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Advancing the Chiropractic explanation of subluxation: An evidence-informed dynamic model for adjustment, manipulation and accountable care

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Narrative: Chiropractic has long used subluxation and adjustment language to describe clinically recognised relationships among spinal function, manual intervention, neural responsiveness and human adaptation. The difficulty is not simply whether subluxation exists as a discrete entity, but whether the term can be used in a way that is observable, testable, clinically accountable and understandable both within and beyond the profession. This paper proposes a contemporary, evidence-informed definition of subluxation based on present knowledge, while recognising that the definition may evolve as future research clarifies the contribution of adjustment, active care, lifestyle-informed advice and other elements of the chiropractic encounter.

The aim is to offer a definition that is acceptable across Chiropractic's diverse clinical, philosophical and technique traditions, and also credible to patients, other health professionals, educators, researchers, regulators and the wider public. In this model, subluxation is reframed as a dynamic, context-dependent functional state involving altered movement, mechanical sensitivity, pain modulation, sensorimotor interpretation, recovery state and adaptive capacity. This approach allows Chiropractic to retain its distinctive identity and clinical language while reducing unhelpful internal division and improving communication at healthcare frontiers where shared understanding, trust and accountability are required.

The model avoids over-reliance on fixed-lesion correction or general health-restoration assumptions, while leaving conceptual room for future research to extend or refine the construct. The paper also examines the relationship between chiropractic adjustment and spinal manipulation. It argues that Chiropractic adjustment may be understood as a profession-specific, clinically targeted and potentially refined form of spinal manipulative or mechanical-sensory intervention. Rather than treating adjustment and manipulation as either identical or completely separate, the paper proposes a claim-level approach in which terminology, clinical intent, assessment, force characteristics, dose, mechanisms, outcomes and safety are described with greater precision. Current evidence supports modest benefits of spinal manipulative therapy for some spinal pain presentations and plausible short-term mechanical, neurophysiological and contextual effects.

A contemporary adjustment model can build on this evidence while encouraging more specific research into Chiropractic procedures, reasoning, active-care integration, lifestyle-informed practice and patient-centred outcomes. The proposed framework supports precise documentation, functional re-testing, careful patient communication and professional accountability.

Indexing terms: Chiropractic; subluxation; Chiropractic adjustment; spinal manipulation; spinal manipulative therapy; manual therapy; evidence-based practice; mechanotransduction; proprioception; pain science; sensorimotor integration; adaptive capacity; clinical reasoning..

Introduction

Chiropractic occupies a distinctive position at the interface of spinal function, skilled manual contact, neuromusculoskeletal care and professional identity. Its enduring clinical intuition is that mechanical input to the spine and related tissues can matter for pain, movement and function. That intuition remains clinically important because low back pain is a major global health problem and is commonly influenced by biological, psychological, social and health-system factors. (1) Contemporary guideline syntheses for musculoskeletal pain recommend patient-centred assessment, education, reassurance, activity advice, self-management support and selective use of physical and manual therapies. (2) Isolated structural correction is therefore insufficient as a complete explanation or care model for most common spinal pain presentations. (2)

> *... The evidentiary issue becomes sharper when adjustment is defined only by its proposed target. If adjustment is said to differ from manipulation because it corrects subluxation, and subluxation is then inferred from response to adjustment, the reasoning risks becoming circular...'*

This paper does not ask Chiropractic to abandon subluxation language. It asks whether the concept can be modernised so that its useful clinical features are retained while its explanatory basis is updated. This requirement is not new. A range of Chiropractic scholars have argued, in different ways, that subluxation should be approached as a testable theoretical or clinical construct rather than as a settled clinical fact. Keating and colleagues characterised subluxation syndrome as a potentially testable construct with limited experimental support, while Mirtz and colleagues found insufficient epidemiological evidence to establish subluxation as a causal factor in health and disease when assessed against Hill's criteria. (3, 4) These critiques do not invalidate Chiropractic care, they instead point to the need for Chiropractic language to become more observable, operationalised and accountable to clinical testing.

Historically, subluxation was attached to stronger causal claims than contemporary evidence can support. Palmer's early writing placed adjustment within a theory of nerve interference and disease causation. (5) Stephenson's text similarly embedded Chiropractic in a metaphysical and vitalistic account of intelligence, interference and correction. (6) A modernised subluxation construct should not depend on those claims. It should describe an observable or re-testable clinical state involving movement, sensitivity, sensorimotor response, pain modulation, recovery and adaptive capacity.

This functional reframing also clarifies a second professional problem: the relation between Chiropractic adjustment and spinal manipulation. It is reasonable to say that a Chiropractic adjustment may differ from generic spinal manipulation in professional intent, segmental targeting, contact, setup, force-time profile, explanatory context and clinical ritual. (7, 8) However, terminology alone does not show that evidence on spinal manipulation is irrelevant to adjustment. A categorical distinction would require evidence that adjustment has different assessment reliability, mechanisms, clinical effects, dose-response behaviour, safety profile or external validity.

