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# Axial Spondyloarthritis in the Chiropractic Care Setting

## A Systematic Literature Review

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**Abstract:** Diagnosis of axial spondyloarthritis (axSpA), an immune-mediated inflammatory disease, is commonly associated with chronic inflammatory back pain (IBP) and often occurs years after initial onset of clinical symptoms. Recognition of IBP is important for timely referral of patients with suspected axSpA to a rheumatologist. Patients with all types of back pain are treated in chiropractic care, but the proportion of patients with undiagnosed axSpA is unknown. This systematic literature review investigated the presence of axSpA in patients treated by chiropractors and identified the chiropractor's role in axSpA diagnosis, referral, and management. A PubMed search was conducted using the following search strings: "chiropract\*" AND ("sacroiliac" OR "back pain" OR "spondyloarthritis" OR "ankylosing spondylitis"); English language, since 2009; and (chiropractic OR chiropractor) AND (ankylosing spondylitis OR axial spondyloarthritis), with no date limits. Of 652 articles identified in the searches, 27 met the inclusion criteria. Although back pain was identified as a common reason for patients seeking chiropractic care, there was no mention of axSpA, ankylosing spondylitis, or the distinction between mechanical and IBP. Data from relevant articles suggested that the majority of patients seeking chiropractic care have lower back pain, whereas no articles reported axSpA in this patient population. The near absence of any identified articles on axSpA in chiropractic care may be due to underrecognition of axSpA, resulting in delayed rheumatology referral and appropriate management. Better awareness and increased use of validated screening tools could reduce diagnostic delay of axSpA in chiropractic care.

**Key Words:** chiropractic care, axial spondyloarthritis, ankylosing spondylitis

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**B**ack pain, particularly low back pain (LBP), is highly prevalent in the general population, with most people in industrialized countries experiencing it at least once in their lifetime and a global mean lifetime prevalence of 38.9%.<sup>1,2</sup> Low back pain can be defined as mechanical back pain (MBP) or inflammatory back pain (IBP). Mechanical back pain relates to injury or stress to a component

of the back, such as spinal discs or soft tissues,<sup>3</sup> and can be either acute (<12 weeks) or chronic (>12 weeks). Inflammatory back pain is a clinical construct and is characterized by significant morning stiffness (>30 minutes), improvement with exercise but not with rest, awakening with back pain during the second half of the night, and alternating buttock pain.<sup>3–7</sup> There may be no actual inflammation in the axial skeleton, but the presence of IBP raises the possibility of axial spondyloarthritis (axSpA) since more than 80% of patients with axSpA have IBP.

Patients with LBP are often seen by primary care providers, chiropractors, and physical therapists.<sup>8</sup> It is crucial to determine the initial type of LBP (MBP or IBP) and the specific cause of the pain in these settings because treatment may be different depending on this determination. This distinction of IBP versus MBP is particularly important for progressive conditions such as axSpA, a type of immune-mediated inflammatory disorder for which early initiation of treatment can improve symptoms, function, and quality of life.<sup>9</sup>

Axial spondyloarthritis typically involves the sacroiliac joints, spine, or both, where IBP is a common primary symptom.<sup>10</sup> Cases of axSpA can be further classified as either radiographic axSpA (r-axSpA; also known as ankylosing spondylitis [AS]) or nonradiographic axSpA.<sup>11,12</sup> Health care providers (HCPs) are likely to be unfamiliar with axSpA as the root cause of chronic LBP in some of their patients. Consequently, this leads to underrecognition or delayed diagnosis of the condition.<sup>13</sup> Therefore, it is important for nonrheumatology HCPs to be able to differentiate axSpA from other causes of chronic LBP. Diagnosis of axSpA is most often made outside of the rheumatology practice in the United States, with 67% of cases being diagnosed by other HCPs.<sup>14</sup>

In a study of the frequency of axSpA diagnosis in US rheumatology practices, the referral of patients with CBP to rheumatologists was far less common by chiropractors (1% of all referrals) compared with primary care physicians (54%), orthopedic physicians (12%), physical medicine and rehabilitation providers (5%), and other sources (29%).<sup>15</sup> Many patients with CBP seek chiropractic care (CC),<sup>16</sup> so it is likely that many chiropractors will see patients with axSpA as part of their daily practice without recognizing it. The estimated prevalence of IBP in the general population in the United States is 5% to 6%,<sup>17</sup> whereas the prevalence of axSpA is 0.9% to 1.4%<sup>18</sup>; therefore, chiropractors have a key role in the diagnosis and treatment of CBP and axSpA, with diagnosis in chiropractic/physical therapy settings reported in 7% of cases.<sup>14</sup>

Selection of patients with a high probability of having axSpA and subsequent referral to rheumatologists from chiropractors is important to allow timely diagnosis and management of axSpA and to help optimize utilization of resources.<sup>19</sup> We conducted a systematic literature review (SLR) through March 1, 2021, to investigate the presence of axSpA among patients treated by chiropractors and identified the role of chiropractors in the diagnosis, referral, and management of axSpA.

