

Exploring strategies to improve clinical decision making in a chiropractic office: a case series

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Background: *Clinicians make clinical decisions using the dual process theory. The dual process theory comprises two approaches, System 1, based on heuristics, and System 2, involving an analytical and effortful thought process. However, there are inherent limitations to the dual process theory, such as relying on inaccurate memory or misinterpreting cues leading to inappropriate clinical management. As a result, clinicians may utilize mental shortcuts, termed heuristics, and be susceptible to clinical errors and biases that may lead to flawed decision making and diagnosis.*

Methods: *This case series describes four clinical cases whereby the clinicians use distinct strategies to assess and manage complex clinical presentations.*

Explorer des stratégies pour améliorer la prise de décision clinique dans un bureau chiropratique: une série de cas
Contexte: *Les cliniciens prennent des décisions cliniques en utilisant la théorie du double processus. La théorie du double processus comprend deux approches, le premier système qui est basé sur l'heuristique, et le deuxième système qui implique un processus de réflexion analytique et exigeant. Cependant, il existe des limites inhérentes à la théorie du double processus, telles que le fait de s'appuyer sur une mémoire inexacte ou une mauvaise interprétation des indices conduisant à une gestion clinique inappropriée. Par conséquent, les médecins peuvent utiliser des raccourcis mentaux, appelés heuristiques, et être susceptibles de tenir compte d'erreurs et de biais cliniques qui peuvent conduire à une mauvaise décision et à un mauvais diagnostic.*

Méthodes: *Cette série de cas décrit quatre cas cliniques où les cliniciens utilisent des stratégies distinctes pour évaluer et gérer des présentations cliniques complexes.*

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Discussion: Through the use of self-reflection and acknowledging diagnostic uncertainty, the clinicians were able to reduce common cognitive biases and provide effective and timely patient care. We discuss strategies that clinicians can implement in their daily practice to improve clinical decision-making processes and deliver quality care.

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KEY WORDS: diagnosis, chiropractic, heuristics, clinical decision making, metacognition, bias

Introduction

In making clinical decisions, clinicians typically gather patient information, generate hypotheses about their diagnosis, test their hypotheses, and then reflect on their clinical encounter.^{1,2} Broadly, clinicians diagnose patients using the dual process theory that is comprised of two systems, System 1 and System 2. A System 1 approach is characterized by clinicians using a more automatic response that relies on heuristics and develops with greater clinical experience and repetition.^{1,3} Due to time constraints in practice, clinicians often prefer a System 1 approach. In contrast, System 2 takes on a more analytical approach, where the clinician uses slower and more effortful thought processes; one often used by those with limited clinical experience or knowledge of a condition.^{1,3,4}

However, the dual process theory has inherent limitations. System 1 is built on heuristics, and relies on a clinician's memory to recognize cues and patterns during the clinical encounter.² Unfortunately, improper decision making can occur when the clinician relies on inaccurate memory or misinterprets cues.² In contrast, System 2 is a more methodical approach using decision pathways or algorithms (e.g., decision trees) in the course of the encounter, that is assumed to improve diagnostic reasoning. Still, clinicians may generate hypotheses based on faulty decision trees, resulting in inaccurate clinical decisions being made.^{2,4} Therefore, despite the clinician's best effort to provide high quality clinical care, the utilization of inaccurate knowledge and data gathered using either system could lead to inappropriate clinical management.²

Discussion: Grâce à l'autoréflexion et à la reconnaissance de l'incertitude diagnostique, les cliniciens ont pu réduire les biais cognitifs courants et fournir des soins efficaces et opportuns aux patients. Nous discutons des stratégies que les cliniciens peuvent mettre en œuvre dans leur pratique quotidienne pour améliorer les processus de prise de décision clinique et fournir des soins de qualité.

