

Active Long-term Care Strategies in a Group Setting for Chronic Spine Pain in 3 United States Military Veterans: A Case Series



Jordan A. Gliedt, DC,^a Nathan J. Campbell, DC,^b Clinton J. Daniels, DC, MS,^c and Aram S. Mardian, MD^{b, d}

ABSTRACT

Objective: The purpose of this article is to describe the management of chronic spine pain in 3 United States military veterans who participated in extended courses of chiropractic care that focused on active care strategies in a group setting.

Clinical Features: A 68-year old male veteran (case 1) with a 90% service-connected disability rating presented with chronic neck and lower back pain. An 82-year old male veteran (case 2) with a 20% service-connected disability rating presented with chronic neck and upper back pain. A 66-year old male veteran (case 3) presented with a 10% service-connected disability with chronic episodic back and neck pain. Each veteran described a desire to maintain ongoing chiropractic treatments after completion of a course of chiropractic care in which maximal therapeutic gain had been determined. Patient-Reported Outcomes Measurement Information System (PROMIS) Patient Interference Short Form 6b (PPI), PROMIS Physical Function Short Form 10b (PPF), and Pain, Enjoyment, and General Activity (PEG) outcome measurement tools were used to track response to care.

Interventions and Outcome: Each veteran participated in an extended course of chiropractic visits consisting of group pain education, group cognitive behavioral strategies, group exercise, group mind-body self-regulation therapy, and optional individual manual therapy. Case 1 completed 8 extended chiropractic visits in 12 months and reported no change in PPI scores, improvement in PPF scores, and worsening PEG scores. Cases 2 and 3 completed 6 extended chiropractic visits each over a 12-month period and reported improvements in PPI, PPF, and PEG scores.

Conclusion: This article describes the responses of 3 veterans with chronic spine pain participating in long-term care using chiropractic visits in a group setting that focused on active care strategies. Our group-based, active care approach differs from those described in literature, which commonly focus on visits with a strong emphasis on manual therapy in 1-on-1 patient encounters. (*J Chiropr Med* 2020;19:188-193)

Key Indexing Terms: *Chiropractic; Low Back Pain; Neck Pain; Chronic Pain; Rehabilitation; Long-Term Care*

Paper submitted June 13, 2019; in revised form June 2, 2020; accepted June 17, 2020.^a Department of Neurosurgery, Medical College of Wisconsin, Milwaukee, Wisconsin.

^b Phoenix Veterans Affairs Health Care System, Phoenix, Arizona.

^c VA Puget Sound Health Care System, Tacoma, Washington.

^d Department of Family, Community and Preventive Medicine, University of Arizona College of Medicine—Phoenix, Phoenix, Arizona.

Corresponding author: Jordan A. Gliedt, DC, Department of Neurosurgery, Medical College of Wisconsin, 1155 N Mayfair Rd, Milwaukee, WI 53226.
(e-mail: jordan.gliedt@gmail.com).

Paper submitted June 13, 2019; in revised form June 2, 2020; accepted June 17, 2020.
1556-3707

© 2020 by National University of Health Sciences.

<https://doi.org/10.1016/j.jcm.2020.06.004>

INTRODUCTION

Chronic pain is a common condition of global concern, placing an increasing burden on individuals, the public, and the health care system. For example, chronic pain has been estimated to affect approximately 50 million adults in the United States and to encumber society with approximately \$560 billion dollars in costs each year.¹ Neck and low back pain account for the greatest causes of disability in most countries worldwide.² In Germany, low back pain alone has been measured to have a point prevalence of 28% to 37%, a 1-year prevalence of 76%, and a lifetime prevalence of approximately 85%.³ In Canada, neck pain has been estimated to have a point prevalence of 22% and a lifetime prevalence of approximately 66%.⁴

This epidemic of musculoskeletal pain and disability is represented in the US military veteran population.

