ISSN 0008-3194 (p)/ISSN 1715-6181 (e)/2026/214–227/$2.00/©JCCA 2026

Management of U.S. Veterans presenting with axial spondyloarthritis to a chiropractic clinic: a case series

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Background: *Axial spondyloarthritis (axSpA) is an immune-mediated condition characterized by signs and symptoms of inflammatory back pain (IBP) affecting the spine and sacroiliac (SI) joints, peripheral arthralgia, enthesitis, and systemic extra-articular complications. While chiropractic treatment is effective for chronic mechanical low back pain, evidence is limited for management of patients with axSpA. This report describes the chiropractic management of three U.S. Veterans with chronic spine pain and axSpA.*

Prise en charge de vétérans américains consultant une clinique chiropratique pour une spondylarthrite axiale: série de cas

Contexte: *La spondylarthrite axiale (axSpA) est une affection à médiation immunitaire caractérisée par des signes et des symptômes de douleur rachidienne inflammatoire touchant la colonne vertébrale et les articulations sacro-iliaques, ainsi que par des arthralgies périphériques, une enthésite et des complications systémiques extra-articulaires. Bien que les traitements chiropratiques soient efficaces contre la lombalgie mécanique chronique, les données relatives à la prise en charge des patients atteints d'axSpA demeurent limitées. Le présent rapport décrit la prise en charge chiropratique de trois vétérans américains atteints d'axSpA et présentant des douleurs rachidiennes chroniques.*

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Conflicts of Interest:
The authors have no disclaimers, competing interests, or sources of support or funding to report in the preparation of this manuscript. Data related to these cases are stored in the patient electronic medical records and is available upon reasonable request from the corresponding author.

The patients presented to the VA Puget Sound Health Care System, and the facility Privacy Officer approved the report. Each of the patients provided consent for publication.

This material is the result of work supported with resources and the use of facilities at the VA Puget Sound Health Care System. The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the VA Puget Sound Health Care System.

Case presentation: *All patients were co-managed with rheumatology, and each presented at different points of disease progression. All three cases improved in terms of pain, function, or quality of life. No adverse events were reported.*

Summary: *Patients with axSpA pursue chiropractic services, but the role of chiropractors in the management of patients with axSpA is unclear. This report outlines the experiences of three patients treated in a VA chiropractic clinic. Further research is needed to evaluate the effectiveness and safety of chiropractic treatment of individuals with axSpA.*

(JCCA. 2026;70(2):214-227)

KEY WORDS: chiropractic, spinal manipulation, therapeutic exercise, axial spondyloarthritis, non-radiographic axial spondyloarthritis, interdisciplinary care, case report

Présentation de cas: *Tous les patients ont été pris en charge conjointement avec le service de rhumatologie et ont consulté à différents stades de l'évolution de la maladie. Chez les trois patients, une amélioration de la douleur, de la capacité fonctionnelle ou de la qualité de vie a été constatée. Aucun événement indésirable n'a été signalé.*

Résumé: *Les patients atteints d'axSpA ont recours à des services chiropratiques, mais le rôle des chiropraticiens dans leur prise en charge demeure incertain. Le présent rapport expose l'expérience de trois patients traités dans une clinique chiropratique du département des Anciens Combattants des États-Unis. Des recherches supplémentaires sont nécessaires pour évaluer l'efficacité et l'innocuité des traitements chiropratiques chez les personnes atteintes d'axSpA.*

(JACC. 2026;70(2):214-227)

MOTS CLÉS: chiropratique, manipulation vertébrale, exercice thérapeutique, spondylarthrite axiale, spondylarthrite axiale non radiographique, soins interdisciplinaires, rapport de cas

Background

Seronegative spondyloarthropathies are a group of chronic, immune-mediated inflammatory diseases that affect between 0.5-1.9% of individuals worldwide, and which are responsible for considerable pain, disability, social burden, and decreased quality of life.[1] Axial spondyloarthritis (axSpA) is the most common seronegative spondyloarthropathy subtype and is widely underdiagnosed. An estimated 300,000 Canadians live with axSpA and nearly two-thirds of them experience significant symptoms.[2]

Classically, axSpA has a familial predilection, is highly associated with the human leukocyte antigen B27 (HLA-B27) allele, and is also most commonly diagnosed in males younger than 45 years old.[3] Clinical symptoms include chronic inflammatory back pain (IBP) and stiffness, peripheral arthralgia, enthesitis, and extra-articular complications such as psoriasis, as well as symptoms of the ocular, gastrointestinal, and pulmonary systems.[4]

While this condition was formerly described exclusively as ankylosing spondylitis, differentiation between subtypes of this condition was prompted by the increased availability of magnetic resonance imaging (MRI) which paved the way for earlier detection of sacroiliitis and axSpA recognition before other visible radiographic changes (e.g., ankylosis). The enhanced sensitivity in detection evolved the understanding of the disease course and prompted a 2022 update in the *Assessment of Spondyloarthritis International Society (ASAS)* classification and nomenclature to create a distinction between the most common subtypes of this condition, radiographic axial spondyloarthritis (r-axSpA) and non-radiographic axial spondyloarthritis (nr-axSpA).[5–7]

Management recommendations for patients with axSpA include a personalized approach with a multidisciplinary team coordinated by a rheumatologist. In addition to medication management with non-steroidal anti-inflammatory drugs (NSAIDs) and biologic medications, non-pharmacological approaches like therapeutic exercise, patient education, and lifestyle change are common-

ly recommended.[7,8] Chiropractic services (e.g., advice, education, spinal manipulation, manual therapies, exercise prescription) are well documented for their benefits to patients with chronic mechanical low back pain and are recommended by clinical practice guidelines for the management of back pain.[9,10] Patients with axSpA do present to chiropractors seeking treatment,[11] however, literature pertaining to chiropractic management of axSpA remains limited[12–15].

