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INFLAMMATORY AND MECHANICAL BACK PAIN: AVOIDING DIAGNOSTIC DELAY IN AXIAL SPONDYLOARTHRITIS

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ABSTRACT

Background: Low back pain is a common clinical complaint, most often of mechanical origin. However, a subset of patients presents with inflammatory back pain related to axial spondyloarthritis (axSpA), a condition frequently associated with significant diagnostic delay and adverse outcomes.
Objective: To review and summarize the key clinical, laboratory, and imaging features that differentiate inflammatory from mechanical back pain, with the aim of improving early recognition of axial spondyloarthritis in clinical practice.
Materials and Methods: A narrative literature review was conducted using the PubMed database. Articles published mainly between 2000 and 2024 were identified using the following keywords: "axial spondyloarthritis", "inflammatory back pain", "mechanical back pain", and "diagnostic delay". Relevant clinical trials, observational studies, systematic reviews, and clinical guidelines written in English were included. The review focused on the epidemiology, clinical presentation, laboratory markers, imaging findings, treatment implications, and prognostic consequences of delayed diagnosis in axial spondyloarthritis, and the selected studies were analyzed qualitatively.
Results: Inflammatory back pain is characterized by insidious onset, improvement with exercise, nocturnal pain, and poor response to rest. HLA-B27 positivity and elevated inflammatory markers support the diagnosis, while imaging of the sacroiliac joints—particularly MRI—plays a key role in early detection. In contrast, mechanical back pain is typically activity-related, improves with rest, and rarely shows inflammatory laboratory or imaging findings. Diagnostic delay in axSpA is associated with worse functional outcomes, reduced spinal mobility, and increased radiographic progression.
Conclusions: Accurate differentiation between inflammatory and mechanical back pain is essential for timely diagnosis and appropriate management of axial spondyloarthritis. Increased clinical awareness and a structured diagnostic approach may reduce diagnostic delay and improve long-term patient outcomes.

KEYWORDS

Axial Spondyloarthritis, Diagnostic Delay, Inflammatory Back Pain, Mechanical Back Pain

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1. Introduction

Low back pain is highly prevalent, and an estimated 5–10% of cases progress to chronicity, contributing to substantial healthcare costs, work absenteeism, and frequent medical consultations (Meucci et al., 2015). In 2019, it was the sixth leading cause of disability-adjusted life years (DALYs) among women and ranked fourth in the 25–46 year age group (Abbafati et al., 2020). Most cases are attributable to mechanical or non-specific causes (Will et al., 2018). However, identifying patients with inflammatory spinal disease, particularly axial spondyloarthritis, remains a major challenge for primary care physicians and often results in a 5–10 year delay between symptom onset and diagnosis (Feldtkeller et al., 2003). Such delay may prevent the timely initiation of appropriate therapy, leading to worse outcomes, including disability, reduced spinal and hip mobility, persistent pain, diminished quality of life, and impaired functional status (Fallahi & Jamshidi, 2015).

Distinguishing inflammatory from mechanical causes of back pain in early stages of disease can be particularly challenging in routine clinical practice. The majority of patients presenting with chronic back pain are initially evaluated in primary care settings, where the overall prevalence of axial spondyloarthritis among individuals with back pain is relatively low. As a result, inflammatory spinal disease may not be immediately suspected, especially when symptoms overlap with common mechanical conditions. Early manifestations of axial spondyloarthritis may be nonspecific and intermittent, which further complicates recognition of the disease. Moreover, limited familiarity with the characteristic features of inflammatory back pain among non-rheumatology clinicians may contribute to delayed referral to specialist care. This diagnostic uncertainty may lead to repeated consultations, unnecessary imaging studies, and prolonged exposure to ineffective treatments. Improving awareness

of inflammatory back pain characteristics and implementing structured screening approaches in patients with chronic back pain may therefore play a key role in facilitating earlier diagnosis of axial spondyloarthritis. This review aims to provide a practical overview of the key features that differentiate inflammatory from mechanical back pain, with particular emphasis on axial spondyloarthritis in clinical practice.

2. Definitions and Clinical Features

2.1. Inflammatory Back Pain

Inflammatory back pain (IBP) may arise from several immune-mediated rheumatologic disorders involving the axial skeleton, peripheral joints, and entheses (Sieper & Poddubnyy, 2017). Conditions such as ankylosing spondylitis, reactive arthritis, psoriatic arthritis, enteropathic arthritis, and certain subtypes of juvenile idiopathic arthritis may present with features of IBP. However, the most common and clinically relevant cause of inflammatory back pain is axial spondyloarthritis (axSpA) (Kabeer et al., 2023).

Axial spondyloarthritis (axSpA) represents a spectrum of inflammatory disorders ranging from non-radiographic axSpA (nr-axSpA) to radiographic axSpA (r-axSpA), the latter corresponding to ankylosing spondylitis (AS) (Deodhar et al., 2016). Patients with nr-axSpA and with AS are distinguished by the absence or presence, respectively, of definitive sacroiliitis on conventional radiographic imaging (Sieper, Rudwaleit, et al., 2009). Emerging evidence indicates that the clinical expression of axSpA differs between women and men. While the prevalence of AS is approximately two- to threefold higher in men, nr-axSpA appears to occur at a comparable frequency in both sexes (Wright et al., 2020). In Poland, ankylosing spondylitis affects approximately 0.1% of the population, a prevalence that has remained relatively stable over the past decade (Tłustochowicz et al., 2019). By comparison, current estimates in the United States indicate a higher prevalence, ranging from approximately 0.2% to 0.5% (Reveille, 2011).