Musculoskeletal-related pain diagnoses, specifically spine pain, are the most common complaints of US veterans returning from Operation Iraqi Freedom/Operation Enduring Freedom.⁵⁻⁷ In veterans using Veterans Affairs (VA) care, back pain, joint disorders, and other musculoskeletal conditions appear to continue to increase for at least the first 7 years after deployment.⁸

Chiropractic services are increasingly used in the VA for veterans with low back and neck conditions⁹ and have shown preliminary findings of substantial improvements.¹⁰ Extended courses of chiropractic care beyond the point of determined maximal therapeutic gain are called *maintenance care* by some in chiropractic.^{11,12} We define extended courses of chiropractic care as “scheduling additional visits over a prolonged period of time, but at longer time intervals than during the acute event.”¹¹ These extended courses of care are often delivered with a goal and perceived patient expectation of prevention of new events or maintenance of improvement at the highest possible level for patients with incurable conditions.¹¹

This type of long-term care is provided over an extended period, typically for a chronic condition or disability requiring periodic care. Preliminary findings suggest that extended chiropractic care for persistent and recurrent spine pain may decrease the number of painful days,¹³ particularly for those with dysfunctional psychological profiles characterized by high pain severity, marked interference in daily life, high affective distress, low perceptions of life control, and low activity levels.¹⁴ Outcomes associated with extended courses of chiropractic care may be influenced by care that includes active participation and health-promotion strategies. A 2012 chiropractic consensus process and best-practice document provides guidance for the role of chiropractic care in health promotion, disease prevention, and wellness, emphasizing a requirement of active patient participation with clinical strategies including exercise, diet or nutrition counseling, and lifestyle coaching.¹⁵ Extended courses of care have been described to consist of manual therapy, exercise prescription and training, and counsel on ergonomics, diet, stress management, and lifestyle.^{12,16}

Extended courses of chiropractic care typically focus on the application of manual therapy¹² in 1-on-1 patient encounters, which may restrict patients from actively participating in health-promotion strategies. Group visits for chronic pain are well accepted in other health fields, have been shown to have high patient satisfaction with increased patient knowledge,¹⁷ and could enhance participation in active health-promotion components of extended care. We are unaware of any literature describing extended courses of chiropractic care emphasizing health-promotion strategies in a group setting. Therefore, the purpose of this article is to describe the long-term care of chronic spine pain in 3 US military veterans with extended courses of chiropractic care in a group setting that aims to increase self-efficacy by combining several well-established active care strategies.

CASE SERIES

Ethics

This case series was reviewed by the Phoenix VA Health Care System (PVAHCS) Research Department, and the institutional review board deemed the cases exempt from review and gave permission to publish de-identified data for these 3 people.

Background of Extended Chiropractic Visit Structure

The structure of an optional pathway for extended chiropractic care was developed by a multidisciplinary group process with 2 chiropractors and 1 supervising medical physician within the PVAHCS Chronic Pain Wellness Center and chiropractic clinic. The extended course of care was designed to address the needs of patients with chronic spine pain who subjectively identified a relationship between past maintained chiropractic visits and perception of maintained pain reduction or decreased frequency or intensity of recurrent episodes and were determined by the chiropractor to lack skills or beliefs to optimize their self-efficacy associated with their spine pain. The care was organized around the biopsychosocial (BPS) model of chronic pain and the most recent chiropractic best-practice document on chiropractic care in health promotion, disease prevention, and wellness,^{15,18,19} with a focus on improving patient self-management skills and reducing reliance on passive coping strategies.

Description of Extended Chiropractic Visits

After patients had completed an initial course of chiropractic care in which maximal therapeutic gain was determined, they were provided the option to participate in extended chiropractic visits. Patients participated in extended chiropractic visits at a maximum frequency of 1 session per month. Each visit had 4 elements: group pain education and cognitive behavioral strategies, supervised group exercise, group mind-body self-regulation therapy, and individual manual therapy. Patients were scheduled in a 1-hour group visit, which comprised 20 minutes for each of the 3 group elements and was led by a chiropractor. Not all patients entered extended chiropractic visits on the same date. The format of extended chiropractic visits was designed with the intention for patients to enter extended courses of care at any time point and proceed through 6 visits of care. Patients were not limited to 6 visits of care and were able to self-select out of extended chiropractic visits or return to extended chiropractic visits at any time.