## METHODS

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed for this research.<sup>20</sup>

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### Literature Search and Selection of Studies

A preliminary search was conducted to assess the number of studies discussing axSpA or AS in key US-based chiropractic journals indexed in PubMed (*Journal of Chiropractic Medicine, Journal of Manipulative and Physiological Therapeutics, Journal of the Academy of Chiropractic Orthopedists, Journal of Contemporary Chiropractic, Chiropractic History, Journal of Chiropractic Education*), which identified only 1 relevant manuscript, a case report of AS simulating osteoblastic skeletal metastasis, highlighting a potential unmet need for acknowledgment of axSpA in the chiropractic setting.<sup>21</sup> Subsequently, an SLR of PubMed was performed on June 9, 2020, and refreshed to examine additional potentially relevant articles published through March 1, 2021. The PICOS (Population, Intervention, Comparator, Outcomes, and Study) elements were axial spondyloarthritis (Population); chiropractic (Intervention); diagnosis, referral, and/or management (Outcomes); and any study design (Study), whereas the criteria for Comparator were not applicable (Fig. 1). Only articles published in English were included. Search terms included “chiropract\*” AND (“sacroiliac” OR “back pain” OR “spondyloarthritis” OR “ankylosing spondylitis”) since 2009 to focus on recent studies of patients with axSpA seeking CC for back pain. We then conducted a broader search of (chiropractor OR chiropractic) AND (ankylosing spondylitis OR axial spondyloarthritis) with no publication date limit to maximize the amount of data captured about any mention of AS and axSpA in chiropractic settings. Articles excluded were letters to the editor and commentaries. Articles were selected if they primarily met the following predefined objectives:

1. Studies described how commonly AS or axSpA was observed in chiropractic clinics and/or identified the role of chiropractors in the diagnosis and management of AS or axSpA.
2. Studies described the proportion of patients in chiropractic clinics who were back pain patients, assessed how common IBP was in CC, and/or indicated how common spondyloarthritis (SpA) was in chiropractic clinics.

### Data Extraction and Quality Assessment

After screening raw search results to exclude articles outside of the PICOS elements described previously, titles and abstracts of remaining articles were reviewed independently by 4 reviewers (A.D., S.K., T.M., and S.B.) to assess whether articles met the predefined objectives and should be included in the final review; discrepancies were resolved by an adjudicator (A.D.). The full text of relevant articles was evaluated for specific data relating to back pain in this chiropractic setting and subsequently extracted by an independent party. Additional articles identified from the bibliographies of the search results were included to supplement the findings from the searches. All relevant articles were critically appraised for the validity of the studies using the Downs and Black criteria (Supplemental Table 1, <http://links.lww.com/RHU/A331>).<sup>22</sup>

## RESULTS

### Search Results

An initial search of the literature for articles with a focus on CC and back pain revealed that over 1800 articles have been published since 1950. A sharp increase in the number of publications over the last 20 to 30 years was observed, with over 35 articles being published per year since 2001 (Fig. 2). In our search, we identified 652 English language articles via PubMed (Fig. 3). Upon examination of the full text, 27 articles from the searches were ultimately included in the review (Supplemental Table 2, <http://links.lww.com/RHU/A332>).