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MOTS CLÉS : diagnostic, chiropratique, heuristique, prise de décision clinique, métacognition, biais

Specifically, when utilizing a System 1 approach, the risk of working on 'autopilot' and relying on mental shortcuts, termed heuristics, may occur. Heuristics are often linked to clinician errors and biases.¹ Three basic types of errors include skill-based errors, knowledge-based errors, and rule-based errors.¹ Skill-based errors occur when clinicians follow an habitual course of action, knowledge-based errors occur when clinicians lack necessary information, whereas rule-based errors occur when a clinician misapplies a clinical rule.¹ Despite differences, these errors are interconnected and can result from cognitive biases. An example of a cognitive bias is 'order effect', which occurs when the clinician pays more attention to information presented at the beginning and end of a patient's story but the middle portion is lost.^{1,3} Other biases include the 'availability heuristic' that judges a patient's presentation based on the likelihood of the condition coming to the clinician's mind, 'anchoring bias' that results from the clinician fixating on certain features too early in the patient interaction resulting in difficulty changing the course of their clinical reasoning, and finally, 'confirmation bias', when one is looking for evidence to support their clinical thoughts, thereby potentially failing to identify co-pathology.^{1,3} Unless these unconscious cognitive biases are brought to the forefront, clinicians may continue to utilize flawed decision making processes, resulting in inappropriate patient care.⁵

Furthermore, as a result of errors and biases, a delay in diagnosis or misdiagnosis/diagnostic error may occur. Caputo *et al.* identified characteristics in primary health

care contact providers that could lead to a delay in diagnosis of neurological conditions.⁶ They identified that a delay in diagnosis may occur with clinicians who are less experienced with the pathology of conditions they see infrequently.⁶ Thus, because a clinician may be unaware of particular condition(s), they may not consider them in their differential diagnoses. For example, chiropractors are considered experts in musculoskeletal health, and if clinical encounters are only viewed through this lens, they run the risk of falling into the trap of “*what you see is all there is*”, becoming potentially vulnerable to faulty decision making and inappropriate clinical care.⁷ To help mitigate against this, it is important to implement distinct strategies such as self-reflection during and after the clinical encounter in an effort to reduce the susceptibility to various heuristics and cognitive biases. Therefore, the objective of this case series is to outline a number of cases where chiropractors implemented distinct strategies in order to reduce common cognitive biases and improve patient management as a result.

Ethics

Ethics approval was received from the Research Ethics Board at the Canadian Memorial Chiropractic College (#2202X01). Patient consent was obtained as available.

Case presentations

Case 1

The first case involves a 55-year-old female who fell while walking down a ramp, fracturing her left ankle in May 2018. She presented to an urgent care centre the following day due to severe ankle pain, swelling and inability to weight bear. An x-ray was taken which demonstrated an undisplaced fracture through the fifth metatarsal base, with extension to the adjacent intra-articular space. Prior to the incident, the patient was relatively healthy and exercised five days per week for 30 minutes each day. She was not taking any medications. Her past medical history was unremarkable other than being diagnosed with osteopenia earlier that year.

Following her assessment at urgent care, she was placed in a walking boot and was re-evaluated two weeks later. Upon re-evaluation, a new x-ray demonstrated widening of the fracture site and she was subsequently placed in a hard cast for four weeks. At her four-week follow-up the patient still complained of sharp pain, but

repeat x-rays demonstrated a less visible fracture line at the base of the fifth metatarsal, suggestive of interval healing. She was subsequently placed in a walking boot and told to limit her weight bearing. She was re-evaluated four weeks later, but continued to experience sharp pain at the fracture site with significant swelling of her foot and limited ability to weight bear. Upon examination by the attending physician, the patient was diagnosed with Complex Regional Pain Syndrome (CRPS). The diagnosis was made based on the patient being immobilized in a walking boot and hard cast for a prolonged period, significant pain and swelling still present at the fracture site, and some red discoloration noted when observing the area.

After being diagnosed with CRPS, the patient was assessed by a chiropractor. The examination demonstrated swelling of the left foot with severe pain upon palpation at the base of the fourth and fifth metatarsal bases and calcaneal tuberosity, in addition to decreased calcaneal fat pad thickness. There was no left foot somatosensory hyperesthesia, limb sweating, abnormal hair growth, dystonia, or dystrophy. In addition, there was no dorsal left foot temperature asymmetry when measured with a surface temperature thermometer. There was mild decreased ankle range of motion and pain-related weakness during active and resisted ankle eversion. Further examination did not reveal any nerve tension signs. Following the examination, the chiropractor suspected that the patient was not suffering from CRPS. In consultation with a physiatrist, the patient was referred for a three-phase bone scan which showed mild activity in the lateral aspect of the left midfoot/forefoot suggesting healing fractures involving the fourth and fifth metatarsal heads. In addition, the patient had an MRI which showed a healing nondisplaced fracture at the base of the fifth metatarsal with associated subcutaneous edema and flexor hallucis tenosynovitis with associated muscle edema. Following the chiropractor's examination and imaging results, the patient was diagnosed with healing fractures of the fourth and fifth metatarsal bases and plantar calcaneal fat pad atrophy. Over the course of the next two months, the patient was provided with appropriate care, consisting of manual therapy to improve ankle range of motion, graded exposure and ankle/foot exercises to improve weightbearing tolerance and healing. Manual therapy included soft tissue therapy (i.e. muscle release technique) to the surrounding ankle musculature and mobilization

