NON-SURGICAL INTEGRATION FOR PAIN

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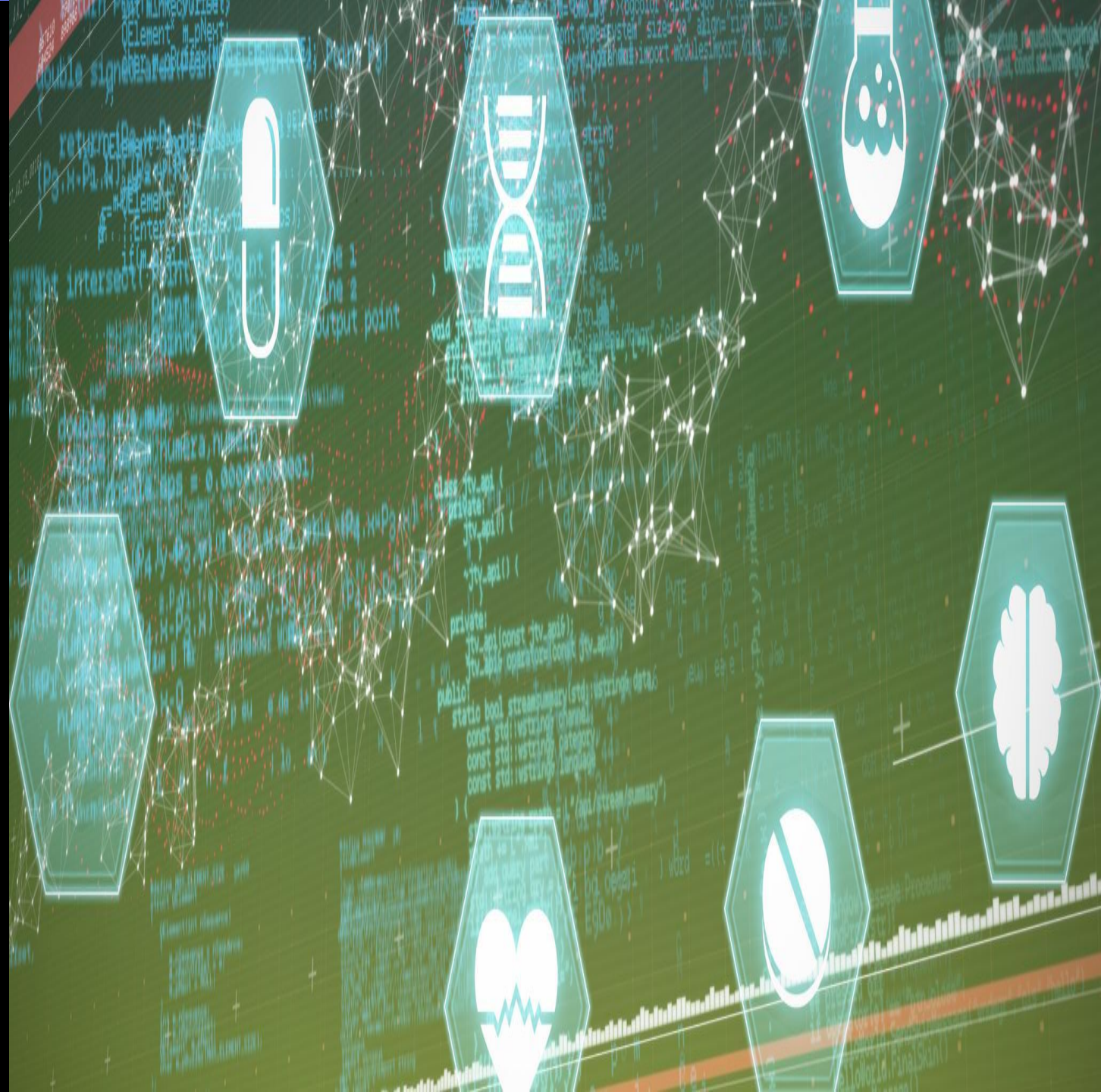

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Impartiality and objectivity are maintained throughout, guaranteeing trustworthy and reliable information.

THE PAIN TRAP

Current Pain Landscape

Global Burden

Chronic pain affects ~20% of adults worldwide.

Opioid Dependence Risk

U.S. opioid prescriptions peaked at 191M (2012); misuse persists.

Surgery Outcomes Vary

Rates rise for musculoskeletal pain, with inconsistent long-term benefit.

Implication

Demand is increasing for non-opioid, non-surgical strategies.

Poor Outcomes

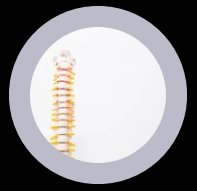
Chronic pain: limited long-term efficacy; persistent post-surgical pain reported in meta-analyses (up to ~40% after spinal fusion).

Strengths

Pharmacologic: rapid symptom relief.
Surgical: potential structural correction.

Weaknesses

Pharmacologic: tolerance, addiction, limited long-term efficacy.
Surgical: persistent pain and dysfunction are common.



Risks

Pharmacologic: overdose, adverse effects.
Surgical: complications and revision surgeries.

Benefits

Pharmacologic: accessible, non-invasive.
Surgical: may help in select pathology-driven cases.

Pain Is Multi-System

Physiological Factors

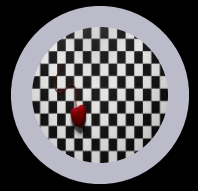
Tissue injury, inflammation, and nociceptive signaling drive acute pain and may persist in chronic states.

Neurological Factors

Central sensitization and altered pathways amplify perception, sustaining symptoms beyond injury.

Immunological Factors

Neuroinflammation and immune dysregulation reinforce chronic pain syndromes and symptom spread.



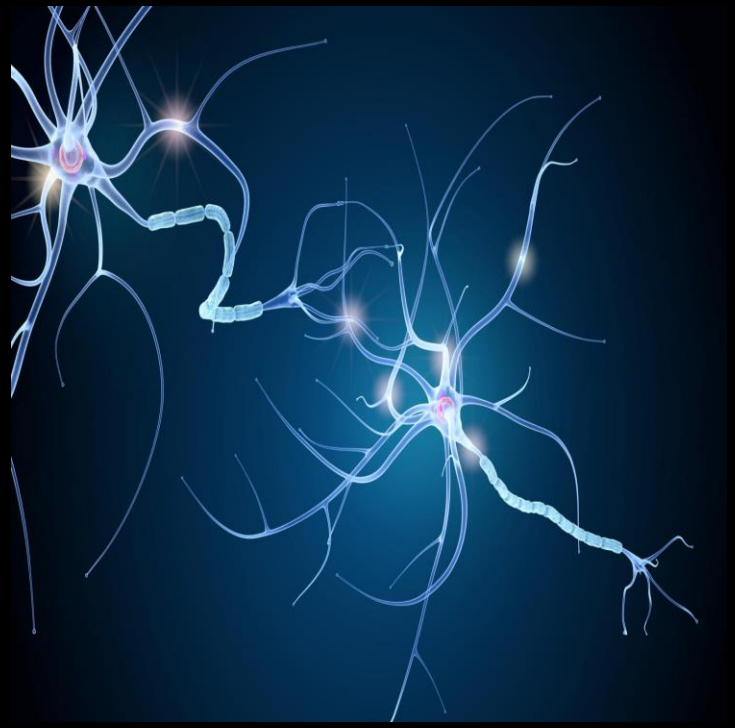
Psychological / Cognitive Influences

Stress, mood, and cognitive patterns shape pain experience and influence treatment outcomes.

Primary Pain Type Classes

Nociceptive Pain

Tissue damage activates peripheral nociceptors (e.g., arthritis, injury). Often improves with anti-inflammatories and manual therapies.