The group-visit component of pain education and cognitive behavioral strategies consisted of individual topics such as education based on understanding pain and the BPS model of pain; active care versus passive care; body mechanics, postural habits and the concept that hurt may

not equal harm; introduction and identification of specific, measurable, attainable, relevant, and time-bound (SMART) goals, with discussion including exercise pacing concepts; recognition and replacement of negative cognitions with positive thoughts; healthy eating, tobacco cessation, and exercise; identification of avenues of social support systems; and cultivation of a positive disposition.

The exercise component of group visits included guided exercises such as walking in place, repetitive sit-to-stand exercise, standing lunges, standing squats, repetitive spinal end-range movements consistent with patient response, various seated and standing yoga poses, tai chi, and gentle spinal ranges-of-motion stretching. The mind-body self-regulation component consisted of activities such as progressive muscle relaxation, mindfulness meditation, guided positive imagery, and development and repetition of positive affirmations.

Manual therapy was not a mandatory component of visits, and patients were given the option to receive manual therapy after each group visit with a goal of shifting focus from passive to active coping strategies. Treatments were applied to cervical, thoracic, or lumbosacral regions as indicated upon physical examination. Manual treatments included, alone or in combination, myofascial soft tissue release, spinal manipulative therapy, and spinal mobilization. Myofascial soft tissue release is defined as manual manipulation of soft tissue in combination with active or passive range-of-motion stretching. Spinal manipulative therapy involves a high-velocity, low-amplitude thrust to a targeted spinal joint slightly beyond its passive range of motion.²⁰ Spinal mobilization is defined as application of manual force to spinal joints within the passive range of joint motion that does not include a thrust.²⁰

Patient-Reported Outcome Measures

Patient-reported outcome measures (PROMs) were used to track patient response to care and assist in clinical decision making for patient management. Patient-Reported Outcomes Measurement Information System (PROMIS) Pain Interference Short Form 6b (PPI), PROMIS Physical Function Short Form 10a (PPF), and the Pain, Enjoyment, and General Activity Tool (PEG) were utilized in the extended chiropractic care. All PROMs were administered before the first session and after every sixth session, except for the PEG, which was administered at every session.

PROMIS is a set of patient-centered metrics that can be used to evaluate and monitor physical, mental, and social health.²¹ PROMIS has developed a range of instruments to measure pain and physical function. The PROMIS pain-interference item bank has been shown to be valid and reliable.²² The PPI comprises a series of questions in which patient answers are assigned numeric scores that are summed to indicate the severity of pain interference (maximum score of 30). A higher total score indicates a greater

extent of pain interference. A defined minimum clinically important difference (MCID) suggesting a meaningful clinical outcome when using PROMIS pain-interference measures has been studied using multiple items in the pain-interference item bank.²³ Results indicate a change ranging from 2 to 5.5 points as a meaningful change in back pain and chronic pain samples.²³

The PROMIS physical-function items have demonstrated increased performance compared with other related PROMs administered to patients with spine complaints.²⁴ A higher score for the PPF indicates a greater ability to perform typical daily physical functions. A defined MCID suggesting a meaningful clinical outcome for the PROMIS physical-function measures has been studied with samples of individuals with rheumatoid arthritis, knee osteoarthritis, and cancer.²³ Results in these studies have shown that a change ranging from 1.9 to 6 points is associated with a meaningful change in these samples.²³

The PEG was developed as a succinct, straightforward multidimensional assessment of chronic pain to be used in ambulatory care settings.²⁵ It consists of 3 items and evaluates average pain intensity, pain interference with enjoyment of life, and pain interference with general activity during the past week.²⁵ The patient rates each item on a numeric scale of 0 to 10, with 10 suggesting the highest degree of pain or interference. The PEG has been shown to be a valid and reliable measure of pain among primary-care patients with chronic musculoskeletal pain.²⁵ A defined MCID suggesting a meaningful clinical outcome has not been established for the PEG. (For patient profiles and outcomes, see [Tables 1](#) and [2](#).)