of the left ankle mortise and fibular head to increase ankle range of motion. The patient was provided with exercises to increase ankle range of motion, as well as improve strength of her lower limb musculature and intrinsic foot muscles. In addition, as a result of significant pain when weight bearing, the patient was provided with graded exposure exercises. The patient was instructed to fold a blanket enough times to create adequate padding in order to walk 10 steps barefoot within her tolerance for pain. Once she was able to complete this she was advised to reduce the thickness of the blanket while walking 10 steps. Over time, she was able to walk barefoot on the floor. Following her treatment, the patient returned to her pre-injury physical activity levels including walking, biking and resistance training with no re-occurrence of symptoms.

This case demonstrates the potential limitation of the dual process theory. The patient's physician diagnosed her with CRPS without careful consideration of the CRPS diagnostic criteria. As a result, the clinician experienced various biases such as 'availability heuristics', 'confirmation bias' or 'base-rate neglect'.⁸ The clinician assumedly

used a System 1 approach based on the clinical presentation and risk factors for the development of CRPS. For instance, limb immobilization, female, and middle-aged adults are all risk factors for the development of CRPS.⁹⁻¹² However, when the patient was assessed by the chiropractor, the chiropractor presumably used a System 2 approach, requiring a careful assessment of her signs and symptoms to arrive at the appropriate diagnosis. The chiropractor compared the patient's symptoms to the Budapest criteria (Table 1), which is the current best practice for the diagnosis of CRPS.¹³ Although the patient had some features of CRPS, her main presenting signs and symptoms did not fit all four criteria required for a diagnosis of CRPS. Specifically, the patient only exhibited swelling and discoloration which is a vasomotor sign/symptom, but did not experience any sensory, sudomotor or motor signs/symptoms. Additionally, the patient did not satisfy criterion 4 of the Budapest criteria as the diagnosis made by the chiropractor better accounted for their symptoms. This case highlights the importance of conducting a complete assessment, as well as not prematurely jumping to conclusions.

Table 1.
*Budapest clinical criteria for diagnosing Complex Regional Pain Syndrome.*¹²

1. Continuing pain that is disproportionate to any inciting event
2. Must report at least one symptom in three of the four categories: a) Sensory: hyperesthesia and/or allodynia b) Vasomotor: temperature asymmetry and/or skin color changes and/or skin color asymmetry c) Sudomotor/edema: reports of edema or sweating changes and/or sweating asymmetry d) Motor/trophic: decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail, skin)
3. Must display at least one sign in two or more of the following categories: a) Sensory: hyperalgesia to pinprick, allodynia to light touch and/or deep somatic pressure and/or joint movement b) Vasomotor: evidence of temperature asymmetry and/or skin color changes and/or asymmetry c) Sudomotor/edema: evidence of edema and/or sweating changes and/or sweating asymmetry d) Motor/trophic: evidence of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and/or trophic changes (hair, nail, skin)
4. No other diagnosis that better explains the signs and symptoms

Case 2

The second case is a 56-year-old male who was previously seen by a chiropractor for chronic back pain, which responded well to conservative care and self-management strategies including a regular exercise routine. In the winter of 2019, he visited his chiropractor after experiencing sharp pains in his left hip and a deep ache in his right shoulder. He attributed his left hip pain due to cold weather, as well as traveling by plane for a work trip. Following the examination, the chiropractor suggested that the pains were of a musculoskeletal origin, namely that the patient was experiencing symptoms related to a strain to the left hip with underlying osteoarthritic changes, as well as a strain to the right shoulder likely related to work postures and his recent travel. The patient began receiving conservative care to his lumbar spine, left hip and shoulder inclusive of spinal manipulation to the lumbar spine, mobilizations to the left hip and shoulder, and soft tissue therapy to the surrounding musculature. The patient was provided a home-based exercise program to improve their ranges of motion and to strengthen the core and pelvic musculature. The patient reported good relief of his lower back pains, but only short-term relief of his hip pain, which was described as a persistent low-grade ache, deep into the joint. His right shoulder pain did not improve significantly following conservative therapy described above. Upon reevaluation, the chiropractor reflected on the presentation and lack of improvement. The chiropractor suspected the patient's pains were related to the presence of an underlying systemic disease. As a result, the chiropractor referred the patient to the family doctor suggesting further diagnostic investigations to be performed.