In the US and Canada, chiropractic is a doctoral-level profession that holistically approaches the evaluation and management of musculoskeletal conditions with non-surgical and non-pharmacological approaches.[16] The purpose of this case series is to describe the chiropractic management of three patients at different progressions of axSpA disease diagnosis and management within an integrated hospital-based system.

Case presentations

We followed the CARE Checklist guidelines for reporting for case reports.[17]

Case 1

A 22-year-old Hispanic male U.S. Army veteran presented to the chiropractic clinic with a history of chronic lower back and left posterolateral hip pain. Two years earlier, he was diagnosed with nr-axSpA and was medically discharged from military service. A chart review of a rheumatology consultation one year before the chiropractic consultation revealed chronic uveitis, laboratory testing demonstrating the presence of HLA-B27 allele and elevated inflammatory markers, and advanced imaging with MRI confirmed bilateral sacroiliitis. Ankylosis was not visible on plain-film lumbar radiographs. (Figure 1) He did not have known family history of autoimmune disease, toxic exposure, or additional pertinent past medical history. Relevant treatment history included minimal benefit with oral NSAIDs and steroid injections to the SI joints, and significant relief of pain and stiffness after initiating rheumatologist-prescribed the Tumor Necrosis Factor inhibitor (TNFi) medication adalimumab.

Upon presentation to the chiropractic clinic, he described symptoms of diffuse joint stiffness upon waking and following heavy lifting as well as pain and stiffness which went through cycles of relapsing and remitting. Pain intensity was rated 2 out of 10, while interference with enjoyment of life and general activity were rated 2 and 1 out of 10, respectively using the pain, enjoyment of life, and general activity (PEG) scale.[18] He reported daily morning stiffness, lasting for up to three hours, that was relieved by walking and stretching. His referral was prompted by a six-month relapse of lower back and left hip pain that hindered his ability to lift weights, run, and play soccer.

Upon examination, pathological reflexes were absent and muscle stretch reflexes, lower extremity myotomes, and skin sensation were all within normal limits. Lumbar extension was moderately reduced and provocative for pain at the bilateral posterior superior iliac spine while lumbar flexion was palliative. Prone SI joint extension bilaterally provoked ipsilateral lower back pain. Thigh thrust and lumbar facet loading were unremarkable. Pain and tenderness were elicited upon palpation of the left quadratus lumborum, left hip external rotators, and the bilateral SI joints. The patient was diagnosed in the chiropractic clinic with mechanical nonspecific lumbosacral pain, complicated by nr-axSpA. As no red flags were observed, the veteran was actively following rheumatology, and a recent pelvic MRI and laboratory testing were on file, no additional workup was deemed appropriate at the time of consultation.

Given the absence of ankylosis, a trial of care was initiated with thoracolumbar, lumbopelvic, and bilateral femoroacetabular high-velocity low-amplitude (HVLA) manipulation, flexion-distraction manipulation to the lumbar spine, myofascial release to the lumbar and hip musculature, and a targeted home exercise program promoting lumbopelvic stability for eight visits over six months. The patient was educated regarding the relapsing-remitting nature of systemic inflammatory conditions. He was encouraged to stay active, including a graded approach to returning to weightlifting, running, and playing soccer, and he was reassured that increasing his activity level to tolerance was safe without undue risk of setting back his overall improvement. He was also advised to continue with treatment as recommended by the rheumatologist to minimize symptoms and disease progression. As expected, his symptoms did relapse and remit throughout the course of care. During these relapses, the veteran reported difficulty connecting with his prescribing provider to refill his biologic medication. The treating chiropractor

