**Introduction**

In a study to measure the burden of diseases, injuries, and risk factors in the United States from 1990 to 2010, Murray and colleagues\(^1\) found that musculoskeletal disorder ranked 6 as a cause of burden of disease. The prevalence of chronic pain in older people living in the community ranged from 25 to 76%.\(^2\)\(^-\)\(^8\) Comparatively, the prevalence of chronic pain in older people living in residential care was higher and ranged from 83 to 93%.\(^9\)\(^11\)

In a review of the literature for age-appropriate approach to delivering pain care for the older population, Makris et al.\(^12\) found 92 studies evaluating both pharmacologic interventions (N=35) and pharmacologic (N=57) modalities. The majority of the studies (N = 50) focused on older adults with osteoarthritis. According to the authors, their findings support a stepwise approach with acetaminophen as first-line therapy. If treatment goals are not met, a trial of a topical steroidal anti-inflammatory drug (NSAID) or Tramadol, or both is recommended. However, the authors caution that oral NSAIDs are not recommended for long-term use due to toxicity and the advancing age of the individual increases the risk for adverse side effects. A multimodal approach is strongly recommended emphasizing a combination of both pharmacologic and nonpharmacologic treatments to include physical and occupational rehabilitation, as well as cognitive-behavioral and movement-based interventions. With respect to the use of alternative therapies, a recent medical “guideline” on the management of pain in the older population found that there is limited evidence to support the use of alternative therapies with older adults. What evidence does exist has been deemed

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**Abstract**

**Objective:** To describe the chiropractic care of an elderly adult with presenting complaints of shoulder pain and co-morbidities.

**Clinical Features:** A 73-year-old female presented with a chief of complaint of shoulder pain of one year duration with co-morbidities of hypertension, hypercholesterolemia, a hiatal hernia, acid reflux, arthritis, and a history of stroke. The patient reported burning pain located at the left acromioclavicular joint and the posterior aspect of the axilla, ipsilaterally. Tylenol provided only temporary and minor relief. Magnetic Resonance Imaging of the cervical spine revealed narrowing of the C4-C5 and C5-C6 intervertebral forams concomitant with degenerative changes. The patient was diagnosed with brachial neuritis and cervicalgia concomitant with osteoarthritis and subluxations of the cervical spine.

**Intervention and Outcome:** The patient was cared for with spinal adjustments characterized as high velocity, low amplitude thrusts and adjunctive therapies consisting of moist heat and y-axis traction of the cervical spine. Following a trial of care consisting of 11 visits over 2½ months, the patient was pain free with improved functioning and quality of life as measured by the Upper Extremity Functional Index and Bournemouth Neck Pain questionnaires.

**Conclusion:** This case report provides supporting evidence on the effectiveness of chiropractic care in elderly patients presenting with symptoms associated with cervical spine dysfunction.

**Keywords:** chronic shoulder pain, chiropractic, vertebral subluxation, elderly

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**Case Study**

**Resolution of Shoulder Pain in a 73 Year Old Female Following Chiropractic Care to Reduce Vertebral Subluxations**

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as generally weak and based upon small-scale studies without proper use of controls or randomization procedures.\textsuperscript{13}

In the interest of evidence-informed practice and to inform higher-level research design, we describe the successful care of an elderly patient with chronic pain.

**Case Report**

**History**

A 73-year-old female presented to a chiropractic teaching clinic with a primary complaint of shoulder pain and comorbidities of hypertension, hypercholesterolemia, a hiatal hernia, acid reflux, arthritis, and a history of stroke. The patient reported experiencing a burning pain sensation adjacent to the left acromioclavicular (AC) joint and the posterior aspect of the axilla, ipsilaterally. According to the patient, this burning sensation had a gradual onset of approximately one year. The patient admitted to taking Tylenol that provided only minor and temporary relief. Consequently, due to her complaint(s), the patient stated that she had been unable to work as an artist who paints figures and makes ornaments since her complaint had progressed significantly over the past year.

**Examination**

On physical examination, her vitals were acquired and provided in Table 1. On visual inspection, the following findings were notable: the patient presented with a major anterior head carriage, mild anterior shoulders (bilaterally), and moderate to severe hyperkyphosis. Digital palpation examination revealed taut and tender fibers in the suboccipital region (bilaterally), at the posterior extensor mass of the cervical spine as well as the rhomboids, upper trapezius and levator scapulae muscles, bilaterally. Active range of motion (ROM) examination findings for the cervical, thoracic and lumbar spine are shown in Tables 2, 3 and 4, respectively. Orthopedic and neurological testing examination findings are shown in Table 5.