The patient received diagnostic tests including radiographs, ultrasound and blood tests. Radiographs of his hips revealed early degenerative joint disease in both hips, radiographs of his lumbar spine revealed moderate multi-level degenerative changes with normal sacroiliac joints, and those of his shoulder demonstrated degenerative joint disease of his acromioclavicular joint with no soft tissue calcifications. An ultrasound of his shoulder showed mild bilateral supraspinatus tendinosis with acromioclavicular joint degenerative joint disease and no rotator cuff tears. Serology testing was negative for Antinuclear Antibody (ANA), Rheumatoid Factor (RF) was <10 U/ml and his Erythrocyte Sedimentation Rate (ESR) was elevated at 34 mm/hr. He was subsequently diagnosed with an

inflammatory arthritide, was prescribed methotrexate by his rheumatologist and reported improved treatment outcomes.

This case highlights a common challenge in clinical practice, where there is diagnostic uncertainty in a patient's presentation. In this case, the chiropractor had previously treated this patient's low back pain successfully; however, when the patient developed new areas of pain that were not responding to care, the chiropractor took a step back to re-assess the patient. After reflecting on the clinical presentation and expected recovery of the working diagnoses, the chiropractor initiated a diagnostic pathway of investigations for the possibility of a systemic condition, specifically inflammatory arthritis. Although the chiropractor did not specifically identify the patient's underlying clinical condition, they methodically assessed the patient using a System 2 approach thereby determining the need for further testing. Inflammatory arthritis typically has a long diagnostic delay but the clinician's approach ensured the patient received appropriate and timely assessment and management.¹⁴

Case 3

The third case is a 65-year-old male who presented to their family doctor with acute low back pain rated 9/10 which he developed after painting his staircase at home. Upon examination, their family doctor diagnosed the condition as a muscle strain and prescribed Tramadol. Three weeks after the onset of pain the patient was not improving, and elected to see a chiropractor for an assessment. The patient reported that since the onset, the pain was manageable when using the medication but there was no significant improvement in the patient's pain levels overall. He described that transitioning from sitting to standing was especially difficult and medication was required to control his pain at night. In addition, the patient mentioned he was in relatively good health with no comorbidities. Lumbar spine radiographs ordered by his family doctor showed mild lower lumbar degenerative disc disease and facet arthrosis. Upon examination by the chiropractor lumbar spine range of motion was relatively normal, there were no nerve root tension signs nor neurological deficits noted. There was mild paraspinal muscle tenderness and segmental dysfunction noted at the lumbosacral junction.

Several aspects of the patient's clinical presentation suggested both mechanical and non-mechanical sources

of their pain. For instance, the mechanism of injury, paraspinal muscle tenderness and segmental dysfunction at the lumbosacral junction could explain the mechanical source of pain. However, a non-mechanical source of pain should be considered given the patient's age, 65 years old, this being their first episode of acute low back pain, severe nocturnal pain, absence of any sustained improvement over a three-week period, and the inability to completely reproduce their pain. As a result of these findings, the patient was referred to a nearby hospital emergency department for further investigation. At the emergency department, a CT scan of the lumbar spine suggested probable prostate cancer metastasis of the L5 vertebral body. The patient was transferred to oncology for immediate urgent care.

This case presented many challenges to the chiropractor who could have easily misdiagnosed the patient if they had not conducted their own examination and carefully evaluated the facts, rather than relying upon the diagnosis of another healthcare provider. For example, the chiropractor could have been susceptible to "anchoring bias" based on the mechanism of injury, a report of a normal lumbar spine x-ray and previous advice by other health care providers. A quick System 1 approach may have resulted in treating this patient conservatively for a period of time which would have resulted in delaying urgent medical care. However, after conducting a comprehensive examination, the chiropractor used clinical judgment to suspect a non-mechanical source of pain, as well as recognizing that musculoskeletal related symptoms and examination findings can co-exist with pathology, thereby ensuring this patient received appropriate care in a timely manner.