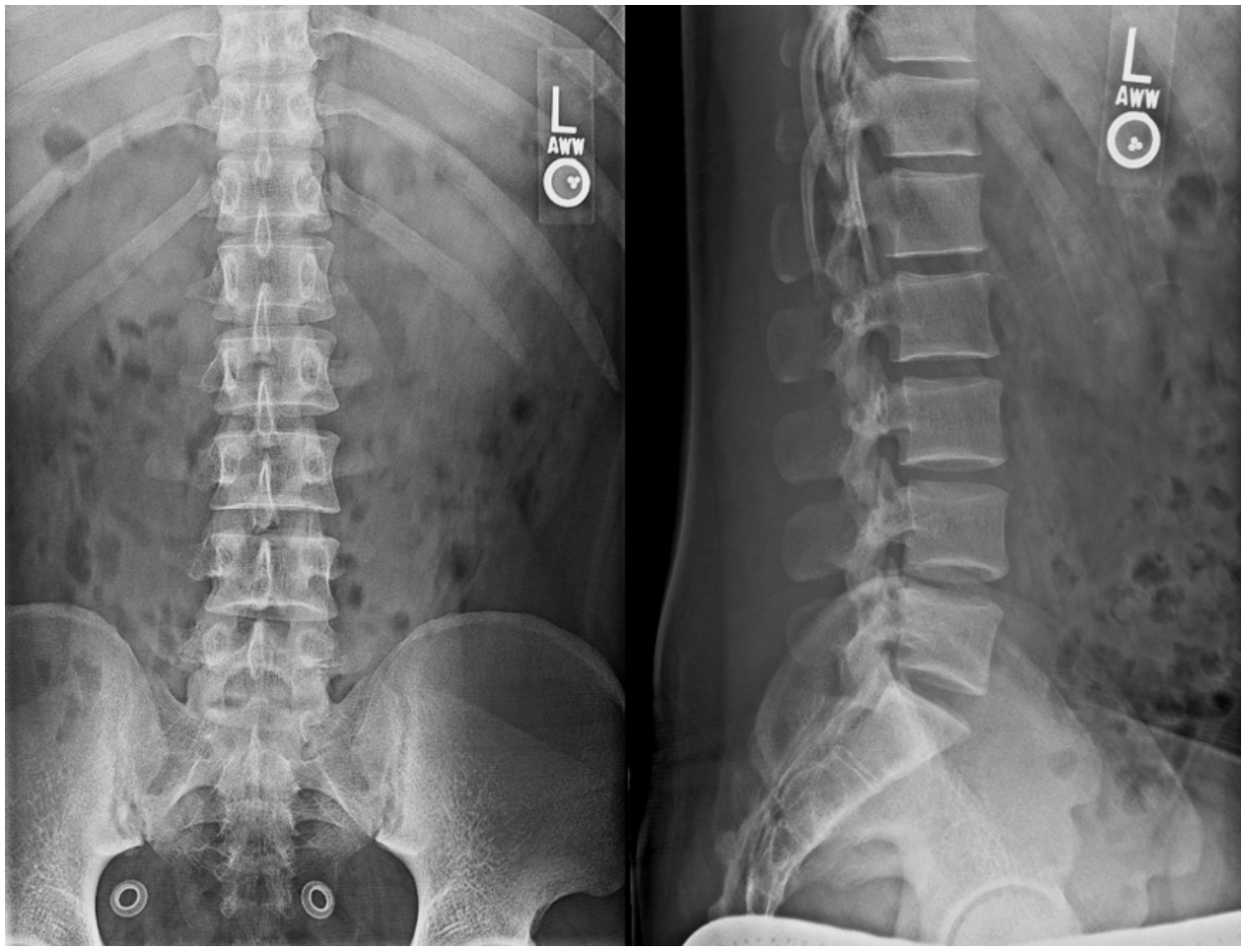

Figure 1.
AP and lateral lumbar radiographs without any signs of sacroiliitis or ankylosis (Case 1).

contacted the patient's rheumatologist to facilitate refill of the prescription.

Following a therapeutic withdrawal from care, a re-evaluation was performed at visit 8. At this time, the veteran presented with minimal lower back pain, with intensity rated 1 out of 10 (50% improvement), and pain impact on enjoyment of life and general activity were rated 0 (100% improvement) and 1 (no change) out of 10, respectively. Although pain flares in the absence of medication continued, he resumed weightlifting three to four times weekly with improved tolerance, regularly playing soccer, and began practicing yoga. He denied experiencing any soreness or adverse events related to his chiropractic treatments. At this time, he was transitioned to care on an as-needed basis for flare management, and it was recommended that he continue his home exercise program.

Case 2

A 55-year-old white male U.S. Navy veteran with previously diagnosed r-axSpA presented to the chiropractic clinic with chronic non-progressive neck, mid back, and lower back pain with intermittent radiating pain to the right groin and posterior knee. He reported his symptoms began after contracting *salmonellosis* thirty-five years earlier, which led to frequent attacks of diffuse axial and peripheral joint pain since the infection. Nine years later, he tested positive for HLA-B27, was diagnosed with

chronic irritable bowel disease, and lumbar radiographic imaging revealed bilateral symmetric erosive sacroiliitis and fusion of the SI joints. (Figure 2) No ankylosis was evident within the lumbar spine. Other pertinent radiographic imaging revealed mild multilevel degeneration of the cervical spine, mild anterior wedging of T8, T9, and T11 within the thoracic spine, and femoral neck osteopenia with a dual-energy X-ray absorptiometry (DEXA) scan performed two years earlier. He did not have any known history of toxic exposure or other pertinent past medical history. His recent treatment regimen included rheumatologist-prescribed TNFi (infliximab) infusions every five weeks for the last seven years. He described infusions as crucial to reducing his frequency and intensity of symptomatic exacerbations and additionally perceived that his chiropractic treatments played an important role in his ability to perform activities of daily living and reduced his need for oxycodone medication which was prescribed to be used on an as needed basis.

Due to patient reported benefit with chiropractic treatment, for the past twelve years he was managed with a supportive care plan consisting of patient education, manual therapy, exercise, and lifestyle advice for chronic pain.

At his most recent trial of care, pain intensity, enjoyment of life, and general activity were all rated 5 out of 10 using the PEG scale, and Neck Disability Index[19] was scored 6 out of 40 (two questions were skipped by the patient). He denied any temporal association with pain in all regions of complaint and reported thoracic pain that was provoked with deep inspiration and coughing. Upon examination, pathological reflexes were absent, and muscle stretch reflexes, upper extremity myotomes, and skin sensation were all within normal limits. Cervical,