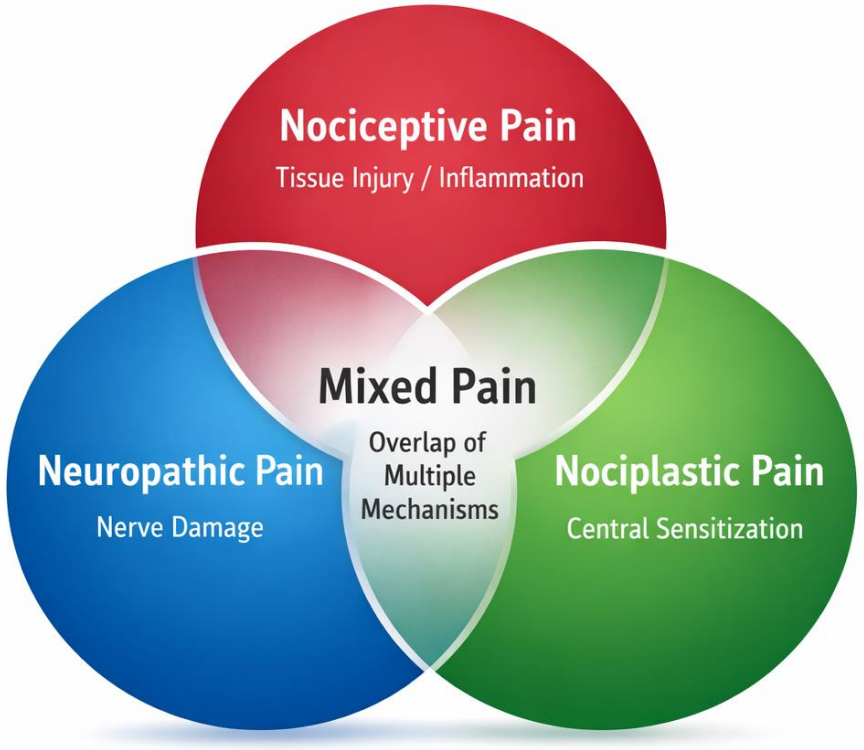
Neuropathic Pain

Nerve injury/disease (e.g., diabetic neuropathy, post-herpetic neuralgia). Affects ~7–10%; may coexist with nociceptive pain and may require anticonvulsants/antidepressants.

Centralized Pain (Nociplastic)

Altered CNS processing, sometimes without ongoing peripheral input (e.g., fibromyalgia). Recognition is increasing; management is often multidisciplinary.

Mixed Pain Challenges



Most Chronic Pain is Multifactorial

Symptom overlap

Low back pain often blends nociceptive and neuropathic features.

Clinical impact

Misclassification leads to inadequate control and higher utilization.

Personalized care

Phenotype using diagnostic tools and patient-reported outcomes.

Why Monotherapy Fails - For Chronic Pain

01

Initial assessment

Chronic pain treated as a single mechanism.

02

Monotherapy starts

Opioids/NSAIDs target only one pathway.

03

Short-term relief

Symptoms drop briefly; drivers persist.

04

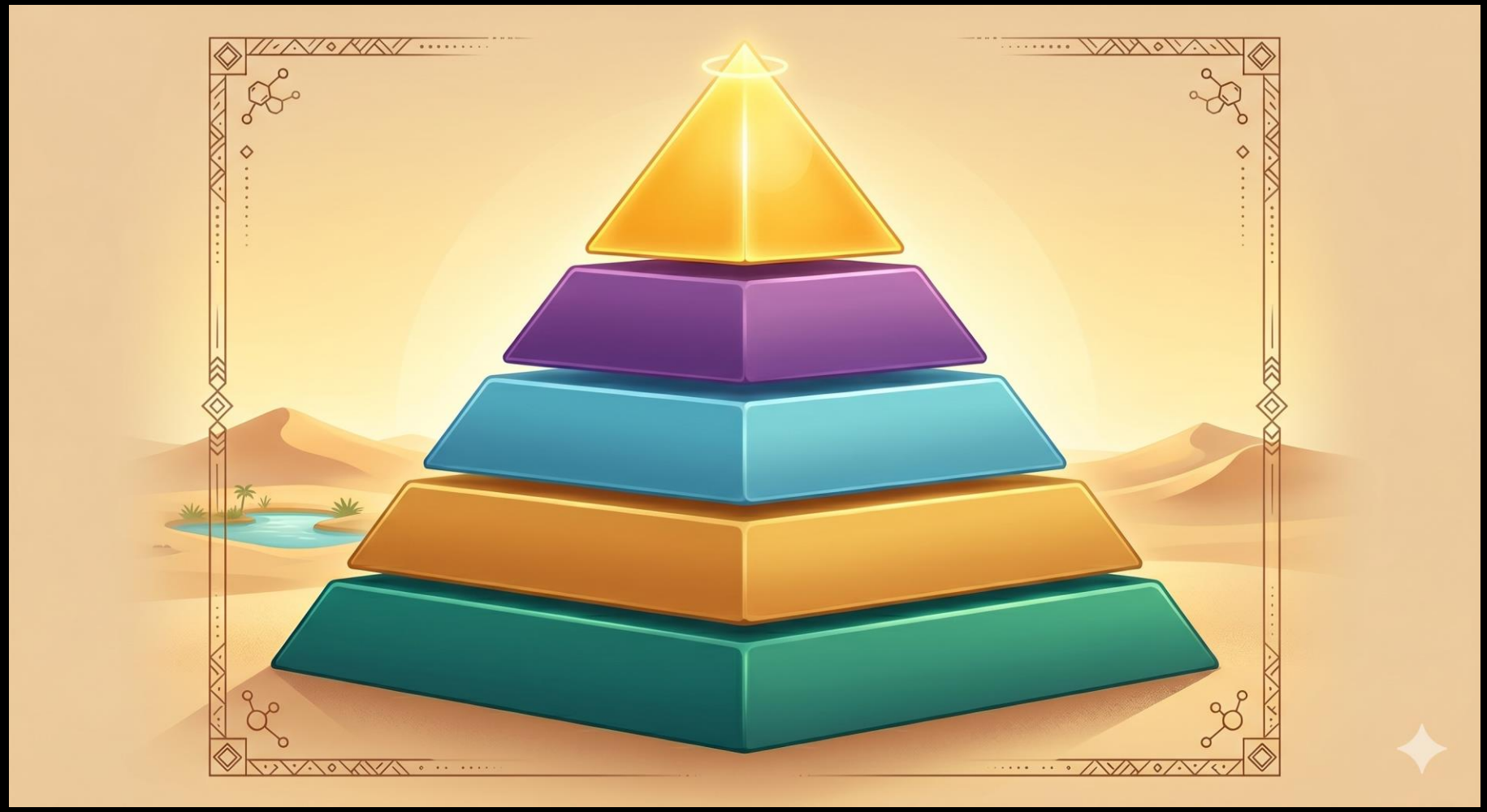
Key factors missed

Central sensitization and psychosocial drivers remain.