A contemporary definition of subluxation also has to do more than satisfy one subgroup within Chiropractic. It should be recognisable across Chiropractic's diverse clinical, philosophical and technique traditions, while also being intelligible to patients, other health professionals, researchers, educators, regulators and the wider public. The longstanding tribal debate around subluxation and adjustment has constrained Chiropractic's ability to communicate its contribution clearly, build trust beyond the profession, and participate fully in important healthcare frontiers. It has also allowed critics to use the profession's least precise or most contested language as a proxy for chiropractic as a whole. (3, 4, 47) A more useful definition should therefore allow Chiropractic to retain distinctive clinical language while making that language more accessible, accountable and shareable in multidisciplinary settings.

Subluxation as a heuristic requiring modern explanatory power

A moderated subluxation framework begins by treating subluxation as a Chiropractic heuristic: a practical way of organising clinical observations about spinal function, patient response and care. This use can be clinically useful when it prompts careful assessment and re-testing. It becomes scientifically risky when the label is treated as a hidden lesion, when a diagnostic category is converted into a causal conclusion, or when an immediate response to care is used as proof that the original construct was correct. Keating and colleagues explicitly warned against presenting subluxation dogmatically rather than as a plausible and testable proposition. (3)

Historical scholarship also shows that subluxation has not been a single stable object. Senzon described changes in vertebral subluxation concepts across chiropractic periods and technique systems. (9) Senzon's later historical work showed that models and techniques from 1962 to 1980 varied substantially in their assumptions and clinical emphases. (10) This historical variability weakens any claim that subluxation is one consistently defined biological entity. It also supports the more moderate view that the term has functioned as an organising label for a family of clinical observations.

The clinical task is therefore to specify the observation before naming it. When a Chiropractor says subluxation, the clinically relevant finding may be painful segmental movement, altered mechanical sensitivity, guarding, reduced movement confidence, impaired load tolerance, recurrent symptom response, poor recovery state or reduced adaptive reserve. Those features are more defensible because they can be observed, re-tested or linked to patient-centred outcomes. An undefined correction claim is less defensible because it is difficult to falsify and may be protected by professional language rather than evidence. (3, 4)

Force as biological and sensorimotor information

Biomechanics remains essential because it describes force distribution, tissue strain, joint motion, stiffness, load tolerance and movement efficiency. A narrow biomechanical account becomes inadequate when spinal findings are reduced to posture, alignment or segmental position alone. Living tissues respond to mechanical environments through cellular signalling,

extracellular matrix behaviour and tissue adaptation. (11) Mechanical cues such as pressure, tensile strain, shear stress, matrix stiffness and tissue elasticity can be converted into biochemical signals through mechanotransduction. (12) These mechanisms do not prove a traditional Chiropractic subluxation lesion. They support the narrower claim that mechanical input can have biologically relevant effects.

Proprioception provides a second basis for modernising subluxation language. Muscle spindles, Golgi tendon organs, joint receptors and cutaneous receptors contribute information about length, tension, joint position, movement and force. (13) This information supports postural regulation, motor control and the ongoing estimation of body state. (13) Sensorimotor learning provides a third basis because movement depends on prediction, sensory feedback, error correction and adaptation. (14) A spinal input can therefore be clinically relevant without being explained as permanent vertebral repositioning.

This distinction is critical. The adjustment can be understood as a skilled mechanical-sensory input delivered into a person whose pain, expectation, movement history, fatigue, confidence and recovery state influence the response. That claim is compatible with contemporary mechanism models of manual therapy. (15, 16) It is more restrained than claiming that the adjustment proves correction of a fixed subluxation object.

Pain, prediction and adaptive capacity

Pain science gives Chiropractic a modern way to explain why similar mechanical findings may have different meanings in different people. The Lancet low back pain series described low back pain as a complex condition shaped by biological, psychological, social and health-system influences rather than by simple structural pathology in most cases. (1) Foster and colleagues emphasised that prevention and treatment should address evidence, implementation and health-system challenges rather than rely on narrow biomedical explanations. (17) Hodges and Tucker proposed that pain changes motor behaviour across multiple levels of the motor system, often producing protective adaptations that may also alter coordination and loading. (18) Hodges and Smeets later argued that movement deficits in pain should be conceptualised through interactions among sensory-perceptual, cognitive, psychological and motor processes. (19)

Expectation and threat also matter. Bishop and colleagues found that patient expectations of benefit influenced outcomes after interventions for neck pain. (20) Fear-avoidance theory explains how pain-related fear may contribute to avoidance and disability in some patients. (21) These findings make communication part of the therapeutic context. They also caution against fragile-spine explanations that may increase threat or dependency.