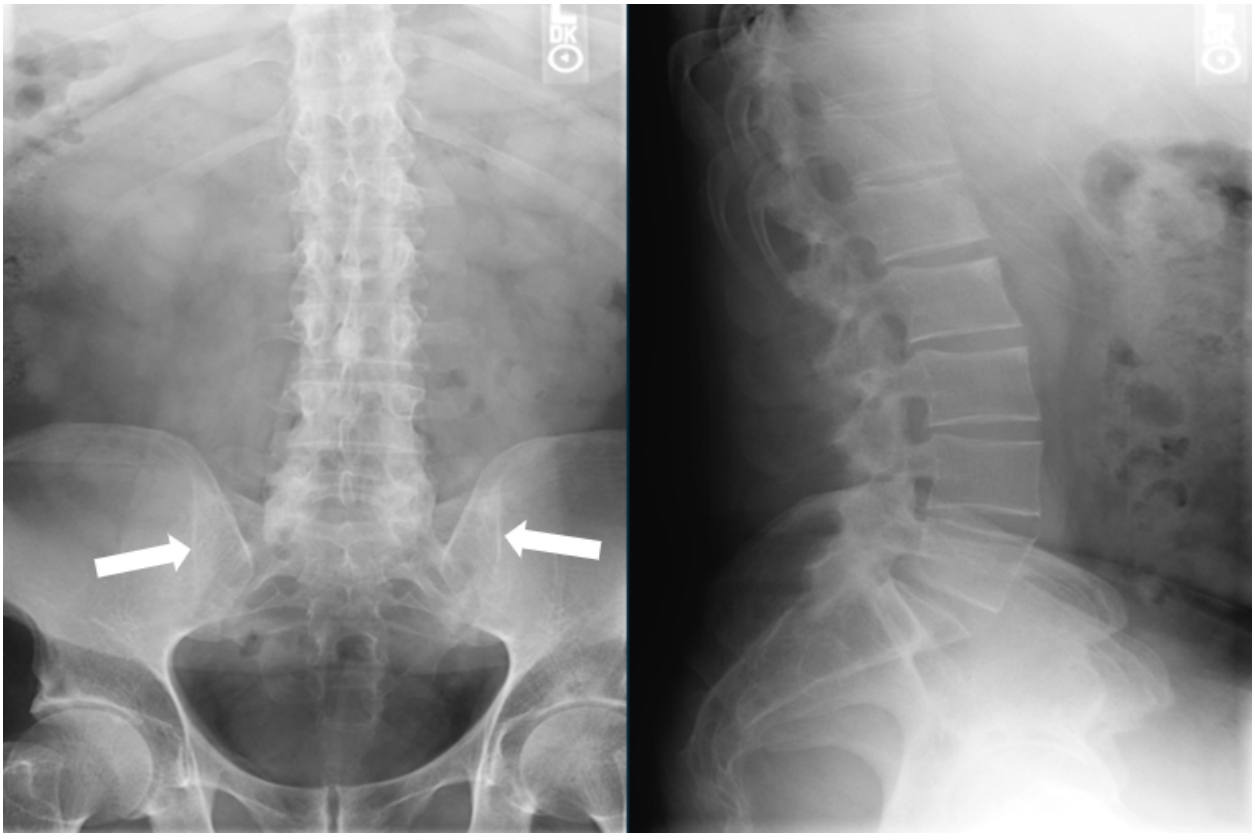

Figure 2.
AP and lateral lumbar radiograph displaying bilateral symmetric erosive sacroiliitis and sacroiliac joint fusion (Case 2).

thoracic, and lumbar ranges of motion were all moderately reduced, except for left thoracic rotation, which was markedly decreased, and all ranges of motion increased his pain and stiffness. Facet loading and prone SI extension testing both increased lumbosacral pain bilaterally. Repeated end-range loading with cervical retraction and lumbar extension were palliative for local pain. The veteran's goals for treatment were to obtain manual therapies and self-management strategies for continued pain relief and to minimize the need for pain medication.

He was diagnosed with mechanical nonspecific cervical, thoracic, and lumbosacral pain, complicated by multiple thoracic compression deformities, r-axSpA, and reactive arthritis. As the veteran was actively following rheumatology and his symptoms were stable at time of presentation, obtaining updated imaging and labs to evaluate inflammatory activity were deemed unnecessary. Treatment consisted of cervical, cervicothoracic, thoracic, and lumbar HVLA spinal manipulation as well as myofascial release to each region of complaint. In addition to his medication management prescribed by rheumatology, he was prescribed and encouraged to pursue a consistent home exercise program of postural-based strengthening and stretching, and to begin walking for exercise on a consistent basis.

Throughout this most recent trial of care, significant improvement in thoracic and lumbosacral mobility was observed without adverse event reported. At re-evaluation pain was rated 7 out of 10 (40% worsening), enjoyment of life was rated 5 out of 10 (no change), and general activity was rated 6 out of 10 (20% worsening), using the PEG scale, reflective of the veteran experiencing a flare-up of lumbopelvic pain. As recommended during treatment, he initiated a consistent home exercise program, reporting he had lost 10 pounds over 5 months. At his request, we agreed to a supportive chronic pain treatment plan at a frequency of one visit every one to two months.

Case 3

A 36-year-old white male U.S. Army veteran was referred to the chiropractic clinic for chronic neck and lower back pain, and he additionally reported poor sleep quality and depression. Prior to the chiropractic presentation, rheumatology was consulted due to suspicion of axSpA. Chart review revealed that the patient was positive for the HLA-B27 allele and suffered from chronic uveitis and peripheral arthralgias. The patient denied a family history of autoimmune disease, symptoms of inflammatory bowel disease, or psoriatic skin lesions. An MRI performed six years earlier was unremarkable for evidence of SI joint inflammation or ankylosis. Considering the absence of MRI findings, the rheumatologist assessed that there was a low suspicion of seronegative spondyloarthropathy and diagnosed him with fibromyalgia. Two years later, following worsening chronic uveitis with unclear etiology, the patient returned to rheumatology. He was prescribed a short dose of the biologic medication adalimumab, and he experienced significant relief of his ocular symptoms and musculoskeletal pain but was lost to follow-up.

He presented to the chiropractic clinic one year later, reporting atraumatic diffuse neck pain and worsening, insidious, lower back pain accompanied by morning stiffness lasting for three to four hours on average. His pain alternated in laterality at the lumbosacral junction and bilateral posterolateral hips. He also reported pain radiating to the right posterior thigh, without paresthesia or weakness. Pain intensity was rated 7 out of 10, while impact on enjoyment of life was rated 6 out of 10, and generalized activity was rated 8 out of 10. Neck Disability Index was scored 32 out of 50, reflecting severe disability. He reported using a single-point cane when walking long distances due to lower back pain and stiffness. Prior treatment with lumbar radiofrequency ablation provided him with relief, but symptoms were now regressed back to pre-treatment status.

Upon examination, pathological reflexes were absent, and muscle stretch reflexes, upper and lower extremity myotomes, and skin sensation were all within normal limits. Cervical, thoracic, and lumbar ranges of motion were all moderately reduced and provocative for pain. Passive supine cervical rotation was provocative for neck pain bilaterally, while no other cervical orthopedic testing elicited symptoms. Lumbar facet loading increased ipsilateral lumbosacral pain. Posterior pelvic pain provocation increased SI joint pain ipsilaterally to the side that was tested. He was diagnosed with mechanical nonspecific cervical, thoracic, and lumbar pain with concern for axSpA. Updated lumbar and pelvic MRIs were ordered, and coordination efforts were initiated to reconnect the veteran with rheumatology to inquire about re-establishing treatment with adalimumab. MRI revealed a mild

