

Rethinking Chronic Pain Care

Integrating Pain Science, Neuroscience, and Psychotherapy for Better Clinical Decisions

EtioLinks White Paper

Dr. Kim du Preez, PhD and Dr. Nirupa Shah, MD, MPH

April 2026

Executive Summary

Chronic pain is one of the most common and costly conditions in healthcare, and a leading cause of long-term disability worldwide. [1,2] Yet despite major advances in our understanding of pain, clinical care remains inconsistent. Patients often move through fragmented pathways, receive mixed explanations, and experience outcomes that are difficult to predict.

The problem is not a lack of knowledge. Over the past two decades, pain science, neuroscience, and psychological treatment have each contributed important insights. We now understand that persistent pain may occur without ongoing tissue damage, that the brain plays an active role in interpreting and regulating bodily signals, and that emotional and behavioural processes can shape how symptoms are experienced and sustained.

The challenge is not a lack of knowledge, but the absence of a clear way of connecting what we already know into a coherent approach to care.

These advances tend to exist in parallel. They are taught separately, applied separately, and often experienced separately by patients. As a result, clinicians are left to integrate

them on their own, often under time pressure and with limited tools to support consistent decision-making.

This paper argues that chronic pain care requires a more integrated approach to clinical reasoning. The aim is not to replace existing models, but to bring them into a clearer relationship with one another so that they can be used more effectively in practice.

Patients do not present as isolated biological, psychological, or behavioural variables. They present as whole systems, in which bodily signals, expectations, emotions, behaviour, and context interact over time. Good care depends on understanding how these elements come together in a given case—and what is most likely to shift that pattern.

Etiolinks was developed to support this kind of reasoning. PainMAP does not attempt to reduce pain to a single cause or prescribe a fixed treatment pathway. Instead, it helps organise relevant patient information into a clearer picture of what may be maintaining symptoms, and how care can be aligned more effectively.

The aim is not to add another layer of theory, but to make existing knowledge more usable—so that clinical decisions become clearer, more consistent, and more effective.

1. The Problem: Knowledge Without Integration

The way we understand pain has changed significantly. Pain is no longer seen as a simple signal of tissue damage. It is now recognised as a sensory and emotional experience shaped by biological, psychological, and social factors. [3] The concept of nociplastic pain reflects this shift, describing pain that arises from altered processing of signals rather than clear structural injury. [4]

These developments have moved the field forward. They have made it possible to explain many forms of persistent pain that were previously difficult to understand.

But progress in theory has not always translated into progress in care.

In everyday clinical practice, structural findings are still often given more weight than they warrant. Imaging is frequently used to manage uncertainty. Treatment pathways may escalate even when there is limited evidence that further intervention will change outcomes. [5,6] The biopsychosocial model is widely accepted, but often remains difficult to apply in a consistent and practical way.

This creates a gap. Clinicians may recognise that chronic pain is complex, but still lack a clear way of working with that complexity when making decisions. Patients, in turn, may receive multiple explanations that do not fully align, making it harder to understand their condition or engage confidently in care.

This is the problem at the centre of chronic pain management today: not a lack of insight, but a lack of integration.

2. Why the Relevant Fields Remain Siloed

Chronic pain draws on multiple areas of knowledge. Each has developed its own language, evidence base, and clinical approach.

Pain science has clarified different types of pain and the role of sensitisation and modulation. [4,7] Neuroscience has deepened our understanding of how the brain predicts and regulates bodily states, including how it interprets internal signals and maintains balance over time. [8–12] Psychological and behavioural approaches have explored how fear, avoidance, emotional processing, trauma, and coping patterns influence recovery. [13–16]

Each of these perspectives is valuable. But in practice, they are often applied separately.

A patient might receive physical rehabilitation from one clinician, psychological input from another, medication from a third, and education from yet another. Each

intervention may be appropriate in isolation, but without a shared framework, it is difficult to see how they fit together.

This fragmentation is not just theoretical—it shapes patient experience. When explanations differ, patients may feel uncertain about what their symptoms mean or what they should do. That uncertainty can increase fear, reduce confidence, and make it harder to engage in treatment.

In chronic pain, explanation is part of the intervention. When explanations are fragmented, care becomes fragmented as well.

3. Understanding Pain as a Brain–Body–Mind Process

To move beyond fragmentation, it helps to begin with a different way of thinking about pain.