In this framework, a subluxation state may include altered tolerance of force as well as altered movement. A patient may present with painful spinal motion, guarded loading, reduced confidence, recurrent flares after ordinary tasks or difficulty recovering after exposure. These observations can be expressed in Chiropractic language while being explained through pain modulation, sensorimotor interpretation and adaptive capacity rather than fixed-lesion correction.

In this paper, adaptive capacity refers to the patient's observable tolerance to ordinary mechanical, sensory, behavioural and recovery demands. Clinically, it may be inferred from load tolerance, flare behaviour, movement confidence, recovery time, symptom variability and the ability to resume valued activities. It is not proposed as a hidden entity or a new diagnostic lesion, but as a practical descriptor of how well the person is currently able to respond to normal demands.

Adjustment and manipulation: related concepts requiring clearer description

Spinal manipulation is commonly used in research as an umbrella term for manual procedures that apply a therapeutic force to spinal joints or related tissues, often including high-velocity, low-amplitude thrusts. (8) Chiropractic adjustment is commonly used within Chiropractic to describe a clinician-selected mechanical input directed to a perceived spinal dysfunction, subluxation or functional state. (7) The two terms are therefore closely related, but not identical in professional meaning. Rather than treating them as either interchangeable or wholly separate, a more productive approach is to describe their overlap and then specify where a Chiropractic adjustment may involve distinctive clinical reasoning, target selection, contact, setup, force characteristics, therapeutic intent and post-intervention re-testing.

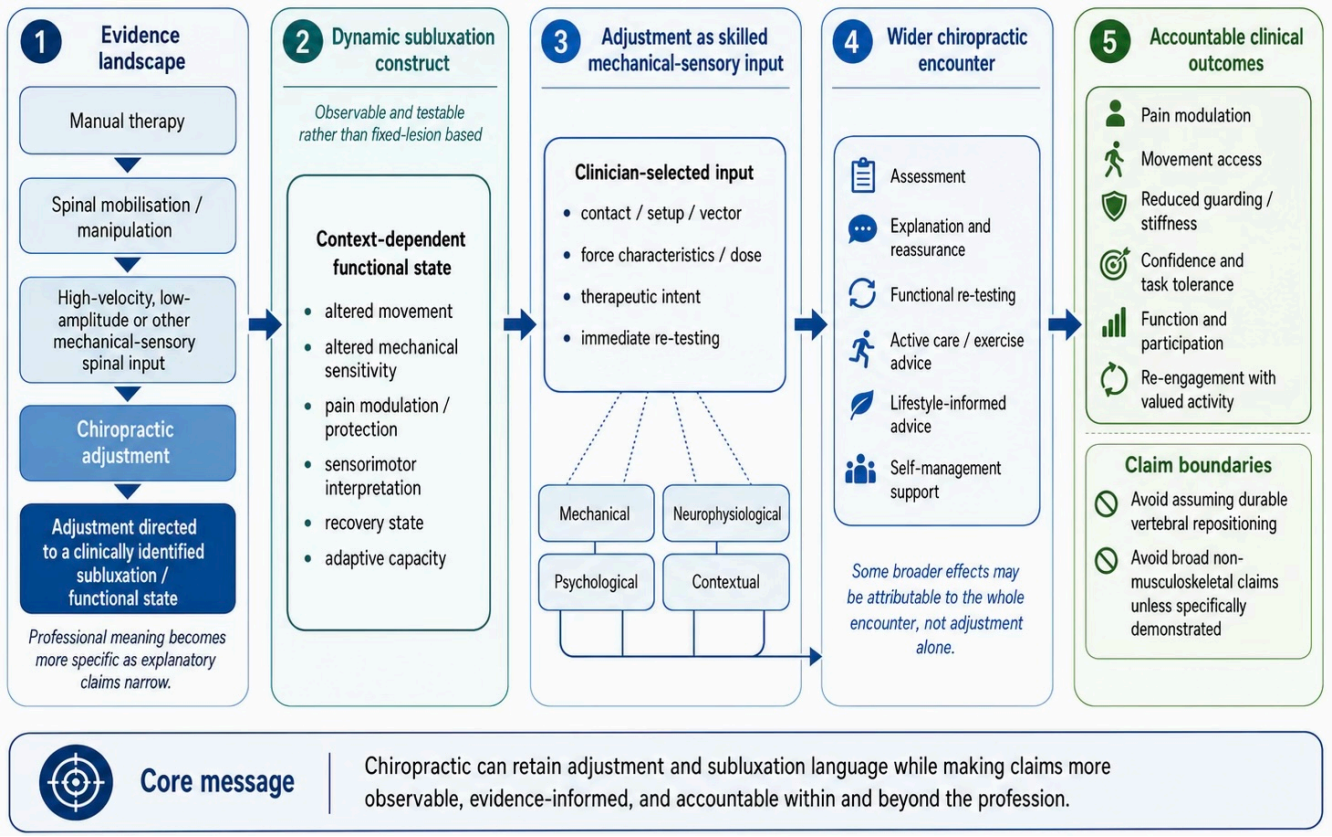
The case for recognising Chiropractic adjustment as a meaningful professional term is that it may include clinical reasoning, target selection, specific contact, vector, amplitude, velocity, patient positioning, therapeutic intent and functional re-testing. Chiropractic training standards identify adjustment and manipulation as central psychomotor procedures rather than mere labels. (7, 8) This argument is plausible at the level of clinical craft because force application and immediate tissue response are relevant to proposed manipulation mechanisms. (15, 22) It is also compatible with contemporary manual therapy models that describe effects as distributed across mechanical, neurophysiological, psychological and contextual pathways rather than as a single local mechanical event. (16, 23) The next task is to describe these features with enough precision that they can be studied, compared and improved.