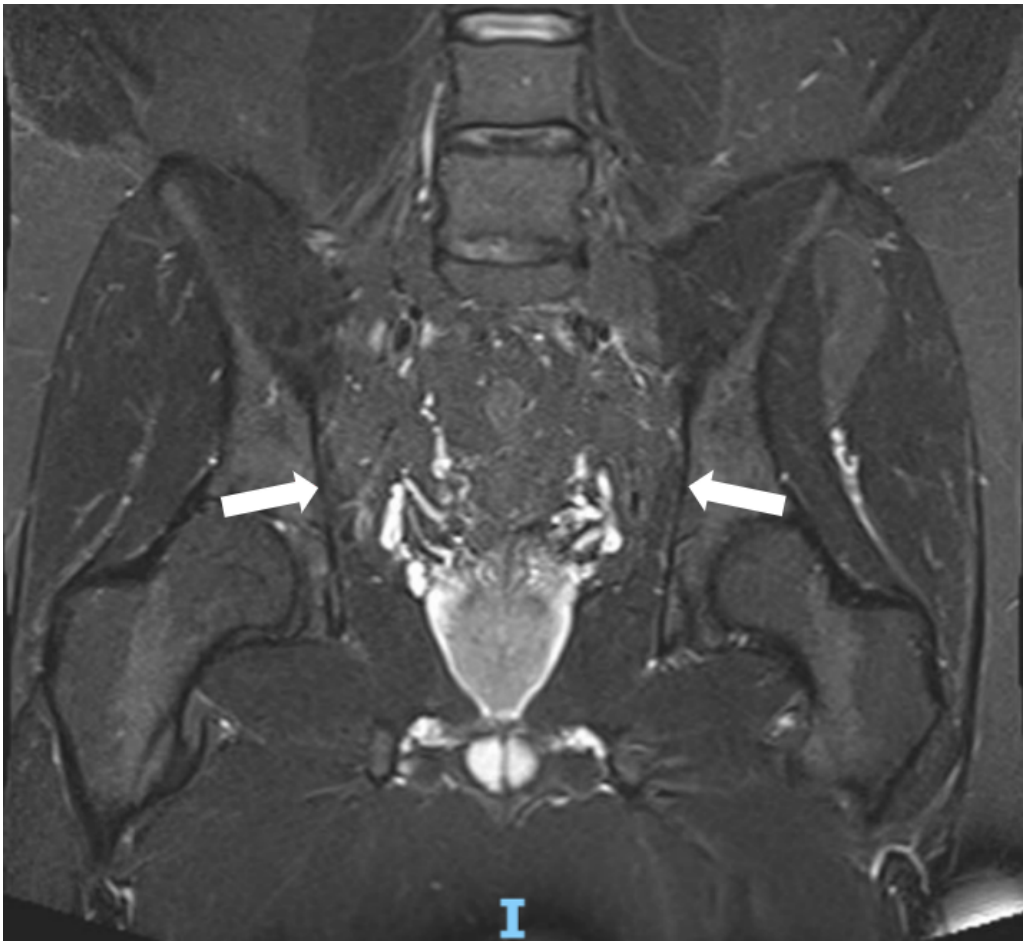

Figure 3.
T2 weighted lumbar MRI demonstrating the absence of sacroiliitis or fusion with well defined sacroiliac joint margins (Case 3).

symmetric L5-S1 disc bulge without nerve root contact, and signs of sacroiliitis remained absent. (Figure 3)

The chiropractic treatment plan consisted of cervical, cervicothoracic, thoracic, and lumbosacral HVLA spinal manipulation, myofascial release, and a home exercise program with an emphasis on cervical and thoracic mobilization, as well as pelvic stabilization exercises. He was followed in the clinic once per month for 18 months. Throughout this care, the veteran presented with fluctuating pain intensity, which became more stable after re-establishing care with a new rheumatologist. That provider diagnosed the veteran with recurrent uveitis with concern for inflammatory peripheral arthritis and/or nr-axSpA and re-initiated adalimumab medication. At final re-evaluation, the patient noted reduced stiffness in all regions of complaint following re-initiation of the biologic medication and a decrease in pain intensity and improved ability to perform generalized activity, which were rated 5 (29.5% improvement) and 7 (13% improvement) out of 10 respectively on the PEG questionnaire. At this point, he was transitioned to an as-needed treatment plan for flare-up management. He denied experiencing any soreness or adverse events related to his chiropractic management.

Discussion

This case series presents the first description of chiropractic management for US military veterans with known

or suspected axSpA spanning various stages of disease progression. Case 1 represented the management of an early progression of nr-axSpA in a younger veteran who received multidisciplinary care including prescription medication from rheumatology, and manual therapy, exercise, and education from the chiropractor. Case 2 described supportive care for chronic pain in an older veteran with longstanding r-axSpA who received consistent chiropractic care for chronic pain, complementing his primary rheumatologic treatment. Case 3 involved diagnostic testing and coordination of care for a patient with suspected axSpA.

In the absence of other disease states, recognition of well-established clinical features greatly increases the likelihood of identifying axSpA.[20] (Table 1) Chronic IBP is a key clinical feature in differentiating axSpA from other conditions. Hallmarks of IBP include relapsing and remitting back pain of insidious onset that begins before age forty, is worse at night and upon first waking, improves with movement, and does not improve with rest (Figures 4 and 5).[21,22] Although the specificity of IBP for an axSpA diagnosis is limited, if these hallmark symptoms are present, then further investigation is indicated and referral to a rheumatologist is warranted.[23] All three cases

Table 1.
Likelihood ratios of clinical features for the diagnosis of axial spondyloarthritis.