Case 1. A 68-year old male veteran presented to the chiropractic clinic within the primary-care department at the PVAHCS for initial extended chiropractic care evaluation with a history of chronic neck and lower back pain of several years' duration. He had a service-connected disability rating of 90%. The veteran was diagnosed with chronic nonspecific neck and back pain with spondylosis. His PPI was measured at a score of 21, PPF at 31, and PEG at scores of 2, 2, and 2. He described a long history of

Table 1. Patient Profiles

Patient	Age, y	SC, %	Visits	Diagnosis
Case 1	68	90	8	Chronic nonspecific cervical and lumbar pain with spondylosis
Case 2	82	20	6	Chronic cervicogenic with spondylosis and myofascial pain
Case 3	66	10	6	Chronic episodic mechanical and nonspecific back and neck pain with spondylosis

SC, service-connected disability rating.

Table 2. Patient-Reported Outcomes

Outcome Measure	Case 1		Case 2		Case 3	
	Pre	Post	Pre	Post	Pre	Post
PPI	21	21	19	13	23	8
PPF	31	33	40	42	40	47
PEG: Average Pain Intensity	2	4	3	4	8	1
PEG: Pain Interference With Enjoyment of Life	2	4	5	3	8	1
PEG: Pain Interference With General Activity During the Past Week	2	4	4	4	8	1

PEG, Pain, Employment, and General Activity Screening Tool; PPF, PROMIS Physical Function Short Form 10a; PPI, PROMIS Patient Interference Short Form 6b; PROMIS, Patient-Reported Outcomes Measurement Information System.

multiple chiropractic visits and a perceived need to continue with ongoing chiropractic care. He proceeded with extended chiropractic care through participation in group visits. The veteran completed 8 visits over a 12-month period, with completion of the manual therapy component at each visit. Readministration of outcome measures was completed after the sixth visit, yielding a PPI score of 20, a PPF score of 33, and PEG scores of 4, 4, and 4.

Case 2. An 82-year-old male veteran presented to the chiropractic clinic within the primary-care department at the PVAHCS for initial chiropractic evaluation with a history of chronic neck pain and upper back pain of several years' duration. He had a service-connected disability of 20%. The veteran was diagnosed with chronic cervicalgia with spondylosis and myofascial pain. Administration of outcome measures yielded a PPI score of 19, a PPF score of 40, and PEG scores of 3, 5, and 4. The veteran had completed a recent course of chiropractic treatments and described an extensive history of multiple chiropractic visits, with a desire to continue with ongoing chiropractic care. He proceeded with extended chiropractic visits and completed 6 visits over a 12-month period, with completion of the manual therapy component at 5 of the 6 sessions. Readministration of outcome measures was completed after the sixth visit, yielding a PPI score of 13, a PPF score of 42, and PEG scores of 4, 3, and 4.

Case 3. A 66-year-old male veteran presented to the chiropractic clinic within the primary-care department at the PVAHCS for initial chiropractic evaluation with a several-year history of chronic episodic neck and low back pain. He had a service-connected disability of 10%. The veteran was diagnosed with chronic episodic mechanical and nonspecific back and neck pain with spondylosis. He perceived benefit from a recent past course of chiropractic

treatments and expressed a desire to continue with ongoing chiropractic care to maintain current pain reduction and functional status. Administration of outcome measures yielded a PPI score of 23, a PPF score of 40, and PEG scores of 8, 8, and 8. The veteran proceeded with an extended course of chiropractic care through participation in group visits and completed 6 visits over a 12-month period, with completion of the manual therapy component at each of the 6 visits. Readministration of outcome measures was completed after the sixth visit, yielding a PPI score of 8, a PPF score of 47, and PEG scores of 1, 1, and 1.