As part of the examination protocol at this teaching clinic, the patient was provided with the Upper Extremity Functional Index\textsuperscript{14} (UEFI) survey and the Neck Bournemouth\textsuperscript{15} questionnaire. The baseline scoring for these survey instruments were 13/80 and 53/70, respectively.

Based on the history and physical examination findings, the patient was determined to have nerve root irritation on the left side of the cervical spine. This was later confirmed with Magnetic Resonance Imaging (MRI) with the following report of findings: (1) A mild to no more than moderate degenerative changes of the cervical spine with a very mild central canal narrowing at the C5-C6 functional spinal unit (FSU) secondary to degenerative changes and a broad-based disc bulge; (2) No herniation was found at any level; and (3) Mild left-sided neural foraminal narrowing at the C4-C5 FSU with mild to moderate left-sided neural foraminal narrowing at the C5-C6 FSU.

**Intervention & Outcomes**

Given the patient’s symptoms of possible nerve root irritation, it was determine that the best course of care for this patient was y-axis cervical distraction with right lateral flexion and chiropractic adjustments restricted to the cervical-occipital, cervical and cervico-thoracic FSUs. The patient was provided a working diagnosis of brachial neuritis and cervicalgia, along with osteoarthritis of the cervical spine. On the first visit, the patient was determined to have subluxations of C2 body right, C5 body right, and T1 body right. The patient was adjusted accordingly utilizing Diversified Technique characterized as high velocity, low amplitude thrust type of adjustments. In addition, the patient was provided with moist heat applied to the cervical spine and manual y-axis traction. The patient’s response to care in the described manner was immediate relief.

The patient was cared for in a similar manner (i.e., adjustments to the cervical spine, moist heat and long axis traction of the cervical spine) over a period of approximately 2½ months. Following the second visit, the patient stated: “100% improvement since yesterday’s treatment. There is no burning at all in my neck or shoulder.”

For visits 4-6, mechanical tractioning (at 27-28º and 20lbs for 15 minutes) was added to the usual manual distraction procedure. By the 7\textsuperscript{th} visit and a little over 3 weeks into care, the patient stated: “The only time I have pain is every so often I have pain here (pointing to the AC joint). It only burns every so often now, it’s no longer constant.” The patient also reported an increase in cervical spine ROM and was instructed to begin scapular retraction exercises and was given a green Theraband.

The patient also reported at this time that a visit with her medical doctor resulted in recommending that she “get a shot” in her neck and to stay away from chiropractors. The patient’s reply to her physician was that she thought that such a recommendation was a “stupid idea” and informed him that she did not want to have any invasive procedures or drugs introduced into her system.

By the 9\textsuperscript{th} visit, the patient stated: “The pain and discomfort was unbearable a few weeks ago, but now it’s really not so bad- I can definitely live with it. I can function now- I couldn’t function before.” After 11 visits, the patient was asked to complete the UEFI and Bournemouth questionnaires and scored 0/80 and 0/70, respectively. Given the chronicity of the patient’s condition, her positive response to chiropractic care and goal of enhanced overall health, she requested to be placed on a “wellness care” basis.

**Discussion**

A number of issues are germane for discussion in the case report presented. However, in the interest of brevity, we focus on the patient’s complaint of neck pain despite their presenting complaint of shoulder pain. Our reasons are two-fold. First, the patient’s presenting complaint was attributed to cervico-brachial neuralgia secondary to degenerative joint disease resulting in narrowing of the IVF at the C4-5 and C5-C6 FSUs. Secondly, the care approach was provided to the cervical spine almost exclusively. For a discussion on the clinical management of a patient presenting with shoulder pain, we direct to the reader our case report on this subject.
published in this Journal.\textsuperscript{16}

By 2030, the estimated percentage of adults \( \geq 65 \) years of age living in North America and Europe will comprise 20\% and 21.6\% of the population, respectively. By 2050, its been projected that in the United States alone, 20.3\% and 23.7\% of the population will be \( \geq 65 \) years old and \( \geq 85 \) years old, respectively.\textsuperscript{17} These changes in population demographic towards an aging population does not merely imply an increase in chronic morbidity but also in how such changes affects the individual's functional abilities, the associated increase in social and psychological problems that ultimately impacts the myriad facets of one's wellbeing and quality of life.