Pain is not purely physical, and it is not purely psychological. It is a lived experience generated within a nervous system that is constantly interpreting what is happening in the body.

From a neuroscientific perspective, the brain does not simply receive signals—it actively interprets them. It uses past experience, current context, and ongoing predictions to make sense of incoming information. In this process, the distinction between sensation and meaning becomes less clear-cut.

Pain, in this sense, is not just a signal. It is part of a broader process of determining whether the body needs protection.

When the system leans toward protection—because of past experience, ongoing stress, or persistent expectations of threat—bodily signals may be interpreted in a way that sustains pain, even in the absence of ongoing injury. [12,17]

Psychological and behavioural processes are closely tied to this system. Fear, avoidance, emotional suppression, trauma, and patterns of coping all influence how signals are interpreted and how the body responds. These are not separate from biology; they are part of the same regulatory system.

This is why chronic pain cannot be fully understood from a single perspective. It emerges from the interaction of body, brain, emotion, behaviour, and context.

4. Why Psychotherapy Matters in a Neuroscientific Model

Psychotherapy is sometimes seen as an additional component of care, introduced when emotional distress becomes prominent. This view is too narrow.

Many of the processes that sustain persistent pain—fear of movement, emotional inhibition, chronic stress, relational threat, rigid patterns of coping—are directly addressed within psychological approaches. [13–16] These processes influence physiological regulation, attention, behaviour, and the way symptoms are experienced.

Recognising this does not diminish the reality of pain. On the contrary, it situates pain within a broader biological system in which emotional and behavioural processes play an active role.

Psychotherapy brings an essential dimension to care. It helps clinicians understand how symptoms are experienced, what they may represent within a person's life, and how patterns of response may be reinforcing or maintaining them.

When integrated with pain science and neuroscience, this perspective becomes more powerful. It allows for explanations that are both biologically grounded and personally meaningful.

5. From Explanation to Clinical Decision-Making

Understanding pain differently is only useful if it changes what we do.

In chronic pain care, the challenge is often not recognising complexity, but knowing how to act on it. Clinicians are frequently faced with multiple possible directions: rehabilitation, education, psychological support, medication adjustment, further investigation, or referral.

Without a clear framework, these decisions can feel uncertain. Care may become reactive rather than strategic.

An integrated approach helps organise this complexity. It provides a way of thinking about which processes are most relevant in a given case, what may be maintaining symptoms, and which type of intervention is most likely to be helpful at that stage.

This marks a shift from understanding what is happening to deciding how best to respond in practice. A theory helps us understand what might be happening. Clinical reasoning helps us decide what to do next.

6. The Risk of Fragmented Treatment Pathways

When decisions are not guided by integrated reasoning, care pathways can become disjointed.

Patients may move from one intervention to another without a clear sense of direction. Each step may be reasonable in isolation, but the overall pathway lacks coherence. When improvement does not occur, the response is often to escalate care, rather than to reconsider alignment.

Over time, this can increase uncertainty. Patients may lose confidence in treatment, become more focused on symptoms, or feel that their condition is not well understood.

In this way, the system can unintentionally reinforce the very patterns it is trying to resolve.

A more integrated approach helps interrupt this cycle. It allows clinicians to step back, reconsider the pattern, and align care more closely with what is maintaining symptoms.

7. The Role of Context and Change Over Time

Persistent pain is not static. It changes over time, influenced by stress, environment, expectations, and prior experiences of care.

Some patients respond quickly to new explanations or interventions. Others change more gradually. Some experience fluctuating symptoms that are sensitive to context. Others show more stable patterns.

These differences matter. They shape how care should be paced, how progress should be interpreted, and how decisions should evolve.

Clinical reasoning, therefore, must take into account not only what is happening, but how patterns are unfolding over time.

8. Operationalising Integration Without Replacing Clinicians

Chronic pain places significant demands on clinicians. Decisions must often be made quickly, using incomplete information, and within systems that are not always designed to support complex reasoning.

In this context, insight alone is not enough. What is needed is a way of organising information so that it can be used effectively in practice.

PainMAP was developed to support this process. It does not replace clinical judgement, diagnose conditions, or prescribe rigid pathways. Instead, it helps bring together relevant information in a way that supports clearer understanding and more consistent decision-making.