Since 1984, ankylosing spondylitis has been defined according to the modified New York criteria, which require radiographically confirmed sacroiliitis (Linden et al., 1984).

In 2009, the Assessment of SpondyloArthritis International Society (ASAS) introduced a classification system for axial spondyloarthritis, encompassing both radiographic axSpA (r-axSpA, synonymous with AS) and non-radiographic axSpA (nr-axSpA) (Sieper, Van Der Heijde, et al., 2009). The ASAS classification may be applied to patients with chronic back pain lasting at least three months and symptom onset before the age of 45 years.

According to the ASAS criteria for inflammatory back pain, the presence of at least four out of five specific clinical features supports a diagnosis of IBP. Inflammatory back pain typically begins before the age of 40–45 years, has an insidious onset, and is characterized by prolonged morning stiffness and improvement with physical activity. Pain often worsens during the second half of the night and may awaken patients from sleep (Table 1). In addition, inflammatory back pain may be accompanied by other spondyloarthritis-related features, including peripheral arthritis, enthesitis (particularly at the heel), dactylitis (swelling of the fingers or toes), and extra-articular manifestations such as acute anterior uveitis, psoriasis, or inflammatory bowel disease (Crohn's disease or ulcerative colitis) (Table 2). In the original validation study, fulfillment of four of these five features demonstrated a sensitivity of 80% and a specificity of 73% (Table 1) (Sieper, Van Der Heijde, et al., 2009).

Table 1. ASAS expert criteria for inflammatory back pain (IBP) (Sieper, Van Der Heijde, et al., 2009).

IBP is suggested if at least 4 of the following 5 features are present
1. improvement with exercise, **2. pain at night,** **3. insidious onset,** **4. age at onset under 40 years** **5. no improvement with rest**

The ASAS classification system for axial spondyloarthritis includes two alternative pathways: one based on imaging evidence of sacroiliitis and the other on HLA-B27 positivity in combination with additional SpA features (Table 2).

Table 2. ASAS classification criteria for Axial spondyloarthritis (Sieper, Van Der Heijde, et al., 2009)

Axial SpA	
Patients with back pain ≥3 months and age at onset <45 years	
Sacroiliitis on imaging (MRI or X-ray) + **≥1** additional **SpA features**	HLA-B27 positive + **≥2** additional **SpA features**
SpA features: • Inflammatory back pain • Peripheral arthritis • Enthesitis (heel) • Uveitis • Dactylitis (swelling of fingers/toes) • Psoriasis • IBD (Crohn's disease or ulcerative colitis) • Good response to nonsteroidal anti-inflammatory drugs (pain relief within 24–48 h of full dose) • Family history of SpA • HLA-B27 positivity • Elevated C-reactive protein (after excluding other causes)	

A thorough medical history should include assessment of musculoskeletal and extra-musculoskeletal SpA features, as well as a family history of spondyloarthritis. Rapid symptom improvement within one to two days of NSAID initiation supports a diagnosis of axSpA. The history may also reveal features suggestive of alternative diagnoses, such as prior spinal trauma or surgery, systemic symptoms, neurological deficits, or widespread pain syndromes (van Gaalen & Rudwaleit, 2023).

Physical examination remains a key component in the evaluation of suspected axSpA. Clinicians should assess peripheral joints for arthritis, heels for Achilles enthesitis, hands and feet for dactylitis, and skin and nails for psoriasis. Although uncommon, the presence of acute anterior uveitis strongly supports the diagnosis. Spinal mobility may be assessed using measures such as cervical rotation, chest expansion, the Schober test, and lateral spinal flexion, interpreted against age-adjusted reference values. However, these measures have limited diagnostic utility due to wide interindividual variability and age-related decline (Ramiro et al., 2015).

2.2. Mechanical Back Pain

Mechanical low back pain is defined as pain arising from intrinsic disorders of the spine, intervertebral discs, or adjacent soft tissues. This category includes lumbosacral muscle strain, intervertebral disc herniation, lumbar spondylosis, spondylolisthesis, spondylolysis, vertebral compression fractures, as well as acute or chronic traumatic injuries involving spinal structures (Patrick et al., 2014).

Physical examination should include an assessment of lower-extremity strength, sensory function, and deep tendon reflexes. Inspection, palpation, and evaluation of the lumbosacral range of motion aid in detecting focal tenderness, movement limitations, and muscle spasm (Will et al., 2018).

Mechanical back pain often follows trauma or repetitive overuse, worsens with movement or physical activity, and improves with rest. Pain may be localized or radiate to the buttocks or lower limbs, depending on the underlying pathology, and may be accompanied by restricted range of motion, muscle tenderness, or neurological symptoms such as paresthesia or weakness in conditions like disc herniation or spinal stenosis (CASAZZA, 2012; Deyo et al., 1992; Downie et al., 2013; Patrick et al., 2014).