DISCUSSION

These 3 cases show a variability of response that might be generally expected in a similarly structured course of extended chiropractic care with a similar demographic. This approach is unique in that it is the first documentation known to the authors to describe extended chiropractic care focused on active care strategies with an emphasis on self-efficacy and health promotion in a group setting. This active approach to patient care is part of a broader cultural transformation initiative, supported by recent recommendations from the National Academies of Science, Engineering, and Medicine, the Institute of Medicine, and the National Pain Strategy focusing on shifting from passive therapies to active self-management through nonpharmacologic, multimodal, BPS-oriented methods.²⁶⁻²⁸ The design of extended care allowed us to meet the preexisting expectations of patients with a perceived reliance on maintained passive chiropractic treatments, which theoretically provided greater appeal to patients to engage in a program centered on active care. Additionally, the design leveraged group therapy sessions that allowed patients the opportunity to learn from each other. The emphasis on active self-care and group dynamics was incorporated into visits, with the intent to shift the locus of control from passive provider-centric coping to active patient-centered self-efficacy.

Future Studies and Limitations

Extended courses of chiropractic care warrant investigation to assess whether this approach is a beneficial mode of treatment and to clarify associated ambiguities of extended chiropractic care. Research investigating patient selection, treatment components, delivery methods, and outcomes associated with extended courses of chiropractic care for chronic spine pain are warranted.

We recognize that the practice of extended chiropractic care currently lacks several defined parameters, and its heterogeneous implementation is widespread.¹¹ Frequency of extended care has been described to range from 1 session

every 2 weeks to 1 session every 3 months.^{13,29-33} We chose to set visit frequency to a maximum of 1 session per month, influenced by these previous descriptive reports. However, there is no substantiated evidence to support our defined frequency.

Theoretically, extended courses of care are a conceivable method of clinical care which may yield decreased episodes of recurrent spine pain or promote functional preservation. Beattie et al described a model using longitudinal care with an emphasis on addressing self-management strategies as an alternative approach to traditional short-term therapy sessions.³⁴ This approach may provide long-term stimuli to address chronic neuromusculoskeletal impairments associated with chronic pain, provide ongoing coaching resulting in a stronger therapeutic alliance, and enhance adherence to an exercise regimen and long-term self-care strategies. If a patient lacks necessary skills to enhance self-efficacy, a longer-term approach which emphasizes active self-management may strengthen the individual's ability to engage in effective self-care strategies.

However, longitudinal care may not be ideal for all individuals with chronic pain.³⁴ Extended care paradoxically may promote a reliance on health care practitioners, particularly if sessions focus on passive care. This may distract from full adoption of self-empowerment and self-care. Patients who are resistant to exercise or have a low degree of self-efficacy may potentially show resistance toward self-management and have a reduced likelihood of success with perpetual care unless self-mastery is promoted.^{34,35} Influenced by this, we chose to deemphasize the manual therapy component of visits and stress active self-care techniques. Research is needed to assist in identifying factors predictive of success with prolonged care and models to stratify patients to the most efficient and effective therapeutic approaches.

Finally, we organized visits to include 4 distinct elements. These are not an exhaustive list of potentially positive interventions for extended courses of care for chronic spine pain. Questions remain regarding optimal combinations of therapies and the mode of intervention (ie, group sessions versus individual sessions). Furthermore, the ideal frequency of the intervention(s) is unknown.

CONCLUSION

The application of long-term care using chiropractic visits in 3 veterans provides a description of how extended chiropractic care was utilized for chronic spine pain, with a range of outcomes seen. Our group-based, active care approach differs from those described in the literature, which commonly focuses on visits with a strong emphasis on manual therapy in 1-on-1 patient encounters.

ACKNOWLEDGMENT

The authors thank Cheryl Hawk, DC, PhD, for providing assistance in the development of the manuscript.

FUNDING SOURCES AND CONFLICTS OF INTEREST

No funding sources or conflicts of interest were reported for this study.

CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): J.A.G., N.J.C., A.S.M.

Design (planned the methods to generate the results): J.A.G., N.J.C., A.S.M.

Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): J.A.G.

Data collection/processing (responsible for experiments, patient management, organization, or reporting data): J.A.G., N.J.C.

Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): C.J.D.

Literature search (performed the literature search): J.A.G.

Writing (responsible for writing a substantive part of the manuscript): J.A.G., C.J.D.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): J.A.G., N.J.C., C.J.D., A.S.M.