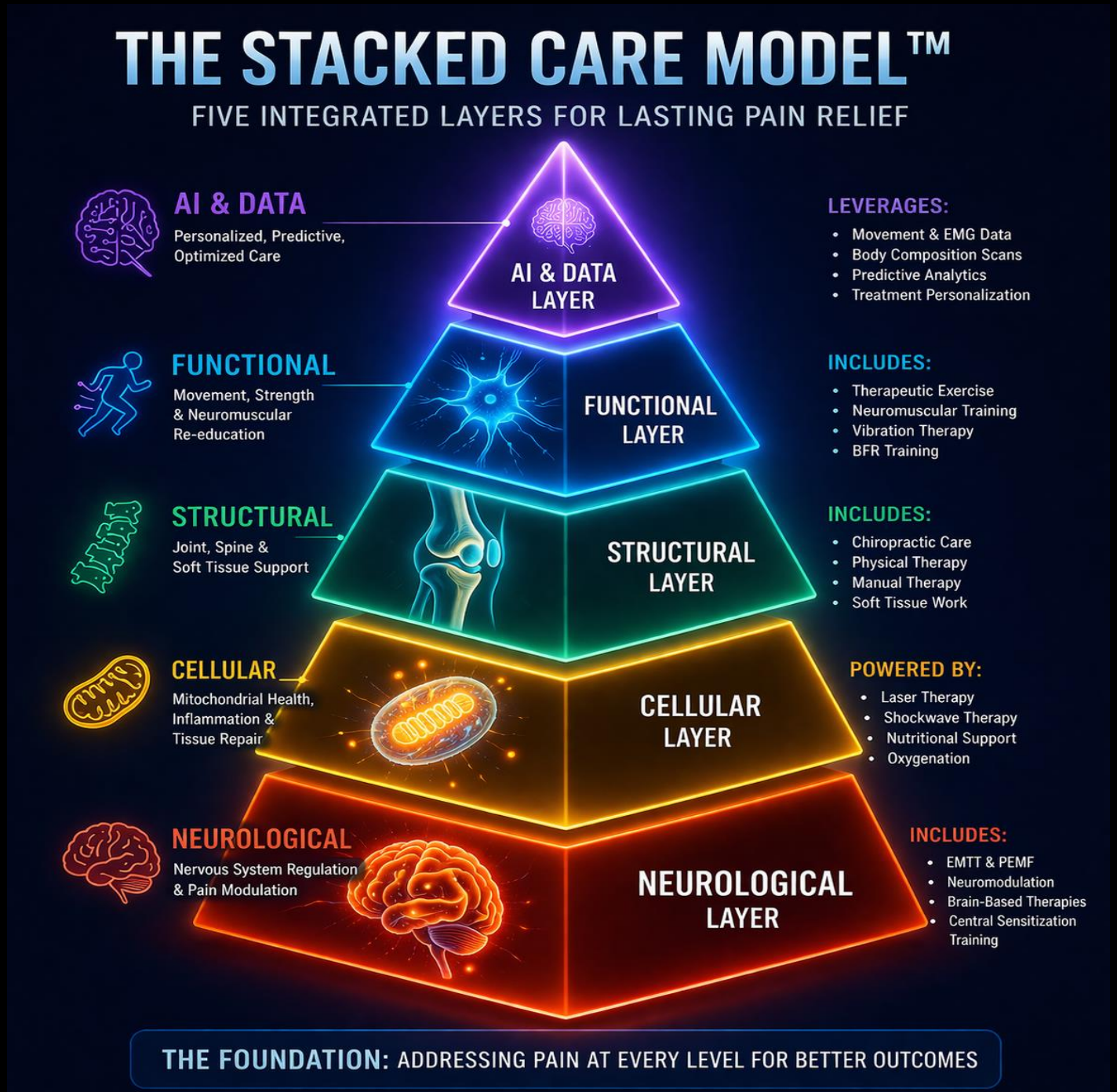
05

Frustrated Pt and Provider

No one knows what to do.



STACKED CARE MODEL



Stacked Care Pyramid

5-layer, stepwise model

Care progresses from neurological regulation to biochemical, behavioral, structural, and functional recovery–each layer builds on the last.

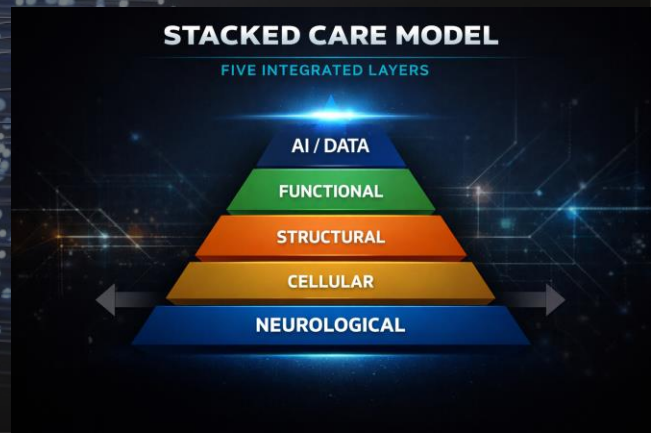
Maps complexity to interventions

The hierarchy reflects pathophysiology and enables targeted choices aligned with the dominant pain drivers.

Stacking creates synergy

Combining therapies across layers supports holistic relief and personalization over time.

Layer 1: Nervous / Autonomic System



Nervous System Modulation

The most common and oldest form of neuromodulation is done by electrical stimulation techniques such as TENS or interferential. This therapy reduces pain perception by modulating neural activity.

These noninvasive to minimally invasive methods can rebalance pain and autonomic circuits, improving conditions like neuropathy and migraine.

Modern Neuromodulation Modalities

PEMF

Mechanism: Pulsed fields enhance mitochondrial function and cellular metabolism.

Evidence: Supports neuropathic pain relief and improved cellular energy.

EMTT

Mechanism: High-frequency magnetic pulses support cellular repair and reduce neuroinflammation.

Evidence: Effective for chronic musculoskeletal pain and autonomic normalization.

VNS

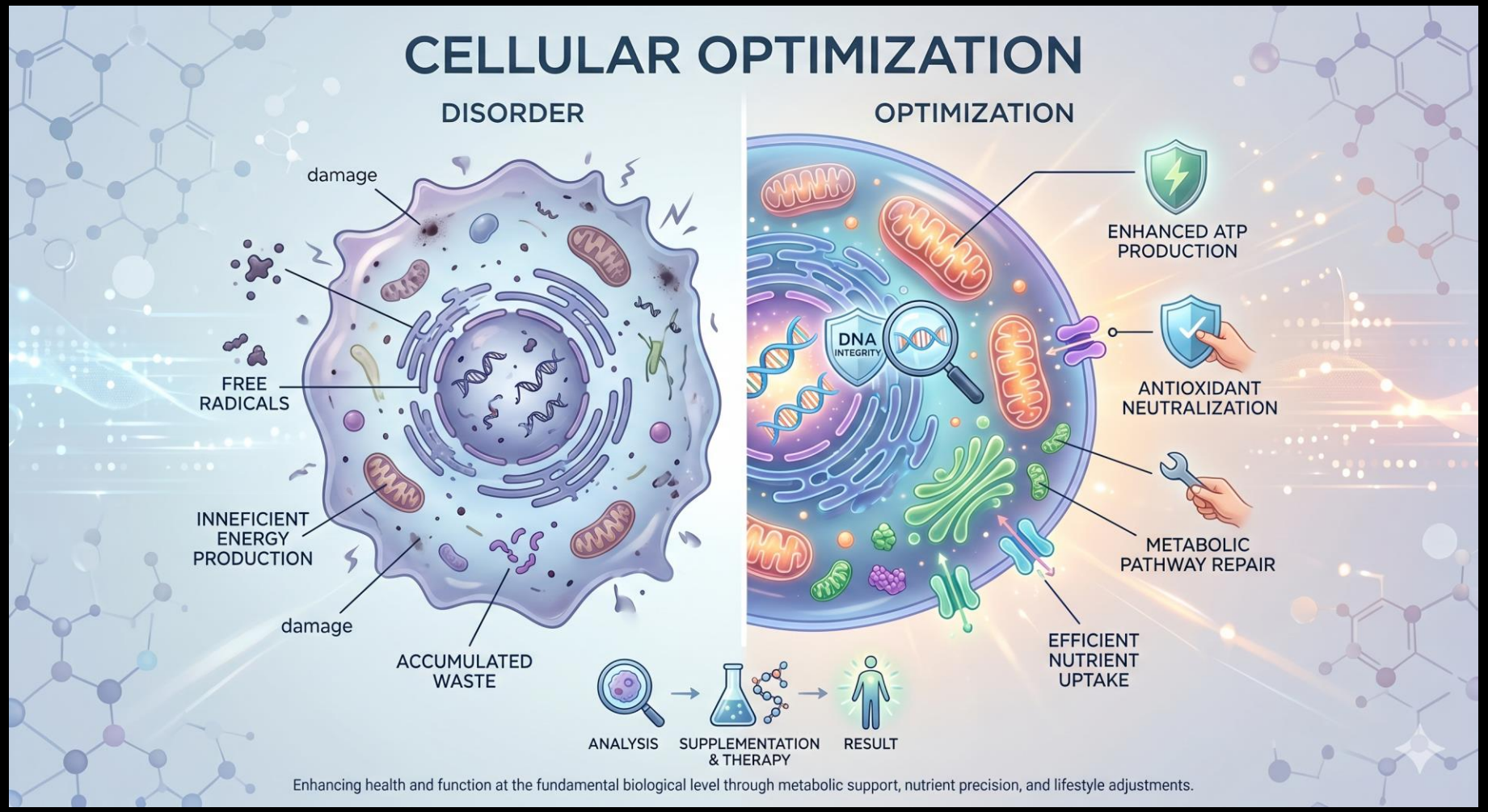
Mechanism: Vagus nerve stimulation modulates autonomic balance and lowers systemic inflammation.

Evidence: Reduces neuroinflammation and benefits chronic pain syndromes.