3. Laboratory Evaluation in Inflammatory and Mechanical Back Pain

3.1. Axial Spondyloarthritis

Axial spondyloarthritis (axSpA) represents the most common and clinically relevant cause of chronic inflammatory back pain and therefore constitutes the primary focus of laboratory evaluation in this context. AxSpA is a polygenic disorder, with HLA-B27 representing the most influential individual genetic risk factor. Its diagnostic utility arises from the substantially increased frequency of HLA-B27 in individuals with axSpA compared to the general population (van Gaalen & Rudwaleit, 2023). In the ASAS-PerSpA study of patients diagnosed with axSpA HLA-B27 positivity was 89% in Asia, 65% in the Middle East and North Africa, 78% in Europe and North America and 81% in Latin America (Boel et al., 2022). For context, the prevalence of HLA-B27 in the general population of Europe and North America is approximately 6–8% (van Gaalen & Rudwaleit, 2023). Despite their diagnostic value, laboratory tests alone are insufficient to establish or exclude the diagnosis of axial spondyloarthritis. Although HLA-B27 is strongly associated with the disease, its presence is neither necessary nor sufficient for diagnosis. A substantial proportion of individuals carrying HLA-B27 never develop axSpA, while a minority of patients with confirmed disease are HLA-B27 negative.

Acute-phase reactants, particularly C-reactive protein (CRP), should be assessed in patients with suspected axSpA. Elevated CRP is present in approximately 25–40% of individuals with axSpA (Rudwaleit et al., 2009). CRP is also incorporated into the Ankylosing Spondylitis Disease Activity Score (ASDAS), the preferred measure of disease activity in axSpA, and persistently elevated levels are associated with spinal radiographic progression. When CRP is unavailable, erythrocyte sedimentation rate (ESR) may be used as an alternative acute-phase marker (van Gaalen & Rudwaleit, 2023). Acute-phase reactants such as CRP and ESR may remain within normal limits in a considerable proportion of patients, particularly in early disease stages. Consequently, normal inflammatory markers do not exclude axSpA, and clinical suspicion should remain high when characteristic symptoms are present.

Laboratory investigations therefore play a supportive role and should always be interpreted in conjunction with clinical findings and imaging results. In addition, laboratory testing is useful in the differential diagnosis of chronic back pain, helping to exclude alternative inflammatory, infectious, or malignant causes.

3.2. Mechanical Back Pain

Laboratory investigations, including a complete blood count (CBC) with differential, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP), may be indicated when infection or bone marrow malignancy is suspected; in other cases, laboratory findings in mechanical back pain are typically nonspecific or unremarkable (CASAZZA, 2012).

4. Imaging in Inflammatory and Mechanical Back Pain

4.1. Axial Spondyloarthritis

As axial spondyloarthritis is the most common inflammatory cause of chronic back pain, imaging assessment primarily aims to detect sacroiliitis and other features suggestive of this condition. Imaging plays a crucial role in the diagnosis of axSpA. Although inflammation can affect the entire spine, it is most readily detected in the sacroiliac (SI) joints (van Gaalen & Rudwaleit, 2023). In many centers, pelvic radiographs remain the first-line imaging modality, as they can identify sacroiliitis while being less costly and resource-intensive than MRI.

On conventional radiographs, both sacroiliac joints are assessed and graded according to the extent of structural involvement. A radiograph is considered positive for sacroiliitis when changes reach at least grade 2 bilaterally or grade 3 unilaterally. The grading system is as follows:

- Grade 0 - normal findings,
- Grade 1 - indicates suspicious but non-definitive changes,
- Grade 2 - reflects minimal abnormalities such as small erosions or sclerosis without joint space alteration,
- Grade 3 - definite sacroiliitis with features including erosions, sclerosis, joint space widening or narrowing, or partial ankylosis,
- Grade 4 - corresponds to complete ankylosis (Linden et al., 1984; van Gaalen & Rudwaleit, 2023).

Although radiography is the most commonly used modality to assess sacroiliac joint involvement, it often fails to detect early disease, as clinical symptoms of sacroiliitis may precede radiographic changes by several years (Van Gaalen et al., 2014).

Magnetic resonance imaging (MRI) allows for detection of sacroiliac joint inflammation in SpA before radiographic changes appear. The updated 2019 ASAS MRI Working Group consensus defines sacroiliac joint MRI lesions in SpA as the unequivocal presence of bone marrow edema on STIR sequences or osteitis on post-gadolinium T1 images, localized to the subchondral or periarticular bone marrow and considered highly indicative of SpA (Maksymowych et al., 2019). Bone marrow edema extending more than 1 cm from the subchondral bone, occurring at multiple sites, and visible on at least two consecutive slices is strongly suggestive of axSpA. However, bone marrow edema alone is insufficient for a positive MRI and should be interpreted alongside structural lesions, such as fat metaplasia or erosions, to improve diagnostic specificity (Lambert et al., 2016). The diagnosis of axial spondyloarthritis should never rely solely on imaging findings. Instead, MRI results must be evaluated in the broader clinical context, including the presence of inflammatory back pain, extra-articular manifestations, and relevant laboratory findings.

4.2. Mechanical Back Pain

According to the American College of Radiology (ACR) Appropriateness Criteria, uncomplicated acute low back pain and/or radiculopathy is generally a benign, self-limiting condition that does not require imaging studies. Imaging is recommended only for patients who fail to show meaningful improvement after approximately six weeks of appropriate pharmacologic management and physical therapy. It is also indicated in individuals presenting with red-flag features that raise concern for serious underlying pathology, such as cauda equina syndrome, malignancy, vertebral fracture, or infection (Hutchins et al., 2021).