### The Main Reasons for Patients Attending Chiropractic Clinics

Patients attend chiropractic clinics for many different reasons, with varying proportions for each reported.<sup>23–27</sup> However, it is clear that musculoskeletal concerns were the most common reasons that people visited chiropractors; 70% of caseloads for chiropractors were people who had musculoskeletal issues, with LBP being

	Inclusion criteria	Exclusion criteria
<b>Population</b>	<ul style="list-style-type: none"> <li>• Adult patients with axSpA</li> </ul>	<ul style="list-style-type: none"> <li>• Pediatric patients</li> <li>• Non-axSpA indication</li> </ul>
<b>Intervention</b>	<ul style="list-style-type: none"> <li>• Chiropractic</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Comparator</b>	<ul style="list-style-type: none"> <li>• NA</li> </ul>	<ul style="list-style-type: none"> <li>• NA</li> </ul>
<b>Outcome</b>	<ul style="list-style-type: none"> <li>• Diagnosis, referral, and/or management</li> </ul>	<ul style="list-style-type: none"> <li>• NA</li> </ul>
<b>Study design</b>	<ul style="list-style-type: none"> <li>• Any</li> </ul>	<ul style="list-style-type: none"> <li>• Letters to the editor, commentaries</li> </ul>
<b>Restrictions</b>	<ul style="list-style-type: none"> <li>• Language: English</li> </ul>	<ul style="list-style-type: none"> <li>• Duplicates, non-English-language articles</li> </ul>

FIGURE 1. Details of SLR methodology, featuring PICOS elements of the search. NA, not applicable.

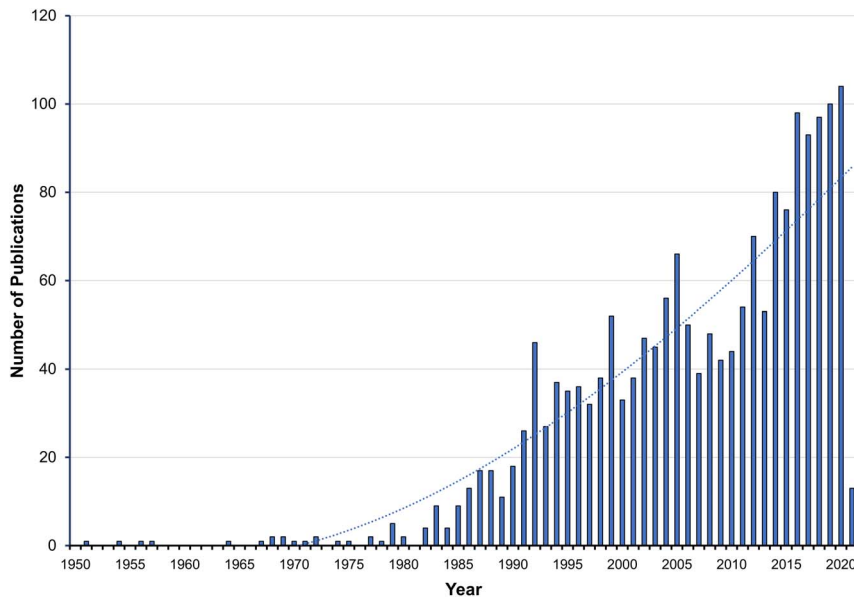


FIGURE 2. Increase in publications including (chiropractic OR chiropractor) AND “back pain” (as of March 1, 2021).

the largest component.<sup>23–25</sup> The rates of back pain reported in patients attending chiropractic clinics varied between 28.5% and 85%,<sup>23,24,28–31</sup> whereas the percentages of neck pain were between 14.9% and 20.9% (Fig. 4).<sup>23,24,28</sup> In a meta-analysis of studies reporting CC provided to active military personnel globally, back pain with or without radiculopathy accounted for the majority of the cases.<sup>32</sup> In a retrospective analysis of self-reported concerns, primary musculoskeletal issues were also reported as the reason for 54.8% of patients presenting at chiropractic clinics; of these,

40.8% of patients presented with back pain, 20.9% with neck pain, and 11.5% with shoulder pain.<sup>24</sup> In a separate SLR, LBP (49.7%; interquartile range [IQR], 43.0%–60.2%), neck pain (22.5%; IQR, 16.3%–24.5%), and extremity issues (10.0%; IQR, 4.3%–22.0%) were also cited as the main reasons for chiropractic clinic visits.<sup>23</sup> A US Veterans Health Administration survey of chiropractic services (n = 36) reported that 88% of respondents ranked LBP as the most common reason for patients attending chiropractic clinics.<sup>33</sup> Another cross-sectional postal survey from the nationally