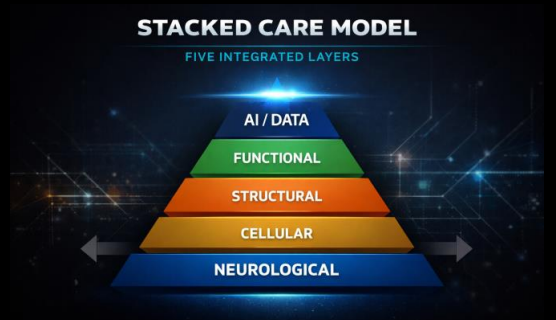
AUTONOMIC IMPACT

Increase in heart rate variability after neuromodulation, correlating with reduced pain sensitivity and improved stress resilience

AUTONOMIC IMPACT – ON CHILDREN



LAYER 2: CELLULAR OPTIMIZATION

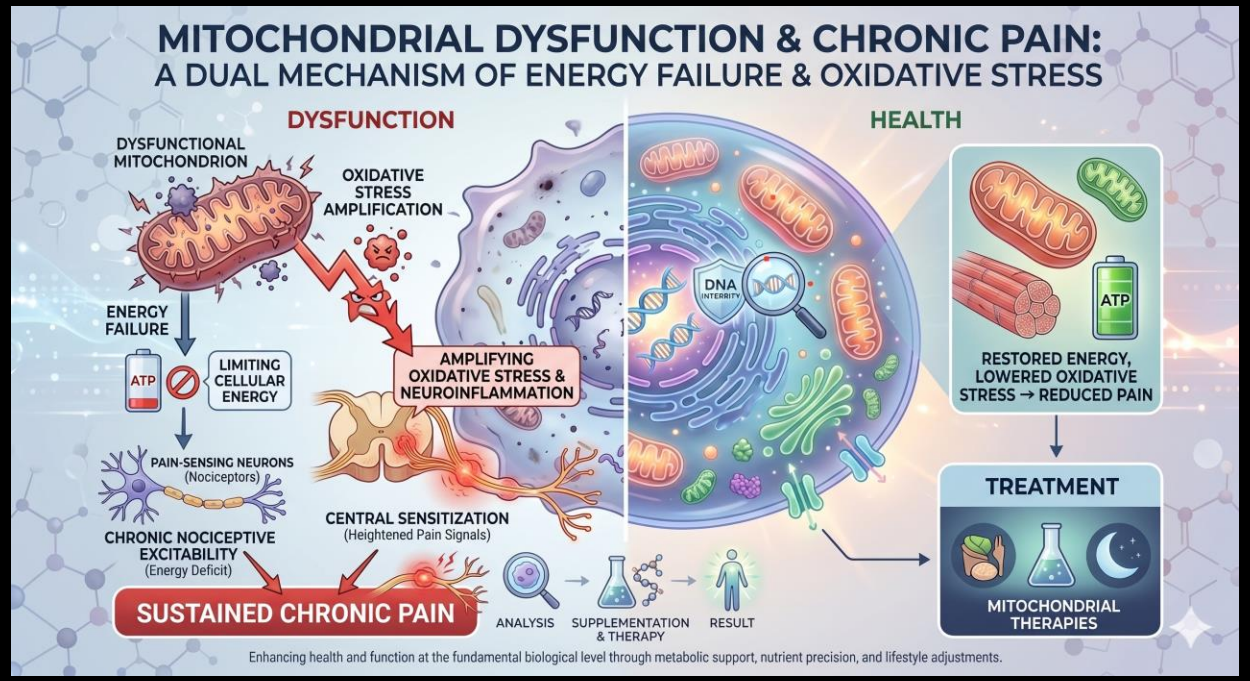


Mitochondrial Health

Inflammation Control for Pain Resolution

Mitochondrial dysfunction can sustain chronic pain by limiting cellular energy and amplifying oxidative stress, destabilizing tissue recovery.

Metabolic therapies, paired with antioxidants and peptides, may reduce pro-inflammatory cytokines, improve repair signaling, and optimize the cellular environment for healing.



CELLULAR RECOVERY

Energy:

- Laser
- EMTT
- PEMF

Repair:

- Focused Shockwave
- Regenerative Medicine

Inflammation

- Nutrition
- Peptide therapy
- Cryotherapy

RESTORING ENERGY TO THE CELL: LASER & RED LIGHT THERAPY BENEFITS

Cellular Healing Promotion

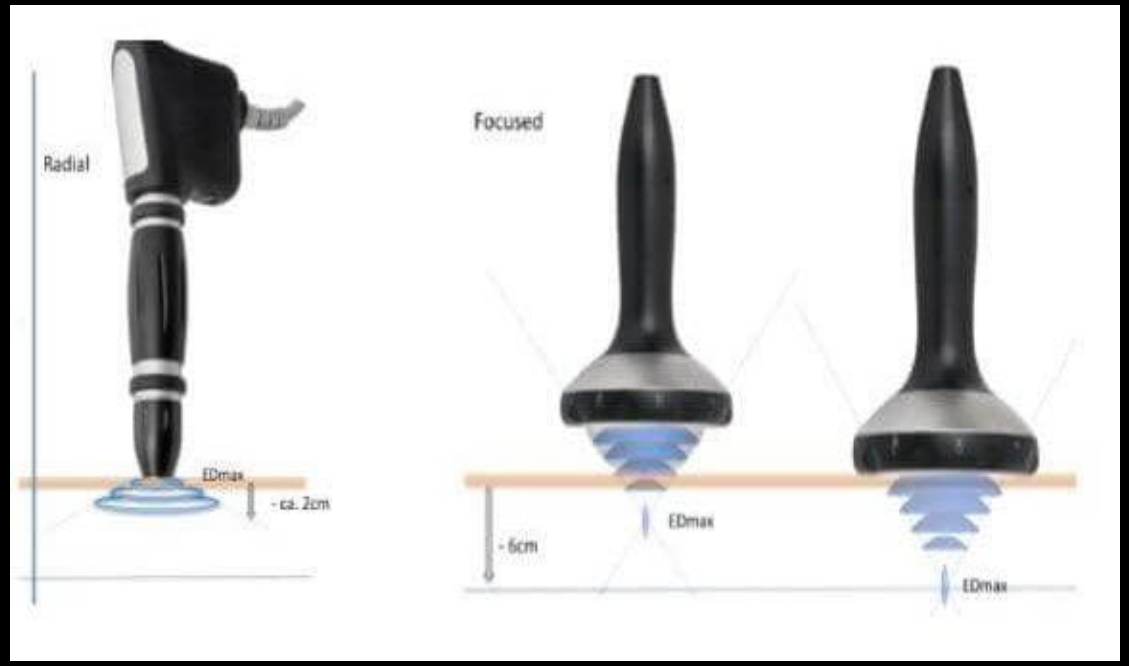
Laser and red-light therapy boost cellular healing by increasing ATP production and minimizing inflammation for faster recovery.

Wavelengths and Target Areas

Wavelengths like 630nm and 660nm penetrate skin and deeper tissues, tailoring treatment to specific therapeutic targets.

Types of Devices

Low-level lasers and LED devices are chosen based on therapeutic goals, enabling targeted cellular regeneration and healing.



UNDERSTANDING SHOCKWAVE THERAPY

Types of Shockwave Therapy

Radial and Focused shockwaves. Radial was the first to the market. Focused is the most current technology – which comes from lithotripsy

Focused Shockwave Treatment

Focused shockwave devices are split into 3 types: hydroelectric, electromagnetic, and piezoelectric. each generating acoustic waves in unique ways.

The devices use high-energy waves to penetrate deeply for precise tissue healing and targeted medical treatments.

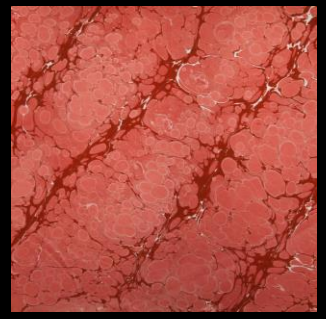
Radial Shockwave Therapy

Radial shockwave therapy disperses energy across a wider area, treating superficial conditions and broader tissue regions. It is more painful and sometimes sedation and or tissue numbing agents must be used.

FOCUSED SHOCKWAVE THERAPY BENEFITS

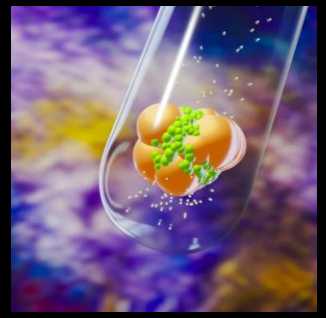
Enhanced Blood Supply

Shockwave therapy stimulates neovascularization, resulting in improved blood flow and cellular health in treated tissues.