Practical Applications:

- This article describes a group format of chiropractic visits focused on active care strategies for patients with chronic/recurrent spine pain.
- Visits consisted of group pain education and cognitive behavioral strategies, group exercise, group mind-body self-regulation therapy, and an optional individual manual therapy session.
- Reduction in pain interference was measured in 2 of the 3 cases and improvement in physical-function metrics was seen in each case.

REFERENCES

1. Dahlhamer J, Lucas J, Zelaya C, et al. Prevalence of chronic pain and high-impact chronic pain among adults—United States, 2016. *MMWR Morb Mortal Wkly Rep.* 2018;67(36):1001-1006.

2. GBD 2015 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388(10053):1545-1602.
3. Schmidt CO, Raspe H, Pflingsten M, et al. Back pain in the German adult population: prevalence, severity, and sociodemographic correlates in a multiregional survey. *Spine (Phila Pa 1976)*. 2007;32(18):2005-2011.
4. Côté P, Cassidy JD, Carroll L. The Saskatchewan Health and Back Pain Survey: the prevalence of neck pain and related disability in Saskatchewan adults. *Spine (Phila Pa 1976)*. 1998;23(15):1689-1698.
5. Driscoll MA, Higgins DM, Seng EK, et al. Trauma, social support, family conflict, and chronic pain in recent service veterans: does gender matter? *Pain Med*. 2015;16(6):1101-1111.
6. Phillips KM, Clark ME, Gironda RJ, et al. Pain and psychiatric comorbidities among two groups of Iraq and Afghanistan era Veterans. *J Rehabil Res Dev*. 2016;53(4):413-432.
7. VHA Office of Public Health and Environmental Hazards. Analysis of VA Health Care Utilization Among US Global War on Terrorism (GWOT) Veterans: Operation Enduring Freedom, Operation Iraqi Freedom. Available at: https://networkofcare.org/library/GWOT_4th%20Qtr%20FY08%20HCU.pdf. Accessed May 8, 2020.
8. Haskell SG, Ning Y, Krebs E, et al. Prevalence of painful musculoskeletal conditions in female and male veterans in 7 years after return from deployment in Operation Enduring Freedom/Operation Iraqi Freedom. *Clin J Pain*. 2012;28(2):163-167.
9. Lisi AJ, Brandt CA. Trends in the use and characteristics of chiropractic services in the Department of Veterans Affairs. *J Manipulative Physiol Ther*. 2016;39(5):381-386.
10. Green BN, Johnson CD, Daniels CJ, Napuli JG, Gliedt JA, Paris DJ. Integration of chiropractic services in military and veteran health care facilities: a systematic review of the literature. *J Evid Based Complementary Altern Med*. 2016;21(2):115-130.
11. Leboeuf-Yde C, Hestbaek L. Maintenance care in chiropractic—what do we know? *Chiropr Osteopat*. 2008;16(1):3.
12. Rupert RL. A survey of practice patterns and the health promotion and prevention attitudes of US chiropractors: maintenance care—part I. *J Manipulative Physiol Ther*. 2000;23(1):1-9.
13. Eklund A, Jensen I, Lohela-Karlsson M, et al. The Nordic Maintenance Care program: effectiveness of chiropractic maintenance care versus symptom-guided treatment for recurrent and persistent low back pain—a pragmatic randomized controlled trial. *PLoS One*. 2018;13(9):e0203029.
14. Eklund A, Hagberg J, Jensen I, et al. The Nordic maintenance care program: maintenance care reduces the number of days with pain in acute episodes and increases the length of pain free periods for dysfunctional patients with recurrent and persistent low back pain—a secondary analysis of a pragmatic randomized controlled trial. *Chiropr Man Therap*. 2020;28(1):19.
15. Hawk C, Schneider M, Evans MW, Redwood D. Consensus process to develop a best-practice document on the role of chiropractic care in health promotion, disease prevention, and wellness. *J Manipulative Physiol Ther*. 2012;35(7):556-567.