Plain radiography of the lumbar spine is primarily useful for evaluation fractures and other osseous abnormalities but generally offers limited diagnostic value due to its low sensitivity and specificity (CASAZZA, 2012). MRI provides superior visualization of neural and soft-tissue pathology. Evidence from a randomized controlled trial demonstrates that early, routine use of magnetic resonance imaging leads to an increased rate of lumbar spinal surgeries without corresponding improvements in pain outcomes or functional status (Jarvik et al., 2003; Will et al., 2018). Computed tomography (CT) serves as an alternative imaging modality when MRI is contraindicated or unavailable (Patel et al., 2016).

The key clinical features that help differentiate inflammatory and mechanical back pain are summarized in Table 3.

Table 3. Key clinical features distinguishing inflammatory back pain from mechanical back pain.

Feature	Inflammatory Back Pain	Mechanical Back Pain
Age of onset	<45	Any age
Onset	Insidious	Often acute
Exercise	Improves	Worsens
Rest	No improvement	Improvement
Night pain	Common	Rare
Inflammatory markers	Sometimes elevated	Normal

5. Treatment Implications Based on Diagnosis

Management of axSpA encompasses both non-pharmacological and pharmacological interventions. Given the inflammatory nature of axSpA, many current therapeutic strategies are aimed at reducing the inflammatory burden (Zimba et al., 2024).

Exercise is a core component of axSpA management, with evidence suggesting higher adherence to supervised programs (Ortolan et al., 2022). While exercise interventions can yield substantial benefits, overly intensive regimens may be detrimental, as mechanical overload can exacerbate inflammation and promote pathological bone formation at entheses and joints (Ansell et al., 2015). Modification of adverse lifestyle factors is also important. Adherence to a balanced diet and maintenance of a healthy body weight may help limit disease progression, whereas smoking and moderate alcohol consumption have been shown to negatively impact disease activity, function, progression and occurrence of comorbidities (Gwinnutt et al., 2023).

Nonsteroidal anti-inflammatory drugs (NSAIDs) remain the first-line pharmacological treatment for axSpA and should be used at the maximum tolerated dose, with clinical response typically assessed within two weeks (Ramiro et al., 2022; Regel et al., 2017). Approximately one-third of patients are nonresponsive or intolerant to NSAIDs, and evidence regarding their effect on radiographic progression remains inconclusive (Baraliakos et al., 2017; Proft et al., 2017; Sieper et al., 2016; Wanders et al., 2005). In patients with persistently

high disease activity despite adequate NSAID therapy, biologic or targeted synthetic DMARDs are recommended, including TNF inhibitors, IL-17 inhibitors, and JAK inhibitors (Ramiro et al., 2022). TNF inhibitors and IL-17 inhibitors are most commonly used as initial biologic therapies, with substantial evidence supporting their efficacy in reducing disease activity, improving function, and decreasing inflammatory lesions on MRI (Barkham et al., 2009; Deodhar et al., 2019; Shentu et al., 2024). Conventional synthetic DMARDs and long-term systemic glucocorticoids are not recommended for axial involvement, although short-term glucocorticoids or local injections may be considered in selected cases (Dhir et al., 2021; Ramiro et al., 2022; Zimba et al., 2024).

In contrast, management of mechanical back pain is primarily symptomatic and multidisciplinary (Will et al., 2018). NSAIDs may provide short-term relief, but their effectiveness is comparable to other analgesics and is limited in radicular pain, while paracetamol shows no clear benefit over placebo (Roelofs et al., 2008; Saragiotto et al., 2016). Exercise therapy and physical rehabilitation play a central role, with modest benefits in chronic pain and reduced healthcare utilization when initiated early (Hayden et al., 2005). Invasive procedures and surgery are reserved for selected cases, as evidence for long-term benefit remains limited (Chou et al., 2009).

6. Related Factors and Prognostic Outcomes of Diagnostic Delay in Ankylosing Spondylitis

In the cross-sectional study of 163 Iranian patients with ankylosing spondylitis (AS) diagnostic delay, defined as the interval between the onset of first symptoms and the correct diagnosis was 7.88±7.17 years on average (Fallahi & Jamshidi, 2015). In this study, diagnostic delay was longer in patients with enthesitis (8.80±7.27 years) compared to those without enthesitis (6.04±6.66 years; p=0.007). Similarly, HLA-B27 negative patients experienced longer delays (10.10±7.44 years) than HLA-B27 positive patients (7.14±6.96 years; p=0.013). Educational level was negatively correlated with diagnostic delay (p=0.002, r= -0.24). Diagnostic delay was also associated with a broad range of prognostic outcomes, including ankylosing spondylitis quality of life (ASQoL), Bath ankylosing spondylitis functional index (BASFI), Bath ankylosing spondylitis metrology index (BASMI), Bath ankylosing spondylitis disease activity index (BASDAI), chest expansion, cervical rotation, tragus to wall and finger to floor distances, modified Schober, intermalleolar distance, morning stiffness, and radiographic sacroiliitis grading. The strongest correlation was observed between diagnostic delay and BASMI, as measured by Cohen's method (r=0.41, p<0.001).