In a review article by Fejer and Ruhe\textsuperscript{18} on the prevalence of chronic pain in the elderly in the developed countries; the 3 most commonly reported MSK condition was back pain followed by osteoarthritis and osteoporosis. For neck pain, the one year prevalence ranged between 9\% and 12\%. Greater variations were noted for the three-month prevalence, ranging between 5\% and 56\% in 65–74 year olds. Gender differences revealed that men report neck pain less often than women and in all the studies reviewed, there was a decrease in neck pain with increasing age. This gender difference was confirmed by Miranda et al.\textsuperscript{19} that found higher self-reported prevalence rates of chronic musculoskeletal disorders among elderly women. This has been attributed to the possibility that women are better at perceiving their physical signs and symptoms than men, and from the knowledge and experience acquired from their role as the family caregiver.\textsuperscript{20}

Additionally, women may have a higher risk of developing musculoskeletal problems due to anatomo-functional differences such as shorter height, lower muscle mass and bone mineral density, increased joint laxity and lower degree of adaptation to physical effort.\textsuperscript{21,22} As with the patient reported, the presence of co-morbidities, which are common in the elderly, can also affect their perception of pain.

Dellarozza et al.\textsuperscript{23} found a significant increase in the report of chronic musculoskeletal pain among depressive elders. Interestingly, the study by Miranda et al.\textsuperscript{24} reflect the importance not only of co-morbidities that directly affect the perception of pain (i.e. depression, anxiety, cognitive deficit), but also co-morbidities that may impact the perception or the report of pain in the elderly by indirect mechanisms. Consistent with this case report is the finding that some co-morbidities associated with chronic musculoskeletal pain may include cardiovascular diseases as a risk factor for developing troublesome neck pain.\textsuperscript{25} Given the existence of these co-morbidities, they highlight the need for collaborative care with other healthcare providers on the part of the chiropractor.

In terms of utilization of chiropractic services, the majority of older adults (and adults in general) seek chiropractic care for back and/or neck pain. Given that "chiropractic care" is often individualized and flexible, treatment approaches vary widely but can be generalized as the use of some form of spinal manipulation concomitant with adjunctive therapies (i.e., diet, exercise & rehabilitation, physiotherapy).\textsuperscript{26} This is consistent with the practice activities of physical therapists and chiropractors in the care of patients with neck pain that found that manual therapy (i.e., spinal manipulation) and exercise were consistently used by both professions.\textsuperscript{27}

For the older population; based on a secondary analyses of baseline interview of the Survey on Assets and Health Dynamics Among the Oldest Old (AHEAD) data of 4,310 self-respondents who were \( \geq 70 \) years old for the years 1991-1996, Wolinsky et al.\textsuperscript{28} found that older adult chiropractic users had the most common characteristics of being white, report pain, and those with geographic, financial, and transportation access. Also using the AHEAD database of 5,510 self-respondents along with their Medicare claims from 1993 to 2007, Weigel et al.\textsuperscript{29} found that chiropractic users were more likely to be women, white, overweight, have pain, have multiple co-morbid conditions, better self-rated health, access to transportation, higher physician utilization levels, live in the Midwest, and live in an area with fewer physicians per capita. In addition to healthcare utilization data, there is an argument for the use alternative therapies like chiropractic based on cost analysis.

Using data from a nationally representative survey of health care utilization and cost, Martin et al.\textsuperscript{30} estimated differences in the total and spine-specific annual expenditures among CAM and non-CAM users with self-reported spine problems. Adjusted annual medical costs among CAM users was $424 lower for spine-related costs, and $796 lower for total health care cost than among non-CAM users. Average expenditure for CAM users, based on propensity matching, was $526 lower for spine-specific costs and $298 lower for total health costs. According to the authors, expenditure differences were primarily due to lower inpatient expenditures among CAM users. Furthermore, CAM users did not add to the overall medical spending in a nationally representative sample with neck and back problems.