Axial Spondyloarthritis Features	**Likelihood ratios (LR) for diagnosis** [21]	**Case 1**	**Case 2**	**Case 3**
Sacroiliitis by MRI	9.0	☑	☑	☒
HLA-B27 expression	9.0	☑	☑	☑
Anterior Uveitis	7.3	☑	☒	☑
Family history of seronegative spondyloarthropathy, inflammatory bowel disease, psoriasis, or uveitis	6.4	☒	?	☒
Good response to NSAIDs	5.1	☒	☒	☒
Dactylitis	4.5	☒	☒	☒
Peripheral arthritis	4.0	☑	☑	☑
Inflammatory bowel disease	4.0	☑	☑	☒
Heel pain (enthesitis)	3.4	?	☑	☑
Inflammatory back pain	3.1	☑	☑	☑
Elevated ESR/CRP	2.5	☑	☑	☑
Psoriasis	2.5	☒	☒	☒

☑ Feature present ☒ = Feature absent ? = Unclear/unknown

Acronyms: CRP, c-reactive protein; ESR, erythrocyte sedimentation rate; MRI, magnetic resonance imaging; NSAIDs, non-steroidal anti-inflammatory drugs.

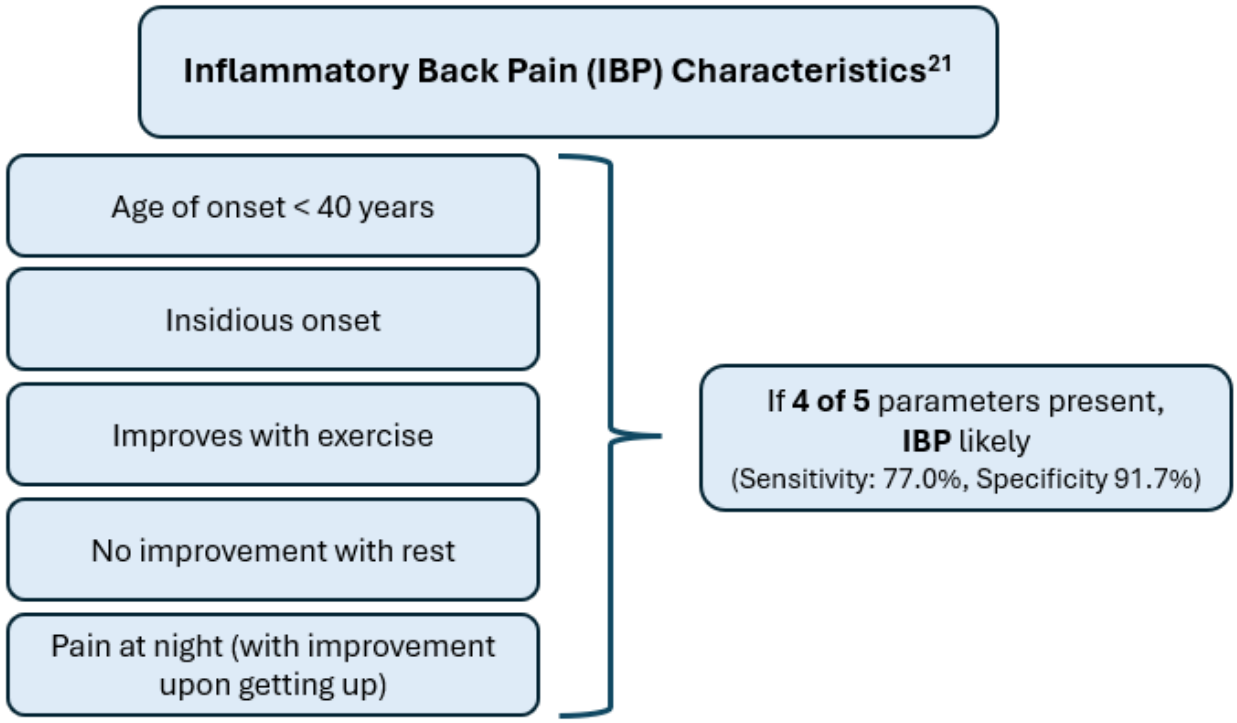

Figure 4.
Assessment of Spondyloarthritis International Society (ASAS) inflammatory back pain diagnostic criteria.[21].

exhibited IBP symptoms, tested positive for HLA-B27, and presented extraspinal features, but disease manifestation visible on imaging varied.

Despite radiographic features being absent in patients with nr-axSpA, evidence of inflammatory lesions such as bone marrow edema and fat metaplasia within the SI joints may be present and viewed with MRI. Rather than two distinct diseases, the non-radiographic distinction in nomenclature functions to capture the broad spectrum of axSpA and allow for acknowledgment of disease progression.[24] A considerable number of cases with nr-axSpA may never develop radiographic sacroiliitis or ankylosis.[25] When transition from nr-axSpA to r-axSpA does occur, it tends to progress slowly, occurring in only 5.8% of patients over 10 years, with even lower rates in those managed with TNFis.[25] The ASAS recommends rheumatologist opinion for axSpA diagnosis, and their classification criteria combine clinical, laboratory, and imaging features.

The differential diagnoses for axSpA share many similar features and can be difficult to distinguish between. Alternative diagnostic considerations include mechanical non-specific low back pain, spondylosis, fibromyalgia, diffuse idiopathic skeletal hyperostosis (DISH), Scheuermann disease, osteitis condensans ilii, and infectious sacroiliitis.[21] Diagnostic imaging evidence of inflammatory sacroiliitis on MRI is a suggestive of axSpA, but other conditions can mimic this appearance. Conditions presenting similarly on imaging include osteoarthritis, stress fractures, infective sacroiliitis, and osteitis condensans ilii.[26] Radiographic diagnosis can be further complicated as sacroiliitis is not specific for axSpA as it has been observed in patients with mechanical low back pain and must be correlated with other clinical findings alongside expert opinion by rheumatologist to confirm diagnosis.[27] The HLA-B27 allele is highly associated with axSpA, but has also been found to be prevalent in those with standalone anterior uveitis and inflammatory bowel disease, juvenile idiopathic arthritis, reactive arthritis, psoriatic arthritis, and undifferentiated spondyloarthritis.[28] Many of these diagnoses may be present concurrently and they are not mutually exclusive.