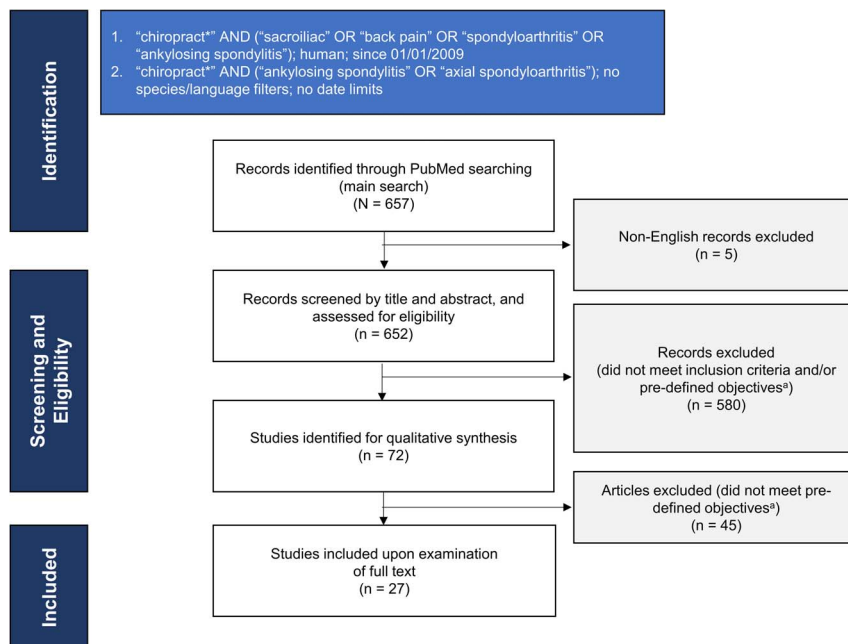


FIGURE 3. Systematic literature review: flow diagram. <sup>a</sup> Predefined objectives for inclusion of articles were as follows: (1) studies that described how commonly AS or axSpA was observed in chiropractic clinics and/or identified the role of chiropractors in the diagnosis and management of AS or axSpA; and (2) studies that described the proportion of patients in chiropractic clinics who were back pain patients, assessed how common inflammatory back pain was in chiropractic care, and/or indicated how common spondyloarthritis was in chiropractic clinics.

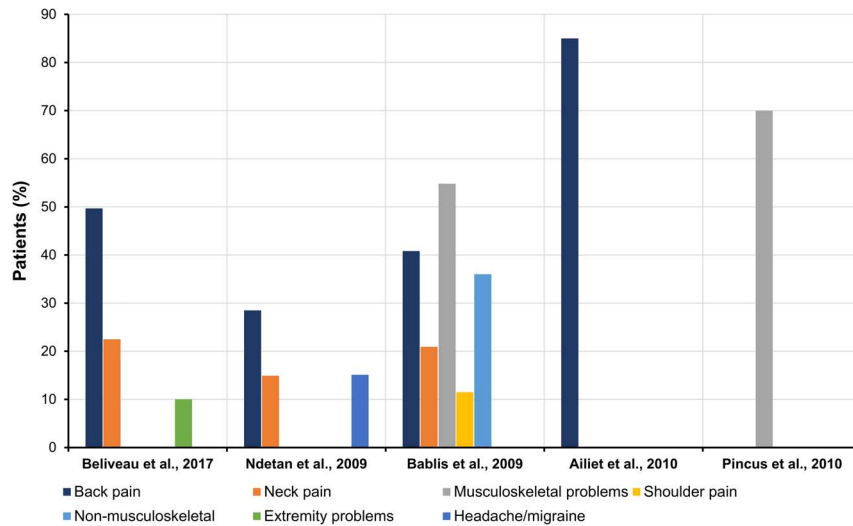


FIGURE 4. Reasons for patients seeking chiropractic care as a percentage of those surveyed.

representative sample of women aged 60 to 65 years from the Australian Longitudinal Study on Women's Health revealed that 37% ( $n = 488$ ) consulted a chiropractor for back pain.<sup>34</sup> Nonmusculoskeletal concerns were reported in 36.0% of patients presenting at chiropractic clinics, with the most common forms being immune and recurrent infections (13.9%), stress and anxiety (12.8%), and depression (10.9%).<sup>24</sup>

### Patients Visiting Chiropractic Clinics for Chronic or Acute Conditions

Back pain can generally be divided into acute, subacute, and chronic categories.<sup>35</sup> Different durations are used to define these divisions; however, a commonly used classification is acute (<6 weeks), subacute (7 to 12 weeks), and chronic ( $\geq 3$  months).<sup>36</sup> There were conflicting data in the literature regarding the duration of back pain in patients visiting chiropractic clinics. A strong consensus was reported among practitioners that intermittent long-term problems outweigh new acute presentations.<sup>25</sup> This was consistent with the finding that 41.4% of chiropractic patients reported a first-time issue, whereas 60.7% of patients who previously had an issue reported having the issue for more than 1 year.<sup>24</sup> However, other reports found acute presentations to account for the majority of visits,<sup>37,38</sup> with specified percentages of concerns reported as 28% chronic and 71% acute.<sup>37</sup> Furthermore, the course of LBP specifically was predicted by clinicians to be short (54%), prolonged (36%), or chronic (7%) in included participants.<sup>39</sup>