Dougherty et al.\textsuperscript{31} addressed the chiropractic care of the older adult by reviewing five specific interventions that are commonly utilized by chiropractors in the care of the older adult (i.e., spinal manipulative therapy (SMT), acupuncture, physical activity/exercise, nutritional counseling and fall prevention). The authors opined that in the care of the older adult, as with any patient population, there is a need for the attending clinician to evaluate the most effective clinical strategy for care. As has already been alluded to, the care approach for the elderly is complicated by many factors such as the presence of co-morbidities (i.e., osseous weakness, interaction of nutritional supplements with current prescription medication as well as concerns about fall risk) that may limit or restrict the type of care employed.

For example, in the patient presented, her advanced age necessitates the judicious application of the chiropractic adjustment in the context of generalized osteopenia and decreased muscle mass/strength. For example, the use of modified force spinal adjustments with HVLA thrust type or the use of low force techniques and/or manually assisted instruments. No adverse events were reported with the use of HVLA thrust type adjustments as described for this patient. According to Dougherty et al.\textsuperscript{32} a higher force versus a lower force technique applied in the elderly demonstrated comparable results.\textsuperscript{33,34}
The complexity in patient care is also reflected in the diagnostic challenges associated with the older patient. The patient in this case report presented with complaints of shoulder pain concomitant with health issues that may impact their management and prognosis. Following a thorough history and physical examination that included MRI imaging, the patient was diagnosed with brachial neuritis, cervicalgia or neck pain and osteoarthritis of the cervical spine. The care provided was directed to the cervical spine rather that the shoulder per se.

In 2010, Hawk et al.34 published their evidence-informed best practices for the chiropractic approach to evaluation, management, and manual treatment for older adult patients. This was based on Delphi consensus of 50 seed statements based on the clinical experience of the multidisciplinary steering committee and the results of an extensive literature review. We encourage the reader to access this reference for the overall best practices recommendation in the care of the elderly. Insofar as they pertain to care issues addressed here, the paper by Hawk et al.34 is congruent with our comments.

As a further context to our discussions, we performed a review of the literature from 2012 to the present in the context of the work by Dougherty et al31 and Gleberzon.32 In terms of the use of spinal adjustments for the elderly, the literature describes patients with lower back pain with and without stenosis36-37, neck pain with and without stenosis38-39, knee pain40-41, thoracic function42-43 and dizziness.44-46

Using the databases MANTIS [2012-2014], Pubmed [2012-2014] and Index to Chiropractic Literature [2012-2014] with the search terms “chiropractic AND elderly AND chronic neck pain”, only a handful of studies have been found. Recently, Maiers et al.47 assessed the relative effectiveness of spinal manipulation (SMT) and supervised rehabilitative exercise, both in combination with and compared to home exercise (HE) alone for neck pain in individuals ages 65 years or older. A total of 241 participants were randomized, with 95% reporting primary outcome data at all points in time.

After 12 weeks of treatment, the SMT with home exercise was superior care compared with the HE-alone care or supervised exercise plus home exercise. Combinatory care, when compared with HE alone, was associated with greater improvement at week 12 and more satisfaction at all points of measure. Multivariate longitudinal analysis incorporating primary and secondary patient-rated outcomes showed that the SMT with HE group was superior to the HE-alone group in both the short- and long-term. No serious adverse events were observed as a result of the study treatments. Evans et al.48 evaluated the relative effectiveness of high-dose supervised exercise with and without spinal manipulation and low-dose home exercise for chronic neck pain. The authors found that supervised strengthening exercise with and without spinal manipulation performed similarly, yielding better outcomes than home exercise particularly in the short term.

A systematic review by Schroeder et al.49 to compare manipulation or mobilization of the cervical spine to physical therapy or exercise for symptom improvement in patients with neck pain found the following, There were no differences in pain improvement when comparing spinal manipulation to exercise, and there were inconsistent reports of pain improvement in subjects who underwent mobilization therapy versus physical therapy. No disability improvement was reported between treatment groups in studies of acute or chronic neck pain patients. No functional improvement was found with manipulation therapy compared with exercise treatment or mobilization therapy compared with physical therapy groups in patients with acute pain. In chronic neck pain subjects who underwent spinal manipulation therapy compared to exercise treatment, results for short-term functional improvement were inconsistent.