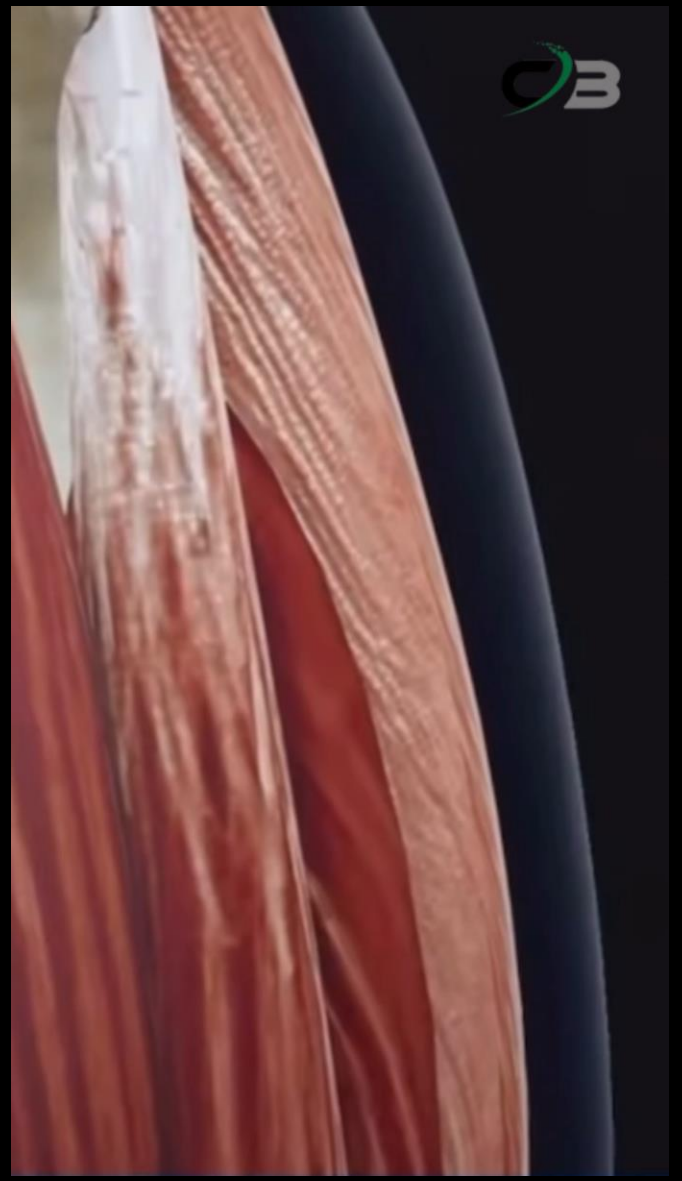
Scar Tissue Breakdown

This therapy helps break down fibrous scar tissue, which increases tissue flexibility and reduces pain.



Accelerated Healing

Shockwave therapy promotes release of stem cells, speeding up healing and regeneration in targeted areas.



PEPTIDE THERAPIES FOR INFLAMMATION CONTROL

PEPTIDES ARE OUT THERE

There are several types of common peptides that you need to be aware of because like it or not, your patients are using them right now.

Safety and Regulation

Limited clinical studies and inconsistent quality control raise safety and regulation concerns for peptide therapies. Professional guidance is strongly recommended.

Peptide	Primary Target	Mechanism of Action	Best For
BPC-157	Connective Tissue	**Angiogenesis:** Grows new blood vessels to "white" tissue (tendons/ligaments).	ACL/MCL tears, tennis elbow, gut lining repair (Leaky Gut).
TB-500	Muscle & Fascia	**Actin Polymerization:** Increases cell migration to injury sites; reduces scar tissue.	Muscle strains, acute trauma, flexibility/stiffness issues.
GHK-Cu	Nerves & DNA	**Remodeling:** Clears damaged proteins; stimulates nerve growth factor (NGF).	Neuropathy, nerve impingement, "creaky" joints, skin aging.
Thymosin Alpha-1	Immune System	**Immune Modulation:** Balances T-cells to stop "cytokine storms."	Systemic inflammation, autoimmune flares, chronic fatigue.
Microdosed GLP-1	**Neuro-Metabolic**	**Microglial Regulation:** Silences "alarm" cells in the brain to lower central sensitization.	**Central Sensitization**, "Brain Fog" pain, neuroinflammation, metabolic syndrome.

NUTRITION FOR CHRONIC PAIN

Anti-Inflammatory Supplements

Curcumin (Turmeric) and Boswellia Serrata are powerful anti-inflammatory supplements, commonly used to reduce chronic pain and swelling.

Omega 3s and Joint Relief

Omega 3 fatty acids help reduce joint pain and support overall joint health in chronic pain management.

Nerve Pain and Cellular Support

Alpha-lipoic acid and acetyl-L-carnitine aid in nerve pain relief. CoQ10 and NAD+ precursors (Nicotinamide mononucleotide), NMN) boost cellular energy and decrease fatigue.

Muscle Relaxation and Pain Modulation

Magnesium helps relax muscles, while (Palmitoylethanolzmide) PEA supports pain modulation, providing relief for various chronic pain conditions.

CRYOTHERAPY BENEFITS EXPLAINED

Reduction of Inflammation

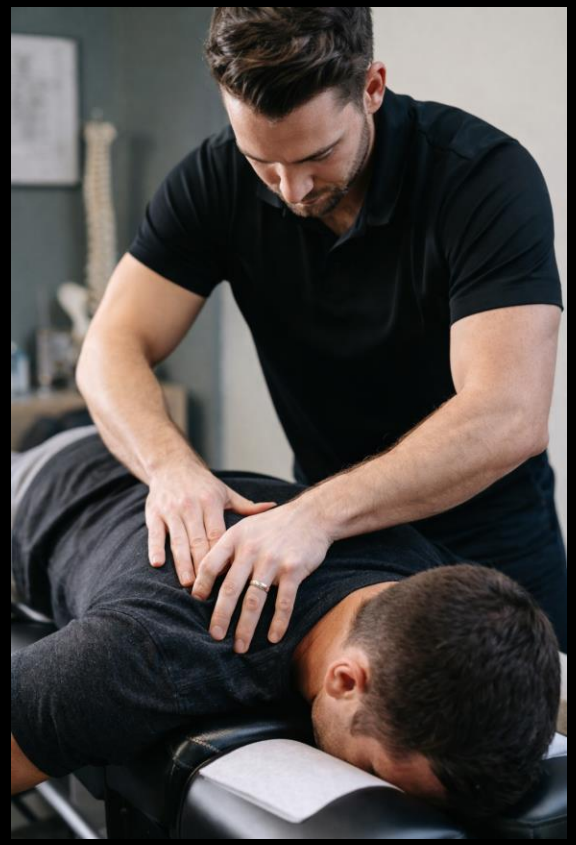
Cryotherapy with CO2 spray effectively reduces inflammation, aiding faster recovery in targeted tissues.

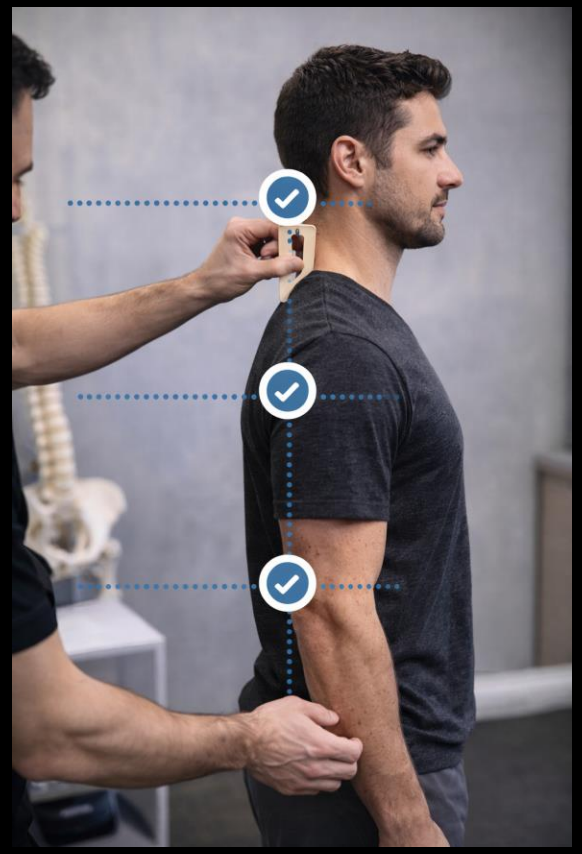
Cell Repair and Regeneration

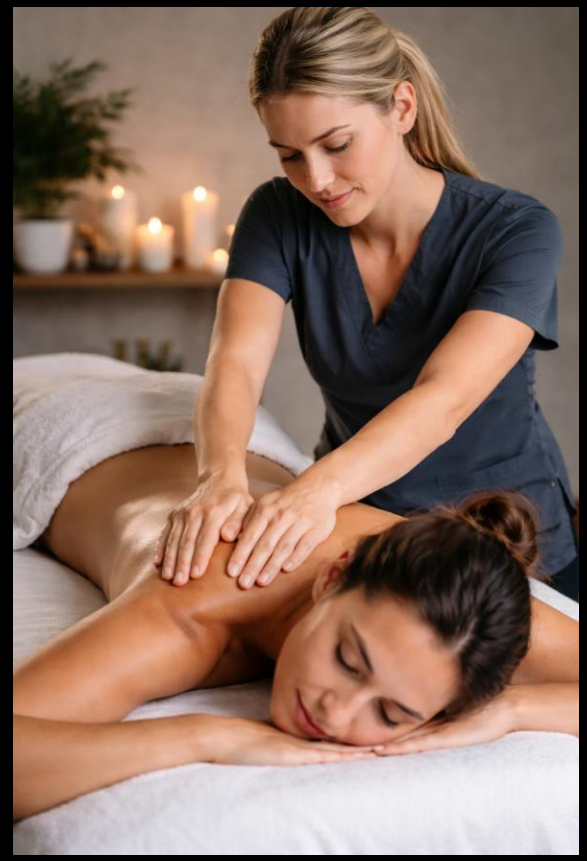
Controlled cold exposure promotes cellular repair and regeneration, enhancing tissue healing processes.