No literature published since 2009 identified in this search contained information regarding the frequency of AS or axSpA in CC, the role of chiropractors in diagnosis and management of AS, how common IBP is in CC, or how common the conditions included under the umbrella term “spondyloarthritis” (SpA) are in CC. However, upon further examination of identified articles, 1 article of interest was cited in one of the review articles included in this SLR.<sup>40</sup> This study showed that, of 315 patients evaluated in a chiropractic setting, 12 patients (3.8%) had radiographic changes in the sacroiliac joint sufficient to meet the New York modified criteria for the classification of AS, clearly showing that AS is being seen within the chiropractic setting. Noting that this may be considered inadequate identification, the reported percentage may be far higher than current data suggest.<sup>40</sup>

### The Role of Chiropractors in the Diagnosis and Management of r-axSpA/AS

There was a lack of information regarding the role of chiropractors in the diagnosis and management of r-axSpA/AS. Only 2 articles identified in the search for CC and AS covered the role of chiropractors in the diagnosis of AS. In a retrospective longitudinal study of all patients diagnosed with AS following a back pain diagnosis from a large insurance claims database, 7% were diagnosed with AS in a chiropractic/physical therapy setting.<sup>14</sup> This study also provided evidence that some chiropractors administered prescription drugs (including tumor necrosis factor inhibitors [in the United States]) and ordered imaging assessments, such as x-rays, computed tomography, and magnetic resonance imaging, in patients with AS in a chiropractic setting.<sup>14</sup> There was no information regarding referral of patients with suspected AS to rheumatologists by chiropractors specifically; however, of 347 patients initially diagnosed with AS by any nonrheumatologist who were later seen by a rheumatologist, only 145 (42%) had their diagnosis confirmed, with the remaining 202 (58%) being subsequently diagnosed with other conditions/disorders.<sup>14</sup> In a cross-sectional survey study of 382 chiropractors and osteopaths, all respondents were familiar with the term “AS” and 99% were confident with their understanding of AS.<sup>41</sup> In contrast, 63% were familiar with “axSpA” and 57% were confident in their understanding of axSpA, whereas only 25% were familiar and 22% were confident in their understanding of “nonradiographic axSpA,” suggesting a poor awareness and understanding of the term “axSpA.”<sup>41</sup> Only 44% of respondents were aware of the availability of biologics to treat AS.<sup>41</sup> Respondents reported a confidence level of 3.2 of 5 with onward referral to general practitioners.<sup>41</sup> The most common barriers to onward referral were reluctance of general practitioners to accept findings and recommendations from chiropractors and osteopaths along with a general unwillingness of general practitioners to refer patients to secondary care, such as a rheumatologist.<sup>41</sup> In a cross-sectional survey, chiropractic students' abilities to detect contraindications, defined as conditions that could worsen with spinal adjustments, were between 81% and 97%.<sup>42</sup> However, the contraindications were detected for 2 different neck pain and LBP scenarios and were not identified from among patients with AS, in whom spinal adjustments represent a major contraindication in areas with confirmed ankylosis.<sup>42</sup> These highlight both a high occurrence of misdiagnosis of AS and inconsistencies between

rheumatologists and nonrheumatologists regarding the diagnosis of AS.

The role of the chiropractor in the management of r-axSpA/AS seemed to differ across studies, and inconsistencies with regard to outcomes and opinion were identified—whereas some saw a positive role of CC for this disease, others suggested potential detrimental outcomes. Studies that supported CC as being beneficial reported positive effects in a variety of outcomes.<sup>43–45</sup> Observed outcomes included global improvements in the signs and symptoms of AS; notable improvement in function, disease activity, and symptoms, as measured by the Bath Ankylosing Spondylitis Disease Activity Index and Bath Ankylosing Spondylitis Functional Index; increase in chest expansion; increase in forward flexion; and decrease in spine/sacroiliac joint pain and muscle rigidity.<sup>43–45</sup>