Similar results were reported in a study of 111 AS patients, in which not only HLA-B27 positivity but also the presence of inflammatory back pain at disease onset (with IBP 3.28 +/- 3.32 years, without IBP 8.57 +/- 8.54 years; p=0.001) and a positive family history (positive 4.60 +/- 4.44 years, negative 10.00 +/- 2.30 years; p=0,003) were associated with significantly shorter diagnostic delays (Dincer et al., 2008).

In another study of 70 AS patients in India, the primary cause of diagnostic delay was misclassification as non-specific back pain, followed by degenerative disc disease, rheumatoid arthritis, and spinal tuberculosis, resulting in prolonged inappropriate treatment. Furthermore, absence of extra-articular manifestations and younger age were also significantly associated with prolonged diagnostic delay (Aggarwal & Malaviya, 2009).

A cross-sectional study on 105 patients demonstrated that establishment of definite SpA diagnosis was associated with appropriate management and subsequent clinical improvement. In contrast, delayed diagnosis correlated with poorer prognostic outcomes, including higher disease activity, worse functional status, reduced spinal mobility, and greater radiographic damage. Patients with diagnostic delay also exhibited a less favorable treatment response, as reflected by higher Bath Ankylosing Spondylitis Disease Activity Index scores and increased rates of radiographic progression. Multivariate analysis identified a prior diagnosis of mechanical back pain as an independent predictor of diagnostic delay (Seo et al., 2015).

Several factors contribute to the persistent diagnostic delay observed in axial spondyloarthritis. One of the most important challenges is the high prevalence of non-specific mechanical back pain in the general population, which often leads clinicians to initially attribute symptoms to benign musculoskeletal conditions. In addition, early manifestations of axSpA may be subtle and easily overlooked, particularly in patients without clear extra-articular features or in those who are HLA-B27 negative. Limited awareness of inflammatory back pain characteristics among primary care physicians and non-rheumatology specialists also contributes to delayed referral to rheumatology services. Furthermore, restricted access to advanced imaging modalities such as MRI in some healthcare systems may prolong the diagnostic process. Improving physician education regarding inflammatory back pain features and establishing clear referral pathways may therefore represent important strategies for reducing diagnostic delay and improving long-term outcomes in patients with axial spondyloarthritis.

Overall, available evidence indicates that factors contributing to diagnostic delay vary across clinical settings and healthcare institutions, but such delays are consistently associated with worse clinical, functional, and radiographic outcomes in patients with SpA.

7. Conclusions

Differentiating inflammatory from mechanical back pain remains a critical challenge in everyday clinical practice. Axial spondyloarthritis frequently manifests as chronic back pain beginning before the age of 45, with insidious onset, prolonged morning stiffness, and improvement with exercise rather than rest—clinical features that may overlap with or be misinterpreted as mechanical back pain. Evidence consistently demonstrates that delayed diagnosis is associated with worse clinical, functional, and radiographic outcomes.

A structured diagnostic approach incorporating clinical features of inflammatory back pain, targeted laboratory testing, and appropriate imaging—particularly MRI of the sacroiliac joints—can substantially improve early recognition of axSpA. Increased awareness among primary care physicians and non-rheumatology specialists is essential to facilitate timely referral and initiation of effective therapy. Early and accurate diagnosis not only improves disease control but also has the potential to reduce long-term disability and improve quality of life in patients with axial spondyloarthritis.

Future efforts should focus on improving early identification of inflammatory back pain in patients presenting with chronic low back pain, particularly in primary care settings. Educational initiatives targeting general practitioners, orthopedic specialists, and physiotherapists may help increase awareness of the key clinical features suggestive of axial spondyloarthritis. The development of simple screening algorithms or referral strategies for patients with chronic back pain beginning before the age of 45 years may also facilitate earlier specialist evaluation.

Advances in imaging techniques and a growing understanding of the immunopathogenesis of axial spondyloarthritis have significantly improved diagnostic capabilities in recent years. Nevertheless, translating these advances into routine clinical practice remains an ongoing challenge. Future research should therefore focus not only on identifying novel biomarkers and imaging strategies but also on optimizing diagnostic pathways and healthcare system organization to minimize diagnostic delay.

Ultimately, reducing the time from symptom onset to diagnosis represents a key step in improving long-term outcomes for patients with axial spondyloarthritis. Earlier recognition of inflammatory back pain and timely initiation of appropriate therapy may help prevent irreversible structural damage, preserve functional capacity, and improve overall quality of life.

Conflicts of Interest: No conflicts of interest to declare.