The broader spinal manipulation literature remains relevant to Chiropractic adjustment because the interventions overlap substantially as mechanical-sensory inputs delivered to the spine. The acute low back pain meta-analysis by Paige and colleagues evaluated interventions under the spinal manipulative therapy label and found statistically significant but modest average improvements in pain and function at up to six weeks. (24) The chronic low back pain meta-analysis by Rubinstein and colleagues found that spinal manipulative therapy produced effects broadly similar to other recommended therapies. (25) These reviews support manual spinal care as a reasonable option for selected spinal pain presentations. (24, 25) They also show why more precise Chiropractic research is useful: broad spinal manipulation trials may not fully describe practitioner reasoning, patient selection, dose, force characteristics, re-testing or technique-specific decision-making. (24, 25)

The evidentiary issue becomes sharper when adjustment is defined only by its proposed target. If adjustment is said to differ from manipulation because it corrects subluxation, and subluxation is then inferred from response to adjustment, the reasoning risks becoming circular.

Keating and colleagues argued that subluxation should be treated as a testable construct rather than as dogma. (3) Mirtz and colleagues found insufficient epidemiological evidence to establish subluxation as a causal construct for health and disease. (4) A more constructive conclusion is that adjustment-specific claims should specify the clinical finding, procedure, mechanism, comparator and outcome being proposed, rather than relying on professional terminology alone. (3, 4) Figure 1 summarises this claim-level model by locating adjustment within the wider manual therapy evidence landscape, while distinguishing the dynamic subluxation construct, adjustment-specific input, whole-encounter factors and accountable outcomes.

Figure 1: Contemporary Chiropractic adjustment within dynamic subluxation framework



Contemporary Chiropractic adjustment within a dynamic subluxation framework. The figure locates Chiropractic adjustment within the wider manual therapy evidence landscape while distinguishing professional terminology from claim-level accountability. Subluxation is presented as a dynamic, context-dependent functional state involving observable features such as altered movement, mechanical sensitivity, pain modulation, sensorimotor interpretation, recovery state and adaptive capacity. Chiropractic adjustment is framed as a clinician-selected mechanical-sensory input whose effects may involve mechanical, neurophysiological, psychological and contextual pathways. The wider chiropractic encounter, including assessment, explanation, functional re-testing, active care, lifestyle-informed advice and self-management support, may also contribute to patient outcomes. The conceptual relationships shown are grounded in literature on subluxation as a testable construct, WHO adjustment and manipulation terminology, manual therapy mechanisms and contextual effects, spinal manipulative therapy evidence, and evidence boundaries for non-musculoskeletal claims. (3, 4, 7, 8, 15, 16, 23, 24, 25, 31) The framework encourages clinicians and researchers to distinguish adjustment-specific effects from whole-encounter effects and to link claims to observable outcomes such as pain modulation, movement access, reduced guarding, confidence, function, participation and re-engagement with valued activity

Mechanism evidence also supports restraint. Bialosky and colleagues proposed that manual therapy may initiate neurophysiological responses through interaction among mechanical stimulus, peripheral mechanisms, spinal mechanisms, supraspinal mechanisms and contextual factors. (15)

> A later modelling paper argued that manual therapy mechanisms should be understood through interacting pathways rather than one isolated biomechanical correction. (16)

Keter and colleagues' living review reported that manual therapy mechanisms are complex and distributed across body systems and contexts. (23) None of these mechanism models requires a fixed subluxation lesion as the explanatory object.