Negative aspects of CC for the treatment of AS that were highlighted included the development of severe neck pain during cervical spondylotic myelopathy (CSM)—a cervical spine fracture with neurological complications was subsequently diagnosed.<sup>46</sup> Cervical spondylotic myelopathy was also found to have likely exacerbated spondylitis in a patient, causing a cervical spine fracture.<sup>47</sup> Furthermore, one of the studies that reported beneficial effects of CSM also noted that the patient subsequently experienced an exacerbation of AS, with several clinical measures of disease supporting this assessment.<sup>44</sup> Chiropractic care as part of a multidisciplinary rehabilitation program for patients with complex neurological conditions revealed that CSM was mostly used to relieve musculoskeletal pain and stiffness.<sup>48</sup> However, only 1 patient with AS was included in this study, and the individual response of that patient was not reported.<sup>48</sup>

It was suggested that chiropractors can play a significant role in the early diagnosis of disease by differentiating IBP from MBP to ensure that patients receive appropriate referral.<sup>7,49</sup> As such, it is important for the chiropractor to evaluate patients for differentiating characteristics of IBP and clinical features, such as response to nonsteroidal anti-inflammatory drugs; peripheral musculoskeletal symptoms suggesting SpA (eg, asymmetric oligoarticular inflammatory arthritis, enthesitis, and dactylitis); presence of inflammatory bowel disease, iritis, or psoriasis; and family history of SpA<sup>49</sup> as soon as possible.

## DISCUSSION

To our knowledge, this is the first study to systematically review the medical literature to find how commonly axSpA is seen in chiropractic clinics. Our SLR showed that data regarding back pain attributable to axSpA in a chiropractic setting are severely limited. Although many people are referred for CC or seek CC themselves, there is little supporting evidence to show whether chiropractors are accurately diagnosing patients with axSpA. Furthermore, the role of CC for patients with axSpA is unclear. Our literature review suggests that a large proportion of patients seeking CC have LBP, but we found only a single study cited in an identified article that showed that 3.8% of patients attending chiropractic clinic had x-ray evidence of sacroiliitis.

Multiple studies showed beneficial effects of CC across multiple outcomes in AS with functional improvement in patients.<sup>43–45</sup> However, caution must be emphasized in the use of CC for the management of AS or axSpA, and the risk associated with CSM, such as acute fracture, must be considered. This is the basis for the opposition for the use of spinal manipulation in patients with advanced AS in the 2019 American College of Rheumatology, Spondylitis Association of America, and Spondyloarthritis Research and Treatment Network treatment guidelines for axSpA.<sup>50</sup> These guidelines

cite the lack of evidence showing spinal manipulation to be beneficial and evidence showing potential severe harm.<sup>50</sup>

There is clearly a need to increase awareness of axSpA among chiropractors because it is likely that some patients with undiagnosed axSpA will seek CC. The lack of appropriate screening for axSpA in chiropractic settings may be contributing to the lengthy diagnostic delay.<sup>51</sup> Being able to accurately diagnose axSpA in early stages rather than in later stages would benefit not only the patient but the health care system as well. Given the wide range of treatments available—including evidence from a retrospective analysis showing tumor necrosis inhibitors being associated with reduced radiographic progression,<sup>9</sup> particularly with early initiation—early diagnosis is crucial for axSpA to minimize the impact of the disease on patient quality of life. Increasing awareness and ability to recognize the symptoms of axSpA among chiropractors and other primary spine practitioners through use of validated screening tools could therefore lead to patients getting more timely referrals to rheumatologists and, as a result, minimize the progressive detrimental effects of the disease.

## Limitations

The sample size resulting from our search was small, with data mainly consisting of case studies, resulting in many confounding factors and the lack of control groups. There are limitations of the SLR methodology itself, which include the use of select keywords and PubMed-indexed articles only. Furthermore, given the paucity of available data, we have included a series of narratives and reviews for sake of completeness. These limitations may cause some reports to be missed; however, this SLR is a direct reflection of the lack of availability of relevant data.

## Summary

Chiropractors have a potentially important role in the diagnosis of axSpA; however, our SLR identified an extremely limited number of articles examining AS/axSpA in the chiropractic setting. This may be because of underrecognition due to lack of awareness of AS/axSpA by chiropractors. Education to increase awareness of the characteristics of IBP among chiropractors may lead to more timely referrals to rheumatologists and therefore a shorter diagnostic delay. Shorter diagnostic delays would likely result in improved outcomes for the patients with undiagnosed axSpA who present at chiropractic clinics with chronic LBP.

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