REFERENCES

1. Meucci, R. D., Fassa, A. G., & Faria, N. M. X. (2015). Prevalence of chronic low back pain: Systematic review. *Revista de Saúde Pública, 49*, Article 1. https://pmc.ncbi.nlm.nih.gov/articles/PMC4603263/
2. Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., et al. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet, 396*(10258), 1204. https://pmc.ncbi.nlm.nih.gov/articles/PMC7567026/
3. Will, J. S., Bury, D. C., & Miller, J. A. (2018). Mechanical low back pain. *American Family Physician, 98*(7), 421–428. https://www.aafp.org/pubs/afp/issues/2018/1001/p421.html
4. Feldtkeller, E., Khan, M. A., van der Heijde, D., van der Linden, S., & Braun, J. (2003). Age at disease onset and diagnosis delay in HLA-B27 negative vs. positive patients with ankylosing spondylitis. *Rheumatology International, 23*(2), 61–66. https://pubmed.ncbi.nlm.nih.gov/12634937/
5. Fallahi, S., & Jamshidi, A. R. (2015). Diagnostic delay in ankylosing spondylitis: Related factors and prognostic outcomes. *Archives of Rheumatology, 31*(1), 24. https://pmc.ncbi.nlm.nih.gov/articles/PMC5827863/
6. Sieper, J., & Poddubnyy, D. (2017). Axial spondyloarthritis. *The Lancet, 390*(10089), 73–84. https://www.sciencedirect.com/science/article/abs/pii/S0140673616315914
7. Kabeer, A. S., Osmani, H. T., Patel, J., Robinson, P., & Ahmed, N. (2023). The adult with low back pain: Causes, diagnosis, imaging features and management. *Hospital Medicine, 36*(12). https://doi.org/10.12968/hmed.2023.0063
8. Deodhar, A., Strand, V., Kay, J., & Braun, J. (2016). The term "non-radiographic axial spondyloarthritis" is much more important to classify than to diagnose patients with axial spondyloarthritis. *Annals of the Rheumatic Diseases, 75*(5), 791–794. https://pubmed.ncbi.nlm.nih.gov/26768406/

9. Sieper, J., Rudwaleit, M., Baraliakos, X., Brandt, J., Braun, J., Burgos-Vargas, R., et al. (2009). The Assessment of SpondyloArthritis international Society (ASAS) handbook: A guide to assess spondyloarthritis. *Annals of the Rheumatic Diseases, 68*(Suppl. 2). https://pubmed.ncbi.nlm.nih.gov/19433414/
10. Wright, G. C., Kaine, J., & Deodhar, A. (2020). Understanding differences between men and women with axial spondyloarthritis. *Seminars in Arthritis and Rheumatism, 50*(4), 687–694. https://www.sciencedirect.com/science/article/pii/S0049017220301372?via%3Dihub
11. Tłustochowicz, M., Brzozowska, M., Wierzba, W., Raciborski, F., Kwiatkowska, B., Tłustochowicz, W., et al. (2019). Prevalence of axial spondyloarthritis in Poland. *Rheumatology International, 40*(2), 323–330. https://link.springer.com/article/10.1007/s00296-019-04482-7
12. Reveille, J. D. (2011). Epidemiology of spondyloarthritis in North America. *The American Journal of the Medical Sciences, 341*(4), 284–286. https://www.sciencedirect.com/science/article/abs/pii/S0002962915313197
13. van der Linden, S., Valkenburg, H. A., & Cats, A. (1984). Evaluation of diagnostic criteria for ankylosing spondylitis. *Arthritis & Rheumatism, 27*(4), 361–368. https://doi.org/10.1002/art.1780270401
14. Sieper, J., van der Heijde, D., Landewé, R., Brandt, J., Burgos-Vagas, R., Collantes-Estevez, E., et al. (2009). New criteria for inflammatory back pain in patients with chronic back pain: A real patient exercise by experts from the Assessment of SpondyloArthritis international Society (ASAS). *Annals of the Rheumatic Diseases, 68*(6), 784–788. https://ard.eular.org/action/showFullText?pii=S0003496724217416
15. van Gaalen, F. A., & Rudwaleit, M. (2023). Challenges in the diagnosis of axial spondyloarthritis. *Best Practice & Research Clinical Rheumatology, 37*(3), Article 101871. https://www.sciencedirect.com/science/article/pii/S1521694223000578?via%3Dihub