The anatomical correction claim has particularly limited support. Young and colleagues systematically reviewed immediate anatomical structural or positional changes after manually delivered high-velocity, low-amplitude spinal manipulation. (22)

> They found a small and heterogeneous literature and concluded that the most credible evidence concerned immediate changes such as facet joint space or spinal stiffness rather than durable vertebral repositioning. (22) This evidence supports the possibility of short-term mechanical change. It does not support broad claims that adjustment permanently corrects a hidden lesion.

Neurophysiological evidence supports only a limited inference. Haavik and Murphy reviewed work suggesting that spinal manipulation may influence sensorimotor integration and motor control. (26) Haavik-Taylor and Murphy reported immediate somatosensory evoked-potential changes after cervical spine manipulation. (27) Niazi and colleagues reported short-term changes in H-reflexes and V-waves after spinal manipulation. (28) Christiansen and colleagues reported immediate changes in strength and cortical drive after a single session of spinal manipulation in athletes. (29) These studies measured short-term or immediate surrogate neurophysiological outcomes after spinal manipulation rather than patient-important clinical outcomes, independent subluxation diagnosis, objective subluxation correction or retained correction. (26, 27, 28, 29)

A systematic review evaluating whether spinal manipulation affects brain function found low-to-medium methodological quality, inconsistent findings and unknown clinical relevance, and concluded that promoting spinal manipulation as a treatment to improve brain function was premature. (30) Therefore, this literature supports mechanistic plausibility only. (26, 27, 28, 29, 30) It is not evidence that a reliably diagnosed subluxation has been corrected, because the subluxation construct remains insufficiently established as a validated clinical lesion. (3, 4) It is not evidence that correction is retained or that patient-important clinical outcomes necessarily improve, because the cited neurophysiological studies measured short-term surrogate outcomes. (26, 27, 28, 29, 30) It is not evidence that general non-musculoskeletal health effects follow, because the Global Summit review did not support spinal manipulative therapy for selected non-musculoskeletal disorders. (31)

The strongest boundary condition comes from non-musculoskeletal claims. Côté and colleagues, reporting the Global Summit systematic review, found that spinal manipulative therapy was not superior to sham interventions in acceptable or high-quality randomised trials for selected non-musculoskeletal disorders. (31) That evidence challenges the claim that treating spinal dysfunction through manipulation or adjustment produces reliable physiological benefits for organ function or general health. (31) A dynamic subluxation model should therefore avoid using adjustment language to imply broad non-musculoskeletal effects unless such effects are specifically demonstrated. (31) This does not preclude future evidence showing adjustment-specific features or effects. It means the burden rests with Chiropractic researchers and proponents to demonstrate those features rather than to claim them by definition.

A fair conclusion is that adjustment and manipulation should not be conflated simplistically, but neither should they be separated by definition alone. Adjustment may be a profession-specific, clinically targeted and sometimes more refined form of spinal manipulative or mechanical-sensory intervention. (7, 8) Its professional meaning may be distinctive. Its clinical claims should build on the wider spinal manipulation evidence while also encouraging more precise research into Chiropractic procedures, reasoning, dose, force characteristics, outcomes and safety. (15, 16, 23, 24, 25) Anatomical correction claims should remain careful because evidence for immediate structural or positional findings after HVLA manipulation is limited and heterogeneous. (22) Generalised non-musculoskeletal claims should be made only where condition-specific evidence supports them. (31) Table 1 summarises constructive ways to describe the relationship between chiropractic adjustment and spinal manipulation without either collapsing the terms or separating them by definition alone (Table 1).

Chiropractic adjustment as skilled mechanical-sensory input

The proposed alternative is not anti-adjustment. It makes the adjustment more scientifically accountable. A Chiropractic adjustment can be described as a skilled, salient mechanical-sensory input delivered to a person whose response is influenced by tissue state, pain sensitivity, sensorimotor prediction, expectation, confidence and recovery capacity. This framing is consistent with Bialosky's model of manual therapy mechanisms because it allows mechanical input to initiate peripheral, spinal, supraspinal and contextual responses. (15) It is also consistent with the broader living-review evidence that manual therapy mechanisms are multidimensional rather than reducible to one tissue event. (23)

Table 1: Constructive ways to describe the relationship between chiropractic adjustment and spinal manipulation. The wording in this table is informed by WHO terminology, manual therapy mechanism models, spinal manipulative therapy evidence, immediate structural-change evidence and evidence boundaries for non-musculoskeletal claims. (7, 8, 15, 16, 22, 23, 24, 25, 31) Note. SMT = spinal manipulative therapy; HVLA = high-velocity, low-amplitude