Its purpose is to strengthen clinical reasoning where it is most needed: in complex, uncertain cases.

9. From Concept to Better Care Pathways

The next phase of progress in chronic pain is likely to depend not only on new discoveries, but on how well existing knowledge is applied in everyday care.

This includes recognising when care pathways are misaligned, making more confident early decisions, using interventions in a more coordinated way, and making better use of available resources.

For clinicians, this means greater clarity. For patients, it means a more coherent experience of care. For health systems, it means more effective use of what already exists.

10. Conclusion

Chronic pain care does not lack ideas. What it often lacks is a clear way of bringing those ideas together in practice.

Pain science, neuroscience, and psychotherapy each offer valuable perspectives. The challenge is not choosing between them, but learning how to think across them.

When that happens, care becomes more aligned, decisions become more consistent, and outcomes can improve—for patients, clinicians, and the systems that support them.

Selected References

1. GBD 2019 Diseases and Injuries Collaborators. 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. *Lancet*. 2020;396:1204–1222.
2. Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. Washington, DC: National Academies Press; 2011.
3. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, et al. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. *Pain*. 2020;161(9):1976–1982.
4. Kosek E, Cohen M, Baron R, Gebhart GF, Mico JA, Rice ASC, et al. Do we need a third mechanistic descriptor for chronic pain states? *Pain*. 2016;157(7):1382–1386.
5. Qaseem A, Wilt TJ, McLean RM, Forciea MA. Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Ann Intern Med*. 2017;166(7):514–530.
6. Jenkins HJ, Downie AS, Moore CS, French SD. Current evidence for spinal imaging in low back pain. *BMJ*. 2018;362.
7. Moseley GL, Butler DS. Fifteen years of explaining pain: the past, present, and future. *J Pain*. 2015;16(9):807–813.
8. Panksepp J. *Affective Neuroscience: The Foundations of Human and Animal Emotions*. New York: Oxford University Press; 1998.
9. Solms M. *The Hidden Spring: A Journey to the Source of Consciousness*. New York: W.W. Norton; 2021.
10. Friston K. The free-energy principle: a unified brain theory? *Nat Rev Neurosci*. 2010;11(2):127–138.
11. Friston K, Kiebel S. Predictive coding under the free-energy principle. *Philos Trans R Soc Lond B Biol Sci*. 2009;364(1521):1211–1221.
12. Van den Bergh O, Witthöft M, Petersen S, Brown RJ. Symptoms and the body: taking the inferential leap. *Neurosci Biobehav Rev*. 2017;74(Pt A):185–203.
13. Barrett LF. The theory of constructed emotion: an active inference account of interoception and categorization. *Soc Cogn Affect Neurosci*. 2017;12(1):1–23.

14. Vlaeyen JWS, Linton SJ. Fear-avoidance model of chronic musculoskeletal pain: 12 years on. *Pain*. 2012;153(6):1144–1147.
15. Lumley MA, Schubiner H. Emotional awareness and expression therapy for chronic pain: rationale and evidence. *Pain*. 2019;160(Suppl 1)–S53.
16. Turk DC, Okifuji A. Psychological factors in chronic pain: evolution and revolution. *J Consult Clin Psychol*. 2002;70(3):678–690.
17. Wiech K. Deconstructing the sensation of pain: the influence of cognitive processes on pain perception. *Science*. 2016;354(6312):584–587.
18. Balas EA, Boren SA. Managing clinical knowledge for healthcare improvement. In: Bemmel JH, McCray AT, editors. *Yearbook of Medical Informatics 2000: Patient-Centered Systems*. Stuttgart: Schattauer; 2000. p. 65–70.
19. Agency for Healthcare Research and Quality. *Clinical Decision Support Systems: State of the Art*. Rockville, MD: Agency for Healthcare Research and Quality; 2009.
20. Sutton RT, Pincock D, Baumgart DC, Sadowski DC, Fedorak RN, Kroeker KI. An overview of clinical decision support systems: benefits, risks, and strategies for success. *NPJ Digit Med*. 2020;3:17.

Citation and Use

Suggested citation:

du Preez K, Shah N. (2026). *Rethinking Chronic Pain Care: Integrating Pain Science, Neuroscience, and Psychotherapy for Better Clinical Decisions*. EtioLinks.

Copyright:

© 2026 EtioLinks. All rights reserved.