Case 4

The fourth case is a 62-year-old retired man who presented with right buttock pain and an associated pulling sensation around the right lateral ankle. The patient reported that this pain gradually began two months prior which he attributed to a period of increased physical activity consisting of playing ice hockey and tennis. There was no preceding trauma that occurred. His average pain intensity was 6/10 but would increase to 8/10 at its worst. His pain significantly limited his daily activities, and he was unable to return to sports. The Keele STarT Back screening tool suggested a moderate to severe risk for chronicity, with significant pain catastrophizing.

When the patient developed this pain, he saw his family doctor who suspected his symptoms were caused by a lumbar disc herniation and ordered a lumbar spine MRI. The MRI showed severe degenerative disc disease at the L1-2 and L2-3 levels with Modic type 1 change, and central stenosis noted at the L2-3 level with facet degenerative joint disease at multiples levels. In addition, there was a suspected entrapment of both the L2 and L3 nerve roots, bilaterally. Following the MRI results, the patient was referred to physiotherapy where he was prescribed McKenzie lumbar extension exercises, which did not provide any significant relief. In addition, he had four sessions of chiropractic care using lumbar flexion-distraction mobilization but once again did not experience significant relief.

As a consequence of feeling no significant relief, the patient consulted another chiropractor. On examination, the chiropractor reported that the patient's lumbar range of motion was limited by 25% in lumbar extension and right lateral bending, straight leg raise was 90 degrees bilaterally without any nerve root tension signs and femoral nerve stretch was negative bilaterally. In addition, sacroiliac joint testing was negative. Palpation over the greater trochanter and gluteus medius muscle was painful and reproduced the chief complaint. The patient's chief complaint was diagnosed as gluteus medius tendinosis that slowly responded to soft tissue therapy (i.e. muscle release technique) combined with a graded exercise program. In addition, the patient required considerable reassurance due to his pain catastrophizing behaviour and kinesiophobia. Specifically, the chiropractor had to consistently reassure the patient of the course of recovery and aetiology of their symptoms.

This case highlights a common scenario encountered in clinical practice whereby a patient has positive imaging findings that do not correlate with the clinical presentation.¹⁵ The imaging findings for this patient suggested a high lumbar spinal nerve irritation contributing to the patient's symptoms; however, the clinical examination did not corroborate the suggested nerve root entrapment as causing this patient's pain nor symptoms. The second chiropractor could have been susceptible to cognitive biases, such as "availability heuristic", "confirmation bias" or "search satisfying" based on previous assessments conducted by the other providers, as well as the imaging findings.⁸ However, they instead relied on the

use of a methodical assessment approach and was able to correctly diagnose this patient, providing appropriate care targeted at the correct structures.

Discussion

The case scenarios presented herein illustrate that the clinicians used distinct strategies to assess and manage complex clinical situations. Each case highlights that clinical decision making involves the application of various information sources to develop a logical and purposeful clinical plan of management.¹⁶ In the context of evidence-based practice, these information sources can consist of clinical experience and research evidence. Research suggests that clinicians with more experience can develop management plans with greater certainty due to their ability to recognize diagnostic patterns.^{16,17} However, diagnostic uncertainty is inherent in all clinical decisions irrespective of clinician experience.

Although there is no widespread accepted definition of diagnostic uncertainty, a proposed definition is the “subjective perception of an inability to provide an accurate explanation of the patient’s health problem”.¹⁸ In clinical practice, strategies can be utilized to further understand, manage and cope with diagnostic uncertainty. For example, Santhosh *et al.* suggests contrasting the related knowledge about diagnostic accuracy and certainty when arriving at a diagnosis (See Table 2).¹⁹ By comparing and contrasting what is known, clinicians can determine if their diagnosis is a “slam dunk”, “cautiously optimistic”, “diagnostic hubris”, or a “diagnostic mystery”.¹⁹ This 2x2 table could help clinicians identify and subsequently reduce their knowledge gaps. As well, this approach can improve communication with patients by acknowledging uncertainty that is present, responding to patient’s concerns, and clearly conveying next steps.¹⁹ For instance, the chiropractor in case number 3 would have fit into the category of ‘accurate and uncertain’ as he had a suspicion of a non-MSK diagnosis but was uncertain as to the exact diagnosis. This line of thinking facilitated patient referral with eventual receipt of appropriate and timely medical care. Using this proposed model allows the clinician to reflect on the case and presenting features, considering their level of uncertainty. The clinician can formulate an evolving hypothesis rather than a static one, allowing for the opportunity to change their clinical management as new information comes to light.