Clinical claim	What it contributes	What still requires specification	Careful wording
Adjustment may be more specific than manipulation.	Specific contact, setup, vector, timing and clinical intent may influence the mechanical-sensory input.	Whether this specificity changes outcomes, mechanisms, safety or dose-response patterns requires direct study.	Adjustment may be a more targeted form of spinal manipulative input.
Adjustment is directed to subluxation.	This preserves chiropractic clinical reasoning and professional identity.	The clinical phenomenon being called subluxation should be described in observable and re-testable terms.	Adjustment may be directed to a clinically identified functional state.
Manipulation research is broad.	Existing trials may include heterogeneous providers, procedures, doses and targets.	Heterogeneity limits precision but does not make the evidence irrelevant.	SMT evidence is relevant, while more adjustment-specific research is needed.
Adjustment may have neurophysiological effects beyond local mechanics.	Studies report short-term changes in sensorimotor or excitability measures after manipulation. (26-29)	Short-term neurophysiological change does not by itself establish durable clinical superiority or broad health effects. (31)	Adjustment may produce short-term mechanical-sensory and neurophysiological responses.
Adjustment may alter local mechanics.	Immediate changes in joint space or stiffness may occur after HVLA manipulation. (22)	Evidence for durable anatomical repositioning is limited and heterogeneous. (22)	Adjustment may modify stiffness, movement access or sensory input rather than permanently reposition vertebrae.
Adjustment may contribute to broader health-related outcomes.	This claim is historically important to some chiropractic traditions. (5, 6)	Broader outcomes require condition-specific evidence and should be distinguished from effects of the wider clinical encounter. (31, 43)	Broader health claims require specific evidence and should not be inferred from spinal response alone.

The clinical value of adjustment should therefore be tested through observable change. Relevant outcomes include pain modulation, perceived stiffness, movement access, protective tone, range of motion, confidence, task tolerance, patient-specific function and capacity to re-engage with valued activity. This is consistent with guideline-level emphasis on function, self-management and activity rather than passive correction alone. (2)

A favourable immediate response can be clinically meaningful. It should not be over-interpreted. Immediate improvement after adjustment may indicate altered sensitivity, changed movement willingness, contextual response, expectation effect or reduced guarding. (15, 16, 20) It may also reflect short-term mechanical change. (22) It does not by itself prove that a fixed lesion existed or that it was permanently corrected.

Operational rules for contemporary subluxation language

1. Define the clinical phenomenon before naming it. If subluxation is used, the record should specify whether the relevant finding is painful spinal movement, altered mechanical sensitivity, restricted functional range, guarding, impaired proprioceptive control, reduced confidence, poor recovery or reduced tolerance to ordinary demand;
2. Match the explanation to the evidence. It is reasonable to say that spinal manual care may provide mechanical-sensory input that can influence pain, movement and sensorimotor responsiveness. (15, 26) It is less defensible to claim that a hidden lesion has been objectively corrected unless the lesion, mechanism and outcome can be independently specified and re-tested; (3, 4)
3. Document change in patient-centred terms. The record should include the patient's functional problem, relevant spinal or movement findings, the manual input used, immediate response, and next functional behaviour to test. Implementation science supports the value of clearly specified intervention processes and context when translating complex interventions into practice. (32) Process evaluation guidance similarly emphasises mechanisms, implementation and contextual influences rather than assuming that a complex intervention works through one simple pathway; (32) and
4. Communicate in language that supports confidence. The clinician can explain that the spine and nervous system are receiving a precise physical input, that the aim is to reduce protective sensitivity or improve movement access, and that the effect is best retained by tolerable use of the body. This is more consistent with evidence on expectations and fear-avoidance than messages implying that the spine is fragile, unstable or chronically out of place. (20, 21)

Translating the model into practice language

For the framework to influence practice, the dynamic definition must be usable in clinical speech. Table 2 connects scientific terms with practitioner language, observable cues, patient-facing explanations and phrases to avoid. The table is intentionally operational. Its purpose is to prevent subluxation from functioning as a magic word that ends clinical reasoning (Table 2)

Table 2: Translating the dynamic subluxation model into practice language. The examples are informed by evidence on best-practice musculoskeletal care, manual therapy mechanisms, patient expectations, fear-avoidance and the need for observable, testable subluxation language. (2. 3, 4, 15, 16, 20, 21, 23) Note. Patient-facing phrases are illustrative and should be adapted to the patient, presentation, consent process and clinical context.