Despite the promising results obtained by Maiers et al.47 and others utilizing higher-level research designs, the review by Schroeder et al.49 point out the inadequacies in a number of these clinical trials. As such, case reports may inform not only practice but also in the design of future clinical trials. This case report is demonstrative not only in reporting the clinical encounter but in its use of both subjective as well as validated outcome measures in the way of the UEFI13 and Bournemouth Questionnaire14 for neck pain. Baseline and comparative UEFI scoring were 13/80 and 0/80, respectively.

A minimum level of detectable change for this questionnaire at 90% confidence is 9 points. The changes observed in the patient reported here met this minimal requirement and indicates a clinically significant improvement in the patient’s functionality. The Bournemouth questionnaire is a 7-item questionnaire examining aspects of neck pain that include pain intensity; ability to perform daily activities and social activities; anxiety status; depression status; pain interference with work activities and pain locus control. Each item is scored on an 11-point numerical rating scale from 0 to 10. A total score is obtained by summing the scoring of each item. The instrument has been shown to be reliable and valid. Significan changes in scoring must be at least 13 points or a change of 36% in the overall scoring and has been demonstrated in the case report presented.50 For the patient presented, baseline and comparative scores were 53/70 and 0/70, respectively and meets the minimum requirement for significant changes in the patient’s neck disability.

**Limitations**

Confounders such as the lack of a control group, spontaneous remission, self-limiting course and natural history of the disorder, subjective validation, and expectations for clinical resolution on the part of the patient make cause and effect inferences with respect to effectiveness of care challenging. Based on these arguments we caution the reader on the lack of generalizability of this case reports and others. Conversely, the success of such clinical encounters is epistemologically congruent with our clinical experience and provides a basis for patients and clinicians alike to make generalizations about their care.

**Conclusions**

We described the successful chiropractic care of an elderly patient presenting with shoulder pain concomitant with co-morbidities. We encourage further documentation in the care
of similar patients to inform practice and higher-level research designs.

References


### Tables

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<td>Height</td>
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<td>Temperature</td>
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<tr>
<td>Heart Rate</td>
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**Table 1. Patient vital signs and anthropomorphic values.**

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<tr>
<td>Flexion</td>
<td>WNL</td>
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<tr>
<td>Extension</td>
<td>Mild-moderate decreased ROM without pain</td>
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<tr>
<td>Left Lateral Flexion</td>
<td>Mild-moderate decreased ROM without pain</td>
</tr>
<tr>
<td>Right Lateral Flexion</td>
<td>Mild-moderate decreased ROM without pain</td>
</tr>
<tr>
<td>Left Rotation</td>
<td>Mild-moderate decreased ROM without pain</td>
</tr>
<tr>
<td>Right Rotation</td>
<td>Mild-moderate decreased ROM without pain</td>
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</table>

**Table 2. Patient active ROM of the cervical spine  WNL= within normal limits**
### Table 3. Patient active ROM of the thoracic spine  
*WNL* = within normal limits

<table>
<thead>
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<th>Movement</th>
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<tr>
<td>Flexion</td>
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<tr>
<td>Extension</td>
<td>Mild-moderate decreased ROM without pain</td>
</tr>
<tr>
<td>Left Lateral Flexion</td>
<td>WNL</td>
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<tr>
<td>Right Lateral Flexion</td>
<td>WNL</td>
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<tr>
<td>Left Rotation</td>
<td>Mild-moderate decreased ROM without pain</td>
</tr>
<tr>
<td>Right Rotation</td>
<td>Mild-moderate decreased ROM without pain</td>
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### Table 4. Patient active ROM of the lumbar spine  
*WNL* = within normal limits

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<td>Extension</td>
<td>Mild-moderate decreased ROM without pain</td>
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<tr>
<td>Left Lateral Flexion</td>
<td>Mild-moderate decreased ROM without pain</td>
</tr>
<tr>
<td>Right Lateral Flexion</td>
<td>WNL</td>
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<tr>
<td>Left Rotation</td>
<td>Mild-moderate decreased ROM without pain</td>
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<tr>
<td>Right Rotation</td>
<td>WNL</td>
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<td>Orthopedic</td>
<td>Load and shift test</td>
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<td>--------------------------------</td>
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<td>Orthopedic</td>
<td>Supraspinatus press test</td>
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<td>Neurological</td>
<td>Sensory exam for C5-T1</td>
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</table>

Table 5. Patient Orthopedic and Neurological testing  WNL= within normal limits