16. Ramiro, S., van Tubergen, A., Stolwijk, C., van der Heijde, D., Royston, P., Landewé, R., et al. (2015). Reference intervals of spinal mobility measures in normal individuals: The mobility study. *Annals of the Rheumatic Diseases, 74*(6), 1218–1224. https://www.sciencedirect.com/science/article/abs/pii/S0003496724027043
17. Patrick, N., Emanski, E., & Knaub, M. A. (2014). Acute and chronic low back pain. *Medical Clinics of North America, 98*(4), 777–789. https://www.sciencedirect.com/science/article/abs/pii/S0025712514000443
18. Downie, A., Williams, C. M., Henschke, N., Hancock, M. J., Ostelo, R. W. J. G., de Vet, H. C. W., et al. (2013). Red flags to screen for malignancy and fracture in patients with low back pain: Systematic review. *BMJ, 347*. https://www.bmj.com/content/347/bmj.f7095
19. Deyo, R. A., Rainville, J., & Kent, D. L. (1992). What can the history and physical examination tell us about low back pain? *JAMA, 268*(6), 760–765. https://jamanetwork.com/journals/jama/fullarticle/399079
20. Casazza, B. A. (2012). Diagnosis and treatment of acute low back pain. *American Family Physician, 85*(4), 343–350. https://www.aafp.org/pubs/afp/issues/2012/0215/p343.html
21. Boel, A., van Lunteren, M., López-Medina, C., Sieper, J., van der Heijde, D., & van Gaalen, F. A. (2022). Geographical prevalence of family history in patients with axial spondyloarthritis and its association with HLA-B27 in the ASAS-PerSpA study. *RMD Open, 8*(1), Article e002174. https://rmdopen.bmj.com/content/8/1/e002174
22. Rudwaleit, M., Haibel, H., Baraliakos, X., Listing, J., Märker-Hermann, E., Zeidler, H., et al. (2009). The early disease stage in axial spondylarthritis: Results from the German spondyloarthritis inception cohort. *Arthritis & Rheumatism, 60*(3), 717–727. https://doi.org/10.1002/art.24483
23. van Gaalen, F. A., Bakker, P. A. C., de Hooge, M., Schoones, J. W., & van der Heijde, D. (2014). Assessment of sacroiliitis by radiographs and MRI: Where are we now? *Current Opinion in Rheumatology, 26*(4), 384–388. https://pubmed.ncbi.nlm.nih.gov/24827751/
24. Maksymowych, W. P., Lambert, R. G. W., Østergaard, M., Pedersen, S. J., Machado, P. M., Weber, U., et al. (2019). MRI lesions in the sacroiliac joints of patients with spondyloarthritis: An update of definitions and validation by the ASAS MRI working group. *Annals of the Rheumatic Diseases, 78*(11), 1550–1558. https://pubmed.ncbi.nlm.nih.gov/31422357/
25. Lambert, R. G. W., Bakker, P. A. C., van der Heijde, D., Weber, U., Rudwaleit, M., Hermann, K. G. A., et al. (2016). Defining active sacroiliitis on MRI for classification of axial spondyloarthritis: Update by the ASAS MRI working group. *Annals of the Rheumatic Diseases, 75*(11), 1958–1963. https://pubmed.ncbi.nlm.nih.gov/26768408/
26. Hutchins, T. A., Peckham, M., Shah, L. M., Parsons, M. S., Agarwal, V., Boulter, D. J., et al. (2021). ACR Appropriateness Criteria® low back pain: 2021 update. *Journal of the American College of Radiology, 18*(11), S361–S379. https://pubmed.ncbi.nlm.nih.gov/34794594/
27. Jarvik, J. G., Hollingworth, W., Martin, B., Emerson, S. S., Gray, D. T., Overman, S., et al. (2003). Rapid magnetic resonance imaging vs radiographs for patients with low back pain: A randomized controlled trial. *JAMA, 289*(21), 2810–2818. https://pubmed.ncbi.nlm.nih.gov/12783911/
28. Patel, N. D., Broderick, D. F., Burns, J., Deshmukh, T. K., Fries, I. B., Harvey, H. B., et al. (2016). ACR Appropriateness Criteria low back pain. *Journal of the American College of Radiology, 13*(9), 1069–1078. https://pubmed.ncbi.nlm.nih.gov/27496288/
29. Zimba, O., Kocyigit, B. F., & Korkosz, M. (2024). Diagnosis, monitoring, and management of axial spondyloarthritis. *Rheumatology International, 44*(8), 1395. https://pmc.ncbi.nlm.nih.gov/articles/PMC11222196/