Scientific component	Practitioner translation	Observable cue	Patient-facing phrase	Avoids
Dynamic functional state	A changeable state in how the spine, nervous system and person are functioning together.	Variable symptoms, altered movement quality, changing load response.	This is about how the area is moving, sensing and responding today.	Rigid lesion language.
Altered movement	The area is not moving comfortably, efficiently or confidently.	Painful range, guarding, stiffness, poor movement confidence.	This area is moving protectively, and we want to improve that response.	Reducing findings to posture or alignment alone.
Mechanical-sensory input	The adjustment provides a precise physical input that the body can respond to.	Change in pain, tone, stiffness, range, confidence or function after care.	The adjustment gives your body a clear signal to help change how the area responds.	Using response as proof of permanent correction.
Pain modulation	Sensitivity may be part of the clinical state.	Tenderness, irritability, flare tendency, reduced tolerance.	Part of the problem is increased sensitivity; the aim is to calm the response and improve movement.	Fear-based damage messages.
Sensorimotor interpretation	The nervous system may be using movement information less effectively.	Poor position sense, altered coordination, protective patterns.	Your spine helps send movement information; we want that signal to become clearer.	Non-operational nerve language.
Adaptive capacity	The person is coping with less reserve than expected.	Recurrent flares, fatigue-related symptoms, poor recovery, low load tolerance.	Care is aimed at improving capacity, not just chasing pain.	Exaggerated wellness claims.
Functional re-testing	Care should produce change that can be observed, felt or functionally tested.	Re-test motion, pain, confidence, task tolerance or patient-specific goal.	Let us check whether that changed what you came in with.	Unsupported correction claims.

State modifiers: recovery, disuse, prior injury and load change

A dynamic subluxation construct becomes more useful when it includes state modifiers. Patient response to adjustment may be influenced by recent activity exposure, de-conditioning, prior injury, sleep, recovery, confidence, tissue irritability, stress and changes in load. These factors do not need to be treated as separate subluxations, nor as effects uniquely corrected by adjustment. Rather, they are modifiers of the person's current capacity to tolerate ordinary demands and to respond to mechanical-sensory input. Short-term disuse can rapidly alter muscle and metabolic physiology; Dirks and colleagues found that one week of bed rest produced muscle atrophy and whole-body insulin resistance in healthy young men. (33)

Prior injury is another relevant modifier. Toohey and colleagues found in a systematic review and meta-analysis that previous lower-limb injury was associated with subsequent lower-limb injury in athletic populations. (34) This does not make recurrence inevitable. It supports the clinical need to consider prior exposure, tissue capacity, movement confidence and load tolerance.

Pain trajectories also matter. Low back pain trajectory research supports recurrent and fluctuating patterns rather than a simple acute-chronic dichotomy. (35) These findings support a state-based explanation in which recovery, recurrence and adaptive capacity are monitored over time.

Load change should also be considered. The International Olympic Committee consensus statement emphasised that both under-loading and over-loading can be problematic depending on recovery, capacity and context. (36) In Chiropractic practice, this means adjustment response should be interpreted alongside recent changes in work, sport, sleep, stress and activity exposure.

Sleep is a clinically relevant state modifier. Santos and colleagues found bidirectional associations between chronic musculoskeletal pain and sleep-related problems in a systematic review and meta-analysis. (37) These data support discussing recovery and sleep as modifiers of response without blaming the patient or converting chiropractic into an unsupported lifestyle cure.

Lifestyle medicine, contextual care and the wider chiropractic encounter

Lifestyle medicine should be integrated into this framework at the level of the Chiropractic encounter and longitudinal care model rather than as an intrinsic effect of the adjustment. Lifestyle medicine is commonly organised around evidence-informed behavioural domains including nutrition, physical activity, restorative sleep, stress management, avoidance of risky substances and social connection. (38) Musculoskeletal service redesign literature has likewise argued for patient-centred, team-based and lifestyle-focused care as a foundation for non-operative musculoskeletal management. (39)

This integration is not foreign to Chiropractic. A systematic review of primary prevention in Chiropractic practice found that many Chiropractors report positive attitudes toward prevention and offer some preventive or wellness-oriented services, while also noting that patients rarely consult specifically for primary prevention. (40) A later systematic review of clinician-based surveys found that a large majority of practising chiropractors report engaging with physical activity promotion, although the underlying survey evidence had moderate-to-high risk of bias. (41) The World Federation of Chiropractic (WFC) has also described a public-health agenda in which Chiropractors may contribute to health promotion and prevention initiatives, particularly where these are connected to musculoskeletal health. (42)

Chiropractic branding, however, has often presented the profession through an adjustment-centred public identity, even though everyday Chiropractic practice commonly includes a broader clinical encounter. Pollard has argued that professional identity and branding should better reflect the contemporary chiropractic profile, including the range of populations seen, practice interests, post-professional education, special interest groups and management approaches used in practice. (46) This distinction matters because the public, other health professionals, regulators and healthcare systems may judge Chiropractic by its simplified external message rather than by the fuller range of care that commonly occurs in clinical practice.

> The critical distinction is causal attribution. Broader effects of Chiropractic care should be investigated as effects of the whole clinical encounter: assessment, explanation, reassurance, physical activity advice, sleep and recovery discussion, load management, behavioural support, referral and follow-up. They should not be attributed to the adjustment alone unless the adjustment-specific mechanism and outcome have been demonstrated.