Enhanced Tissue Recovery

Biological processes stimulated by cryotherapy improve overall tissue recovery and healing outcomes.

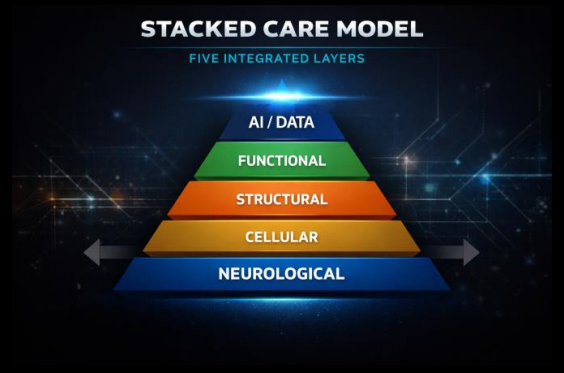






LAYER 3: STRUCTURAL - RESTORATION

Biomechanics, adjusting, decompression, soft-tissue therapy



BIOMECHANICS & JOINT FUNCTION

WHY IT MATTERS

Misalignment increases tissue strain and nociceptive input, sustaining mechanical pain. (Think a piece of food caught between teeth)

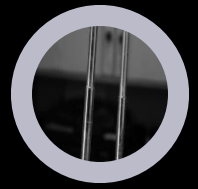
CLINICAL GOAL

Restore joint kinematics to reduce inflammation and secondary dysfunction, improving pain.

CHIROPRACTIC ADJUSTING METHODS

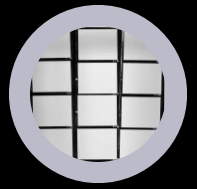
Manual Adjusting

Hands-on spinal and joint manipulation to restore alignment and mobility; often used for acute and or chronic pain and stiffness.



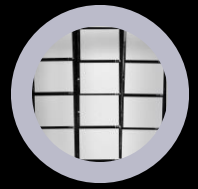
Instrument Adjusting

Specialized tools deliver precise, low-force adjustments—useful when gentler interventions are preferred.



Pain & Disability

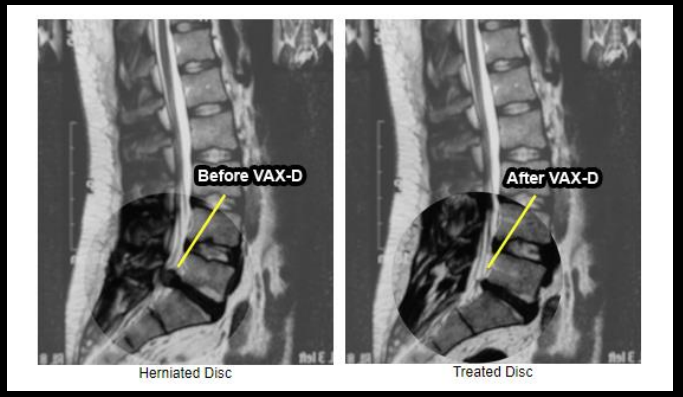
There is strong evidence for improvement in conditions like low back and neck pain.



Neuromuscular Outcomes

Adjustments influence reflexes and postural control; The nervous system is directly affected by spinal adjustments.

NON-SURGICAL SPINAL DECOMPRESSION



Spinal decompression

Non-surgical traction reduces nerve root pressure, supporting disc hydration and tissue healing.

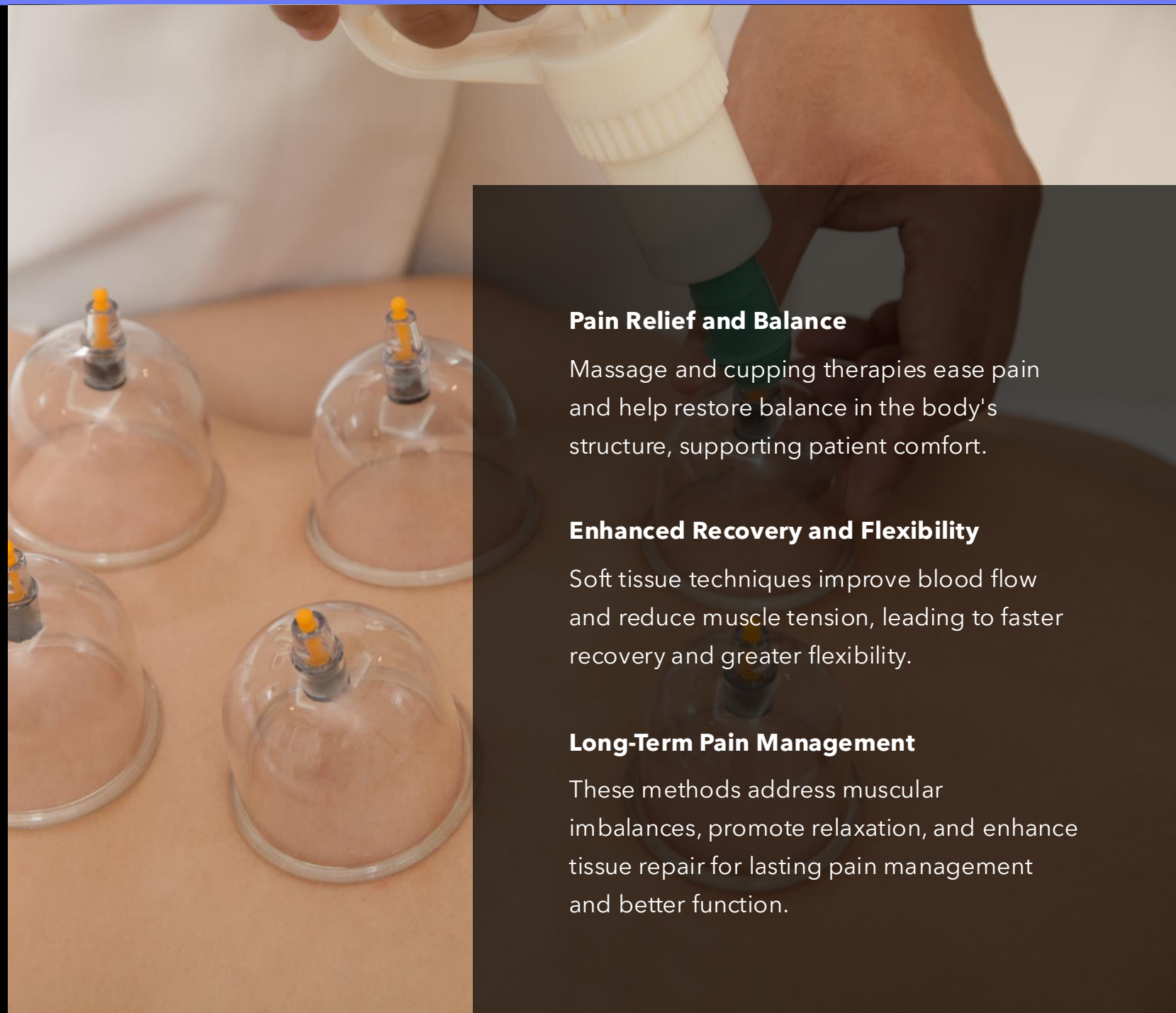
Unique Treatment

This treatment is unique in that there are only two types of treatments that directly target the disc. This and surgery. Direct stem cell injections into the disc are still not proven helpful.

How it all started....

Dr. Allen Dyer, 1991 modified traction with a unique pull of the spine using a logarithmic curve, along with special sensors in the table to reduce muscle guarding. The VAX-D was the first device to receive FDA certification for non-surgical spinal decompression.

RESTORING STRUCTURE WITH SOFT TISSUE TECHNIQUES



Pain Relief and Balance

Massage and cupping therapies ease pain and help restore balance in the body's structure, supporting patient comfort.