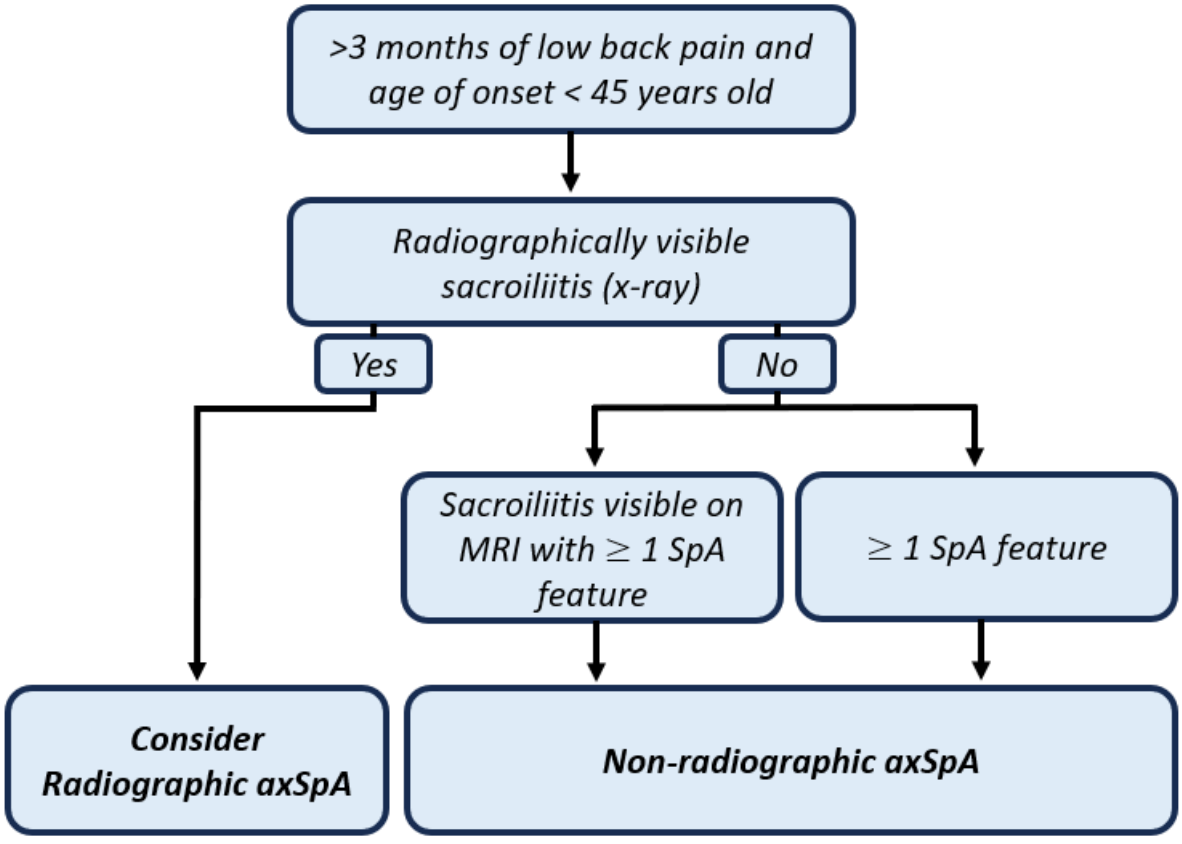

Figure 5.
Classification Criteria for axial spondyloarthritis (axSpA) when evaluating low back pain (LBP) and spondyloarthritis (SpA) features (modified from ASAS criteria).[4,5]

Case 3 was initially diagnosed with fibromyalgia, only to receive medication treatment relief two years later as nr-axSpA was considered.[29] In the absence of definitive axSpA imaging findings or lab markers such as HLA-B27, c-reactive protein, and erythrocyte sedimentation rate, differentiating between the two pathologies can be difficult. The prevalence of fibromyalgia has been reported to co-occur with axSpA in between 4-25% of cases.[30] Case 2 presented with a past medical history of reactive arthritis, a disease in the same family of seronegative spondyloarthropathies as axSpA. Inflammatory sacroiliitis is predictive for reactive arthritis disease progression, with 22-26% of cases evolving to r-axSpA.[31,32] Disc degeneration is also common in patients with axSpA and may provoke concurrent mechanical spine pain.[33] Case presentations may have similar clinical characteristics on clinical examination, laboratory findings, or diagnostic imaging, but they often do not fit the comprehensive clinical profile of axSpA. According to the ASAS guideline, the entirety of the clinical picture must be accounted for alongside expert opinion by rheumatologist to confirm diagnosis.[7]

The development of ankylosis of the spine is the leading source of functional limitation in patients with established axSpA.[34] Despite the wide variation of severity of inflammatory symptoms and degree of ankylosis, the disease burden and management are similar for both nr-axSpA and r-axSpA.[35] The goals of treatment are generally to alleviate symptoms, improve functioning, maintain the ability to work, decrease disease complications, and forestall skeletal damage as much as possible. Clinical guidelines recommend treatment with medications such as NSAIDs, TNFis, supervised and unsupervised exercise,