16. Myburgh C, Brandborg-Olsen D, Albert H, Hestbaek L. The Nordic maintenance care program: what is maintenance care? interview based survey of Danish chiropractors. *Chiropr Man Therap*. 2013;21(1):27.
17. Parikh M, Rajendran I, D'Amico S, Luo M, Gardiner P. Characteristics and components of medical group visits for chronic health conditions: a systematic scoping review. *J Altern Complement Med*. 2019;25(7):683-698.
18. Engel GL. The need for a new medical model: a challenge for biomedicine. *Science*. 1977;196(4286):129-136.
19. Novack DH, Cameron O, Epel E, et al. Psychosomatic medicine: the scientific foundation of the biopsychosocial model. *Acad Psychiatry*. 2007;31(5):388-401.
20. Bronfort G, Haas M, Evans R, Kawchuk G, Dagenais S. Spinal manipulation and mobilization. In: Dagenais S, Haldeman S, eds. *Evidence-Based Management of Low Back Pain*. St. Louis, MO: Elsevier Mosby; 2012. 229.
21. PROMIS. Available at: <http://www.healthmeasures.net/explore-measurement-systems/promis>. Accessed May 8, 2020.
22. Amtmann D, Cook KF, Jensen MP, et al. Development of a PROMIS item bank to measure pain interference. *Pain*. 2010;150(1):173-182.
23. Meaningful Change for PROMIS. Available at: <http://www.healthmeasures.net/score-and-interpret/interpret-scores/promis/meaningful-change>. Accessed October 23, 2019.
24. Brodke DS, Goz V, Voss MW, Lawrence BD, Spiker WR, Hung M. PROMIS PF CAT outperforms the ODI and SF-36 physical function domain in spine patients. *Spine (Phila Pa 1976)*. 2017;42(12):921-929.
25. Krebs EE, Lorenz KA, Bair MJ, et al. Development and initial validation of the PEG, a three-item scale assessing pain intensity and interference. *J Gen Intern Med*. 2009;24(6):733-738.
26. Phillips JK, Ford MA, Bonnie RJ, eds. *Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use*. Washington, DC: National Academies Press; 2017.
27. Edwards RR, Dworkin RH, Sullivan MD, Turk DC, Wasan AD. The role of psychosocial processes in the development and maintenance of chronic pain. *J Pain*. 2016;17(9 suppl):T70-T92.
28. Institute of Medicine Committee on Advancing Pain Research, Care, and Education. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. Washington, DC: National Academies Press; 2011.
29. Senna MK, Machaly SA. Does maintained spinal manipulation therapy for chronic nonspecific low back pain result in better long-term outcome? *Spine (Phila Pa 1976)*. 2011;36(18):1427-1437.
30. Hawk C, Cambron JA, Pfefer MT. Pilot study of the effect of a limited and extended course of chiropractic care on balance, chronic pain, and dizziness in older adults. *J Manipulative Physiol Ther*. 2009;32(6):438-447.
31. Wenban AB, Nielsen MK. Chiropractic maintenance care and quality of life of a patient presenting with chronic low back pain. *J Manipulative Physiol Ther*. 2005;28(2):136-142.
32. Descarreaux M, Blouin J-S, Drolet M, Papadimitriou S, Teasdale N. Efficacy of preventive spinal manipulation for chronic low-back pain and related disabilities: a preliminary study. *J Manipulative Physiol Ther*. 2004;27(8):509-514.
33. Sandnes KF, Bjørnstad C, Leboeuf-Yde C, Hestbaek L. The Nordic maintenance care program—time intervals between treatments of patients with low back pain: how close and who decides? *Chiropr Osteopat*. 2010;18(1):5.
34. Beattie PF, Silfies SP, Jordon M. The evolving role of physical therapists in the long-term management of chronic low back pain: longitudinal care using assisted self-management strategies. *Braz J Phys Ther*. 2016;20(6):580-591.
35. Woby SR, Urmston M, Watson PJ. Self-efficacy mediates the relation between pain-related fear and outcome in chronic low back pain patients. *Eur J Pain*. 2007;11(7):711-718.