30. Ortolan, A., Webers, C., Sepriano, A., Falzon, L., Baraliakos, X., Landewé, R. B. M., et al. (2022). Efficacy and safety of non-pharmacological and non-biological interventions: A systematic literature review informing the 2022 update of the ASAS/EULAR recommendations for the management of axial spondyloarthritis. *Annals of the Rheumatic Diseases, 82*(1), 142–152. https://pubmed.ncbi.nlm.nih.gov/36261247/
31. Ansell, R. C., Shuto, T., Busquets-Perez, N., Hensor, E. M. A., Marzo-Ortega, H., & McGonagle, D. (2015). The role of biomechanical factors in ankylosing spondylitis: The patient's perspective. *Reumatismo, 67*(3), 91–96. https://pubmed.ncbi.nlm.nih.gov/26876187/
32. Gwinnutt, J. M., Wieczorek, M., Balanescu, A., Bischoff-Ferrari, H. A., Boonen, A., Cavalli, G., et al. (2023). 2021 EULAR recommendations regarding lifestyle behaviours and work participation to prevent progression of rheumatic and musculoskeletal diseases. *Annals of the Rheumatic Diseases, 82*(1), 48–56. https://ard.eular.org/action/showFullText?pii=S0003496724086229
33. Regel, A., Sepriano, A., Baraliakos, X., van der Heijde, D., Braun, J., Landewé, R., et al. (2017). Efficacy and safety of non-pharmacological and non-biological pharmacological treatment: A systematic literature review informing the 2016 update of the ASAS/EULAR recommendations for the management of axial spondyloarthritis. *RMD Open, 3*(1), Article e000397. https://pmc.ncbi.nlm.nih.gov/articles/PMC5278330/
34. Ramiro, S., Nikiphorou, E., Sepriano, A., Ortolan, A., Webers, C., Baraliakos, X., et al. (2022). ASAS-EULAR recommendations for the management of axial spondyloarthritis: 2022 update. *Annals of the Rheumatic Diseases, 82*(1), 19–34. https://pubmed.ncbi.nlm.nih.gov/36270658/
35. Baraliakos, X., Kiltz, U., Peters, S., Appel, H., Dybowski, F., Igelmann, M., et al. (2017). Efficiency of treatment with non-steroidal anti-inflammatory drugs according to current recommendations in patients with radiographic and non-radiographic axial spondyloarthritis. *Rheumatology, 56*(1), 95–102. https://pubmed.ncbi.nlm.nih.gov/27997346/
36. Sieper, J., Listing, J., Poddubnyy, D., Song, I. H., Hermann, K. G., Callhoff, J., et al. (2016). Effect of continuous versus on-demand treatment of ankylosing spondylitis with diclofenac over 2 years on radiographic progression of the spine: Results from a randomised multicentre trial (ENRADAS). *Annals of the Rheumatic Diseases, 75*(8), 1438–1443. https://pubmed.ncbi.nlm.nih.gov/26242443/
37. Wanders, A., van der Heijde, D., Landewé, R., Béhier, J. M., Calin, A., Olivieri, I., et al. (2005). Nonsteroidal antiinflammatory drugs reduce radiographic progression in patients with ankylosing spondylitis: A randomized clinical trial. *Arthritis & Rheumatism, 52*(6), 1756–1765. https://pubmed.ncbi.nlm.nih.gov/15934081/
38. Proft, F., Muche, B., Listing, J., Rios-Rodriguez, V., Sieper, J., & Poddubnyy, D. (2017). Study protocol: Comparison of the effect of treatment with nonsteroidal anti-inflammatory drugs added to anti-tumour necrosis factor α therapy versus anti-tumour necrosis factor α therapy alone on progression of structural damage in the spine over two years. *BMJ Open, 7*(6), Article e014591. https://pmc.ncbi.nlm.nih.gov/articles/PMC5623356/
39. Shentu, H., Sha, S., He, Y., He, M., Dong, N., Huang, Z., et al. (2024). Efficacy of TNF-α inhibitors in the treatment of nr-axSpA: A systematic review and meta-analysis based on randomized controlled trials. *International Archives of Allergy and Immunology, 185*(6), 590–599. https://pubmed.ncbi.nlm.nih.gov/38432201/
40. Barkham, N., Keen, H. I., Coates, L. C., O'Connor, P., Hensor, E., Fraser, A. D., et al. (2009). Clinical and imaging efficacy of infliximab in HLA-B27-positive patients with magnetic resonance imaging-determined early sacroiliitis. *Arthritis & Rheumatism, 60*(4), 946–954. https://pubmed.ncbi.nlm.nih.gov/19333933/
41. Deodhar, A., Poddubnyy, D., Pacheco-Tena, C., Salvarani, C., Lespessailles, E., Rahman, P., et al. (2019). Efficacy and safety of ixekizumab in the treatment of radiographic axial spondyloarthritis: Sixteen-week results from a phase III randomized, double-blind, placebo-controlled trial in patients with prior inadequate response to or intolerance of tumor necrosis factor inhibitors. *Arthritis & Rheumatology, 71*(4), 599–611. https://pmc.ncbi.nlm.nih.gov/articles/PMC6593790/
42. Dhir, V., Mishra, D., & Samanta, J. (2021). Glucocorticoids in spondyloarthritis—Systematic review and real-world analysis. *Rheumatology, 60*(10), 4463–4475. https://pubmed.ncbi.nlm.nih.gov/33748829/
43. Saragiotto, B. T., Machado, G. C., Ferreira, M. L., Pinheiro, M. B., Abdel Shaheed, C., & Maher, C. G. (2016). Paracetamol for low back pain. *Cochrane Database of Systematic Reviews, 2016*(6), Article CD012230. https://pubmed.ncbi.nlm.nih.gov/27271789/
44. Roelofs, P. D. D. M., Deyo, R. A., Koes, B. W., Scholten, R. J. P. M., & van Tulder, M. W. (2008). Non-steroidal anti-inflammatory drugs for low back pain. *Cochrane Database of Systematic Reviews, 2008*(1). https://pubmed.ncbi.nlm.nih.gov/18253976/
45. Hayden, J., van Tulder, M. W., Malmivaara, A., & Koes, B. W. (2005). Exercise therapy for treatment of non-specific low back pain. *Cochrane Database of Systematic Reviews, 2005*(3). https://pubmed.ncbi.nlm.nih.gov/16034851/
46. Chou, R., Loeser, J. D., Owens, D. K., Rosenquist, R. W., Atlas, S. J., Baisden, J., et al. (2009). Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: An evidence-based clinical practice guideline from the American Pain Society. *Spine, 34*(10), 1066–1077. https://pubmed.ncbi.nlm.nih.gov/19363457/

47. Dincer, U., Cakar, E., Kiralp, M. Z., & Dursun, H. (2008). Diagnosis delay in patients with ankylosing spondylitis: Possible reasons and proposals for new diagnostic criteria. *Clinical Rheumatology, 27*(4), 457–462. https://pubmed.ncbi.nlm.nih.gov/17899306/
48. Aggarwal, R., & Malaviya, A. N. (2009). Diagnosis delay in patients with ankylosing spondylitis: Factors and outcomes—An Indian perspective. *Clinical Rheumatology, 28*(3), 327–331. https://pubmed.ncbi.nlm.nih.gov/19052836/
49. Seo, M. R., Baek, H. L., Yoon, H. H., Ryu, H. J., Choi, H. J., Baek, H. J., et al. (2015). Delayed diagnosis is linked to worse outcomes and unfavourable treatment responses in patients with axial spondyloarthritis. *Clinical Rheumatology, 34*(8), 1397–1405. https://pubmed.ncbi.nlm.nih.gov/25185731/