Enhanced Recovery and Flexibility

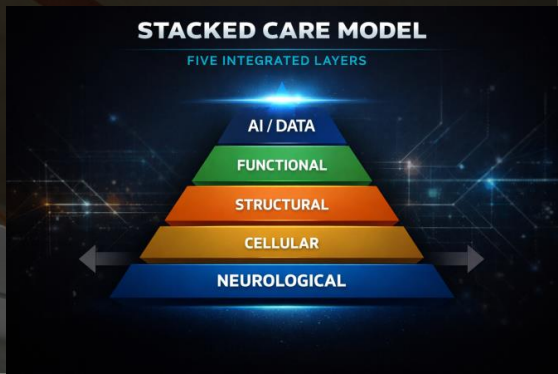
Soft tissue techniques improve blood flow and reduce muscle tension, leading to faster recovery and greater flexibility.

Long-Term Pain Management

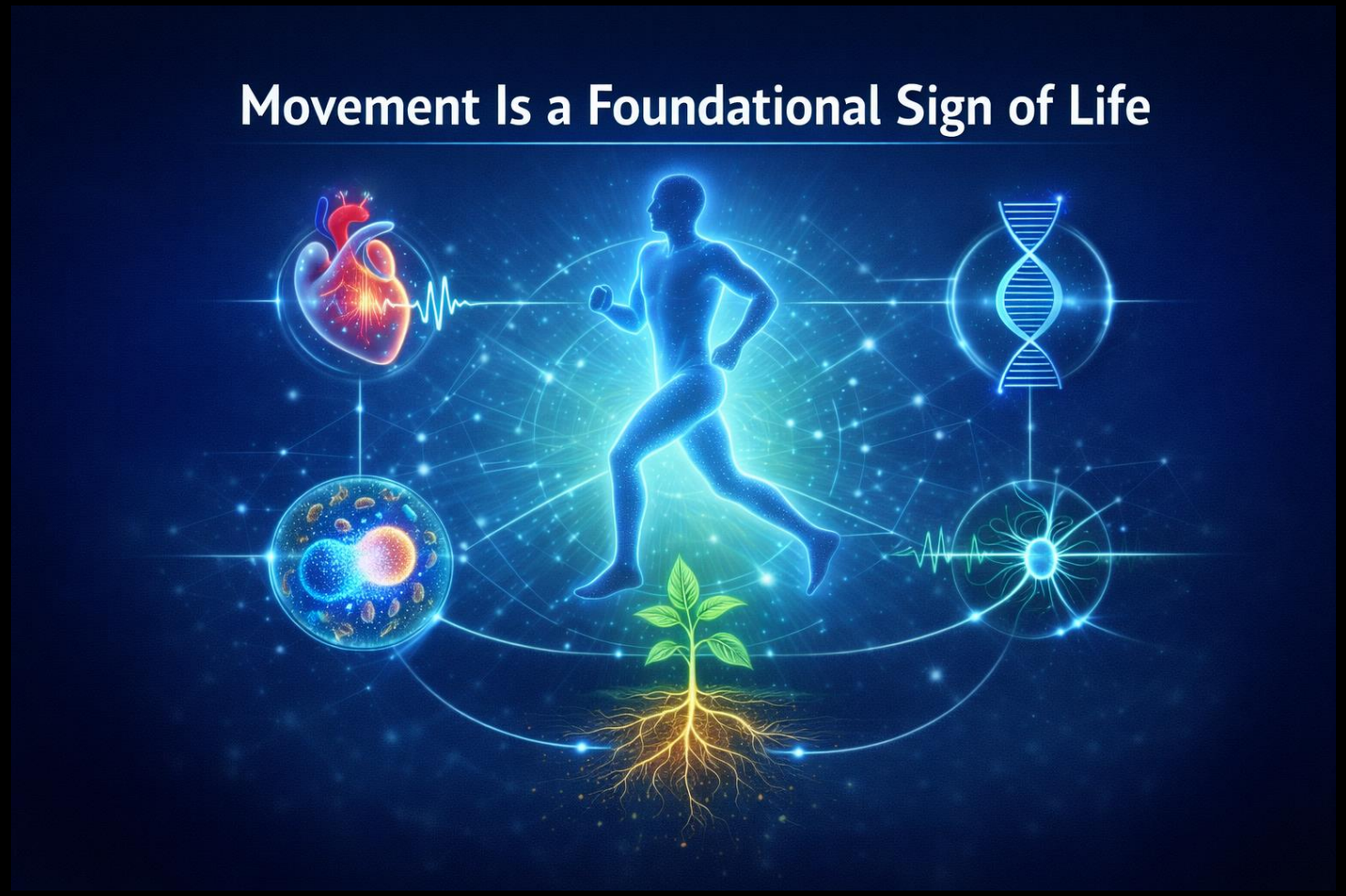
These methods address muscular imbalances, promote relaxation, and enhance tissue repair for lasting pain management and better function.

Layer 4: FUNCTIONAL REPROGRAMMING

Rehab strategies, movement therapy, stability sequencing



#1 RULE IN REHAB - “MOTION IS LOTION”



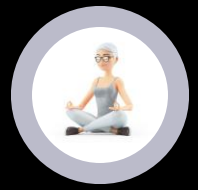
“If you are not moving, you are dying!”

Rehab Strategies

Physical Rehabilitation Therapy

Individualized loading and movement retraining to restore function.

Targets compensations; strong evidence for chronic pain improvement.



Yoga

Breath + mobility to improve flexibility and downshift stress.

Research supports pain reduction and better mood.

Water Therapy

Core stability, posture, and precise control under low-threat – in a weightless environment.

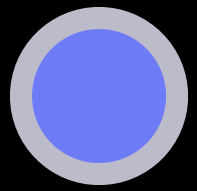
Builds neuromuscular coordination while protecting the joints for lasting support.

Graded Exposure

Stepwise increases in activity to rebuild confidence and capacity.

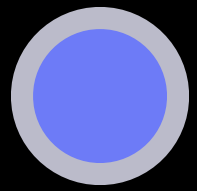
Reduces fear-avoidance and improves function over time.

Cognitive & Behavioral Reprogramming



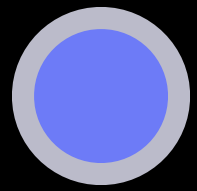
Pain Is Brain-Mediated

- Pain perception is brain-mediated.



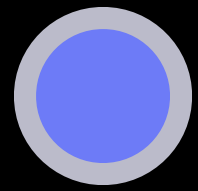
Fear & Catastrophizing

- Fear avoidance and catastrophizing impact outcomes.