Table 2.

Adapted from the proposed model by Santhosh et al.¹⁹ comparing diagnostic uncertainty to diagnostic accuracy.

	Certain	Uncertain
Accurate	“Slam dunk”	“Cautiously optimistic”
Inaccurate	“Diagnostic hubris”	“Diagnostic mystery”

It is important that clinicians self-reflect on clinical encounters to identify what has gone well and what could be improved in order to analyze and alter clinical decision making processes.^{20,21} Reflection can take place at many stages such as during the patient encounter, which helps inform hypothesis generation; after a patient interaction, which helps clinicians learn and improve their clinical decision making moving forward; and on professional experience, which assists in understanding their way of thinking about clinical decision making.²¹ This process of reflection is critical in order for a clinician to self-assess, learn from past experiences and further their clinical expertise. Literature suggests that similar to experienced clinicians, novice clinicians also reflect on their clinical encounters following an interaction, albeit to a lesser degree.²¹ Unlike the novice clinicians, experienced clinicians engage in greater reflection and on-going self-assessment during the encounter.²¹ Developing reflection skills during and after a clinical encounter is important to positively impact patient outcomes, as well as self-assessment and professional growth.²¹

In addition, the act of reflection is important in reducing heuristics and cognitive errors. Graber *et al.* identified that cognitive errors contributed to 74% of cases assessed involving diagnostic error.²² For instance, when placed in familiar environments and seeing a similar patient presentation multiple times during a day in clinical practice, clinicians may be prone to being overconfident. This overconfidence could lead to inappropriate patient care as clinicians may prematurely come to a diagnosis, termed ‘premature closure bias’, or be susceptible to other biases such as ‘anchoring bias’ and ‘confirmation bias’.²³ However, reflective practice strategies can assist in reducing susceptibility to these biases.²⁴ For example, using a checklist during a patient encounter (either mentally or on paper) can provide clinicians with a diagnostic “time out”, allowing one to consider other possibilities and re-

duce the chance of applying these various biases.²⁴ This would also allow clinicians to actively reflect on each case rather than work on autopilot. Furthermore, reflection will assist clinicians in analyzing patient symptoms in their entirety while reducing the chance of overlooking important clinical details in order to determine an appropriate diagnosis and plan of management.

Reflective practice can be challenging to teach to students and novice clinicians. As a result, students and novice clinicians typically encounter greater challenges when faced with diagnostic uncertainty and are unsure how to proceed. Therefore, it is important that educators and experienced clinicians discuss its inherent nature in clinical practice.^{18,25} Students and new graduates should be provided with strategies to cope with diagnostic uncertainty. For example, within a teaching environment educators can walk through cases with trainees, thinking aloud their cognitive and clinical reasoning.²¹ This would provide trainees with a unique look at how an experienced clinician critically thinks about clinical decision making.^{7, 23} These exercises can assist trainees by brainstorming as a group what next steps would be suitable in order to understand how to approach patients when there is no clear diagnosis. Ensuring new learners understand and consider diagnostic uncertainty as a normal part of clinical practice can help reduce negative internal feelings such as anxiety, feeling overwhelmed and self-doubt.²⁶

Summary

This case series described four cases that required the treating chiropractor to apply specific strategies in order to reduce common cognitive biases and avoid inappropriate care. In applying these strategies, the chiropractor in each case was able to provide effective and timely patient care. Cognitive biases and diagnostic uncertainty are an inherent part of patient management that could be effectively addressed by using tools such as reflection and systematic diagnostic approaches. For learners, novice and experienced clinicians, accepting the significance of and implementing strategies to cope with diagnostic uncertainty is important for continuous professional development and optimizing patient outcomes. Future research should focus on assessing if the implementation of strategies discussed herein can result in improved patient care and outcomes.

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