This distinction is supported by the systematic review by Goncalves and colleagues, which found no evidence that Chiropractic treatment produced effects in primary or early secondary prevention for disease in general. (43) A modernised Chiropractic model can therefore include active care and lifestyle-informed constructs without converting them into unsupported subluxation-correction or adjustment-specific claims. (43)

A contemporary subluxation framework should therefore avoid reducing Chiropractic to adjustment alone, while also avoiding the opposite error of minimising the adjustment's professional and clinical importance. Chiropractic care may include assessment, explanation, reassurance, skilled touch, adjustment or manipulation, mobilisation, soft tissue care, activity advice, exercise recommendation, self-management support and lifestyle-informed discussion. These elements may interact to influence pain, confidence, movement behaviour, recovery expectations, participation and adaptive capacity. Some benefits historically attributed to adjustment alone may therefore be more appropriately studied as effects of the wider Chiropractic encounter, within which adjustment remains a distinctive and potentially important mechanical-sensory input.

This distinction also gives a constructive role to contextual factors. Contextual effects are often discussed as though they weaken manual therapy claims or reduce treatment to placebo. A more

clinically useful view is that context, when used ethically and transparently, is part of responsible care. Explanation, consent, therapeutic alliance, expectation, touch, confidence-building language, functional re-testing and advice may help patients interpret symptoms less threateningly and engage more successfully with activity. The relevant question is not whether contextual factors are present, because they always are. The question is whether they are used responsibly to support patient capability, self-management and participation rather than dependency.

Testable propositions and limits

A modernised subluxation framework should generate testable propositions. First, adjustment should be studied as a mechanical-sensory input whose effects can be measured through pain, movement access, perceived stiffness, confidence, sensorimotor measures and functional re-testing. This proposition follows directly from manual therapy mechanism models and does not require a fixed-lesion assumption. (15, 16, 23)

Second, the relationship between adjustment and manipulation should be studied rather than asserted. Trials or pragmatic studies would need to prospectively define target selection, contact, force-time characteristics, dose, practitioner expertise, active-care integration and comparator interventions. Without those specifications, claims of clinical or mechanistic distinctiveness remain underdetermined.

Third, subluxation communication should be studied as a clinical behaviour. Records should become clearer if clinicians translate subluxation into observable descriptors and re-testable outcomes. Process-evaluation guidance is suitable for studying how mechanisms, implementation and context influence a complex intervention. (32) Implementation-science frameworks are suitable for examining whether revised clinical language changes documentation, clinical reasoning, patient-centred outcomes and integration with active care or lifestyle-informed advice in practice. (44)

Fourth, limits must be stated plainly. The framework does not deny fracture, infection, inflammatory disease, progressive neurological disease or other conditions requiring medical recognition. It also does not prove that manual therapy mechanisms are specific, uniform or technique-dependent. Similar outcomes across different interventions may arise from overlapping mechanisms, contextual effects or limitations in measurement. (45)

A further limitation is terminological variation. WHO Chiropractic guidance uses both adjustment and manipulation within Chiropractic training and safety documents. (7, 8) Historical Chiropractic technique literature shows that subluxation concepts and technique systems vary across periods and systems. (9, 10) Some Chiropractors reserve ‘adjustment’ for HVLA thrust procedures, whereas others include low-force, instrument-assisted, tonal or response-based procedures within adjustment language. (7, 8, 9, 10) For this reason, any claim about adjustment must specify the procedure, target, dose, comparator and outcome rather than relying on the professional term alone.

Conclusion

The issue with subluxation is not only whether it exists as a discrete entity. The more important problem is that the construct has often named a clinical phenomenon while relying on explanations drawn from early Chiropractic science. A more defensible future is to retain subluxation as a functional clinical construct while requiring it to be observable, explainable, testable and useful.

The relationship between adjustment and manipulation should be handled with the same discipline. Adjustment may be more refined, more clinically intentional and more professionally meaningful than generic manipulation. The broader spinal manipulation literature therefore remains relevant to chiropractic adjustment, while also leaving room for more specific research into chiropractic procedures, clinical reasoning, dosing, force characteristics, active-care integration and patient-centred outcomes.

A contemporary Chiropractic explanation can therefore describe the adjustment as skilled mechanical-sensory input delivered within a dynamic human system and a broader clinical encounter. This preserves skilled manual contact, clinical judgement and chiropractic identity while making the language of subluxation more observable, testable and communicable. The aim is not to diminish Chiropractic, nor to force uniformity across its diverse traditions. It is to provide a shared explanatory platform that can support clinical precision, patient confidence, research development, regulatory clarity and more constructive participation in wider healthcare.

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