or to perform any analysis.

CONSENT FOR PUBLICATION

All participants provided written consent to be acknowledged in this article.

COMPETING INTERESTS

Clinton J. Daniels, Michele J. Maiers, and Alec L. Schielke all received honoraria from Clinical Compass for their participation in this study. Robert J. Trager reports earning royalties from authoring texts on the topic of sciatica and received consulting fees from Merck for participation in an expert input meeting on chronic low back pain (October 2025). Stacie A. Salsbury received travel support for participation in an expert panel on chiropractic care in older adults from Parker

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CLINICAL TRIAL NUMBER

Not applicable.

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AUTHOR CONTRIBUTIONS

CD and AS contributed to the design, implementation and supervision of the study. All authors contributed to the design methodology. SW and CD developed and completed the targeted literature search. All SC members participated in drafting the seed statements. CE administered the modified Delphi process and CD performed the data analysis. MM, CD, and AS drafted the initial manuscript. All authors read and provided critical review of the manuscript. CD provided supervision.

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