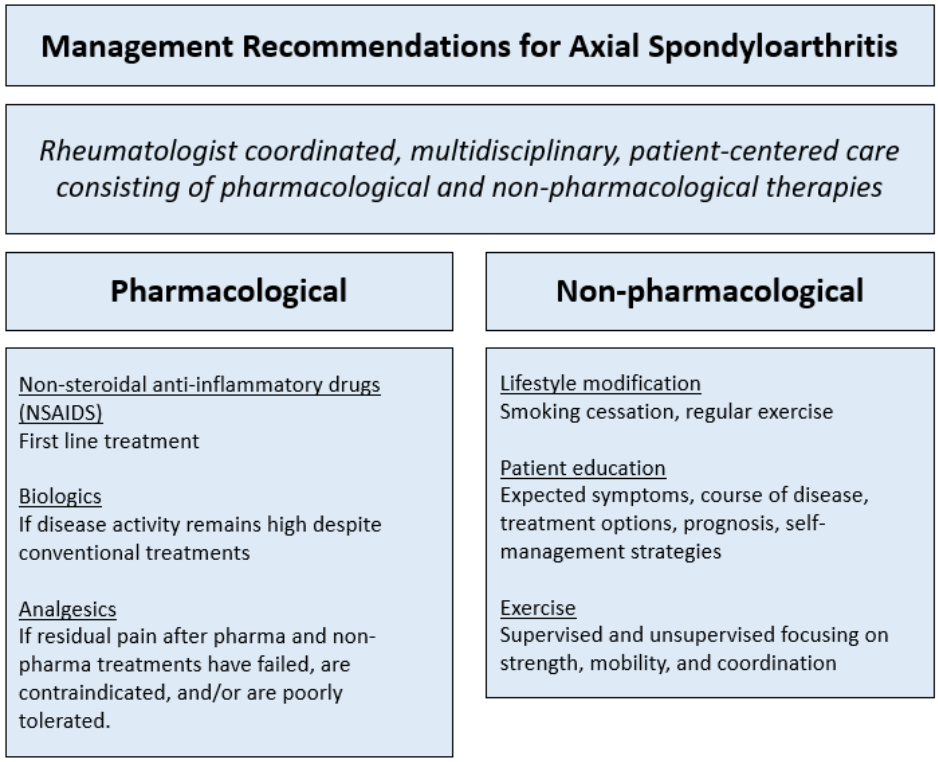

Figure 6.
Management recommendations for axial spondyloarthritis.[7,8]

and formal education on self-management and the nature of the disease.[7,8] (Figure 6)

Chiropractors employ various methods to address axial pain, including joint manipulation and mobilization, soft-tissue therapies, patient education, lifestyle recommendations, therapeutic exercise, and physical modalities (e.g., electrical stimulation, heat). Although disease presentations varied and the diagnosis of one case was uncertain, chiropractic management of each case remained similar, was guideline-concordant, and, as an adjunct to medication management, may have contributed to reduced pain symptoms, improved function, attainment of functional goals, and increased enjoyment of life.

Chiropractic services do not address the underlying inflammatory etiology of axSpA, but they are consistent with management guidelines and may play a role in pain management, improving mobility, and improving function. A recently published observational study suggests that more education of chiropractors is needed to increase appropriate screening for inflammatory back pain in their offices.[11] In cases where IBP is suspected, chiropractors can play a role in referral coordination to a rheumatologist, as was done in cases one and three. The ability of chiropractors to function in the larger healthcare system as licensed independent practitioners can support patients' pain and quality of life through recognition of axSpA and providing guidance towards appropriate management indirectly or directly alongside a rheumatologist.

Chiropractic providers must be cautious of potential safety concerns when treating patients with axSpA, particularly when applying spinal manipulation.[36,37] Chronic inflammation, limited spinal mobility, and increased physical inactivity with axSpA can lead to both new bone formation in the spine as well as increased bone loss. This bone loss represents a point of caution when providing HVLA spinal manipulation, as it is well established that patients with axSpA have a high prevalence of osteoporosis and fracture alongside potential ankylosis.[38–41] The American College of Rheumatology (ACR) recommends against spinal manipulation for patients with r-axSpA in

the presence of spinal fusion or advanced spinal osteoporosis.[8] No recommendations were made by ACR in the context of spinal manipulation and nr-axSpA. In contrast, the World Health Organization guidelines on safety in chiropractic do not consider ankylosing spondylitis to be contraindicated in the absence of ligamentous instability, anatomic subluxation, or ankylosis.[10] Our case 2 with r-axSpA did have known osteopenia via a recent DEXA scan. However, the severity of osteopenia was mild, and he had a long history of benefit with spinal manipulation. Therefore, treatment using HVLA spinal manipulation was initiated, and no adverse events occurred. Fracture risk should be considered by the treating chiropractor and clinical decisions regarding spinal manipulation are best considered on a case-by-case approach.

Limitations

Our report has several limitations inherent to its design as a case series. Case series do not have a control group which precludes the ability to establish causality between treatment administered and the observed outcomes described. As these patients were treated in an outpatient setting, several uncontrolled factors exist that may have influenced their response to treatment. Treatments did not occur in isolation, and it is not possible to identify which treatment(s) resulted in patient improvements. Further, low back pain episodes are commonly self-limiting and axSpA is relapsing and remitting in nature, thus natural history may have played a role in the outcomes reported.[42,43]

We suspect that appropriate medication management of IBP symptoms led to the largest effect on patient outcomes. The role of the chiropractors may be most well suited to identifying IBP, coordination with rheumatology, and providing adjunctive non-pharmacologic treatment options. This study was also limited to a small sample size that may not be generalizable to other patients with axSpA.

Summary

This case series suggests that chiropractic services may be effective as an adjunct to standard medical care in patients with spine pain due to axSpA. While it is important for providers to be cautious of potential contraindications to HVLA spinal manipulation, such as osteoporosis and spinal fusion from ankylosis, none were present in these patients and chiropractic care was well-tolerated without adverse events. Further research is needed to investigate the role of chiropractors in the management of individuals with chronic spine pain related to axSpA.

Abbreviations

ASAS	Assessment of Spondyloarthritis International Society
axSpA	axial spondyloarthritis
DEXA	dual energy X-ray absorptiometry
DISH	diffuse idiopathic skeletal hyperostosis
HLA-B27	human leukocyte antigen B27
HVLA	high-velocity, low-amplitude
IBP	inflammatory back pain
MRI	magnetic resonance imaging
nr-axSpA	non-radiographic axial spondyloarthritis
NSAID	non-steroidal anti-inflammatory drug
PEG	pain, enjoyment of life, and general activity
r-axSpA	radiographic axial spondyloarthritis
SI	sacroiliac joints
SpA	spondyloarthritis
TNFi	tumor necrosis factor inhibitor

Authors' contributions

ZS, KM, and CD drafted the manuscript which was critically revised and approved by all authors and provided patient care described within this study.

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