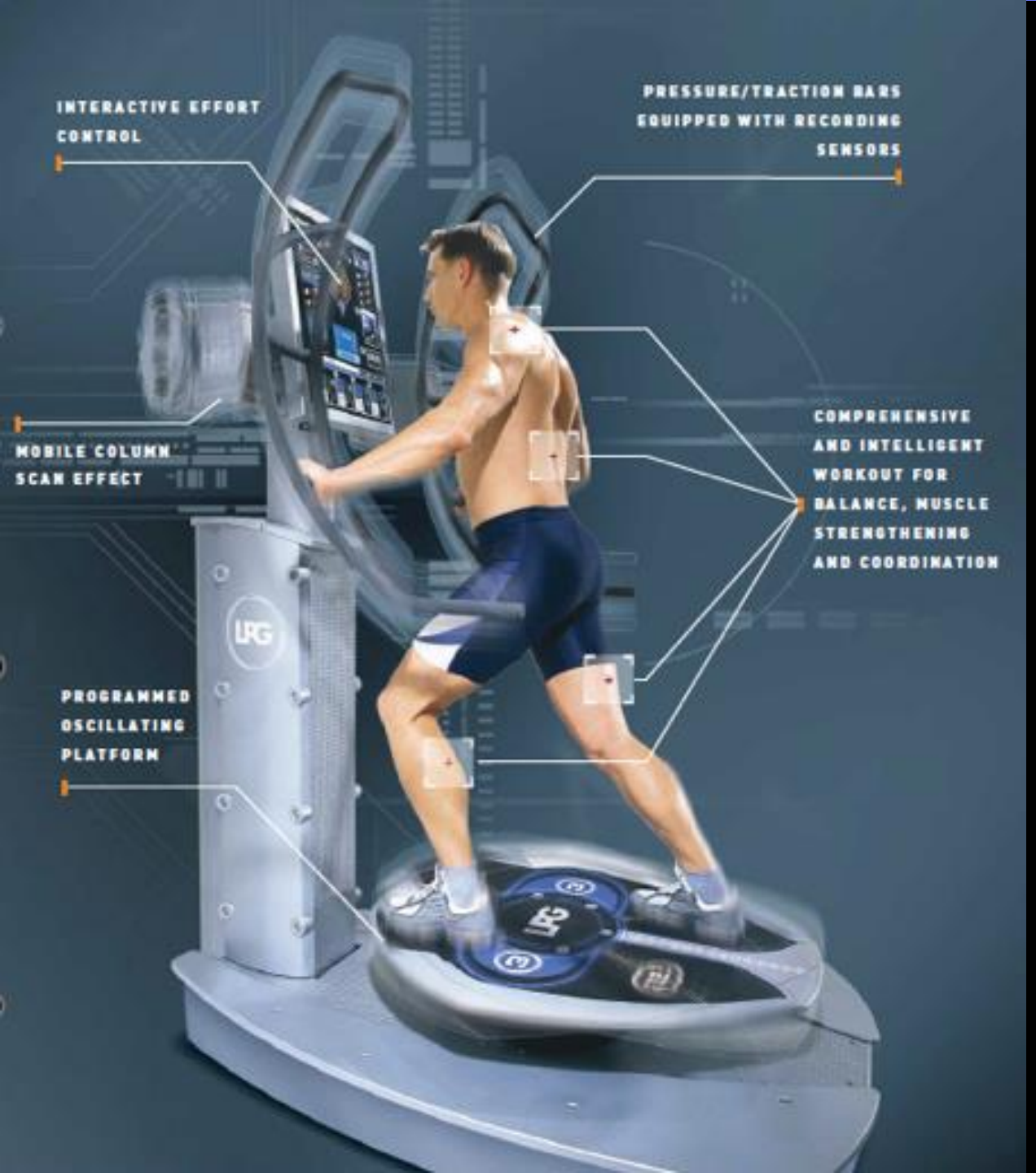
Stress & Autonomic State

- Stress and autonomic state influence pain sensitivity.



Strategies & Goal

- Cognitive and behavioral strategies improve function.
- Goal: retrain the brain—movement is safe.



NEUROMUSCULAR STABILITY TRAINING

Proprioception, balance, and activation for joint control

TRAINING GOAL

Improve balance, proprioception, and coordinated muscle activation to support joint stability and efficient movement.

CLINICAL IMPACT

Evidence links neuromuscular training to fewer and less severe pain recurrences by reinforcing biomechanics and reducing injury risk.


INTEGRATED PATHWAYS
WHAT THIS LOOKS LIKE CLINICALLY
COSTS?

SEQUENCING INTERVENTIONS

01 

Calm the nervous system

Reduce sensitization to improve tolerance and readiness for care.

02 

Support Cellular Healing

Reduce inflammation, enhance cellular repair and mitochondrial support.

03 

Restore structure

Address alignment and tissue capacity to support durable change.

04 

Rebuild function

Progress movement and load to reduce relapse and improve outcomes.

CALM THE SYSTEM – WHAT WE DO FIRST

Cryotherapy

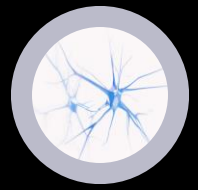
Lowers tissue temperature to reduce neuroinflammation; studies show less pain and improved recovery.

EMTT / PEMF

Modulates cellular activity and inflammation; evidence supports pain reduction and tissue healing.

Low-Level Laser

Supports cellular repair and lowers oxidative stress; trials show improved balance and pain relief.



Vagus Stimulation

Regulates autonomic tone and lowers cytokines; research supports chronic pain and dysautonomia.

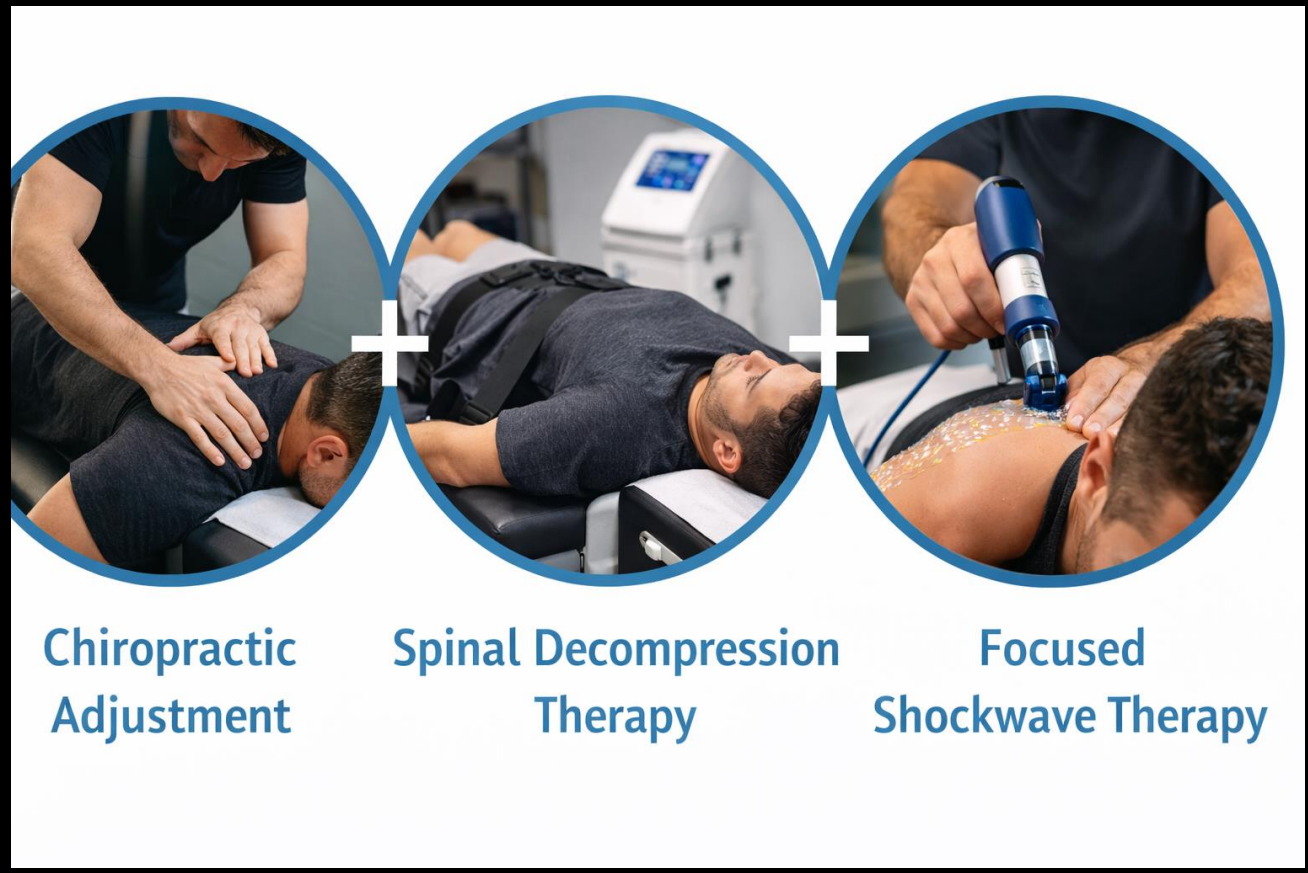
RESTORE STRUCTURE

Structural Therapies

Decompression and adjustments correct biomechanical dysfunction and reduce nociceptive input.

Tissue Healing

Shockwave therapy supports repair, improves local circulation, and calms sensitized tissues.



REPROGRAM FUNCTION

01

Initial Assessment

Baseline function and movement faults identified (20%).

Progress: 20 → 40 → 65 → 85 → 100

02

Early Rehab

Restore pain-free range and controlled loading (40%).

Area chart points: 40%

03

Strengthening

Build capacity and tissue tolerance for higher demands (65%).

Area chart point: 65%

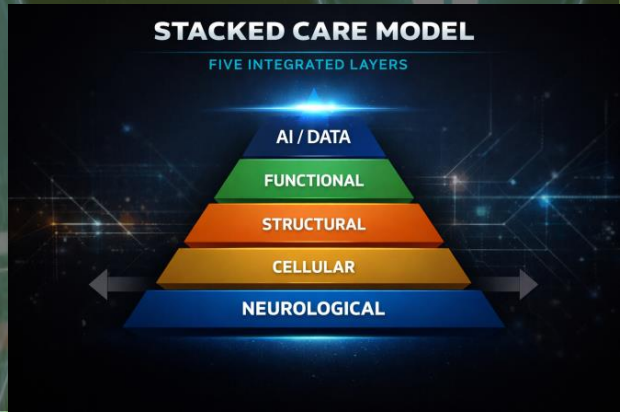
04

Neuromuscular + Return

Reinforce clean mechanics to prevent recurrence; complete recovery (85% → 100%).

Area chart points: 85%, 100%

AI/Data Integration and Oversight



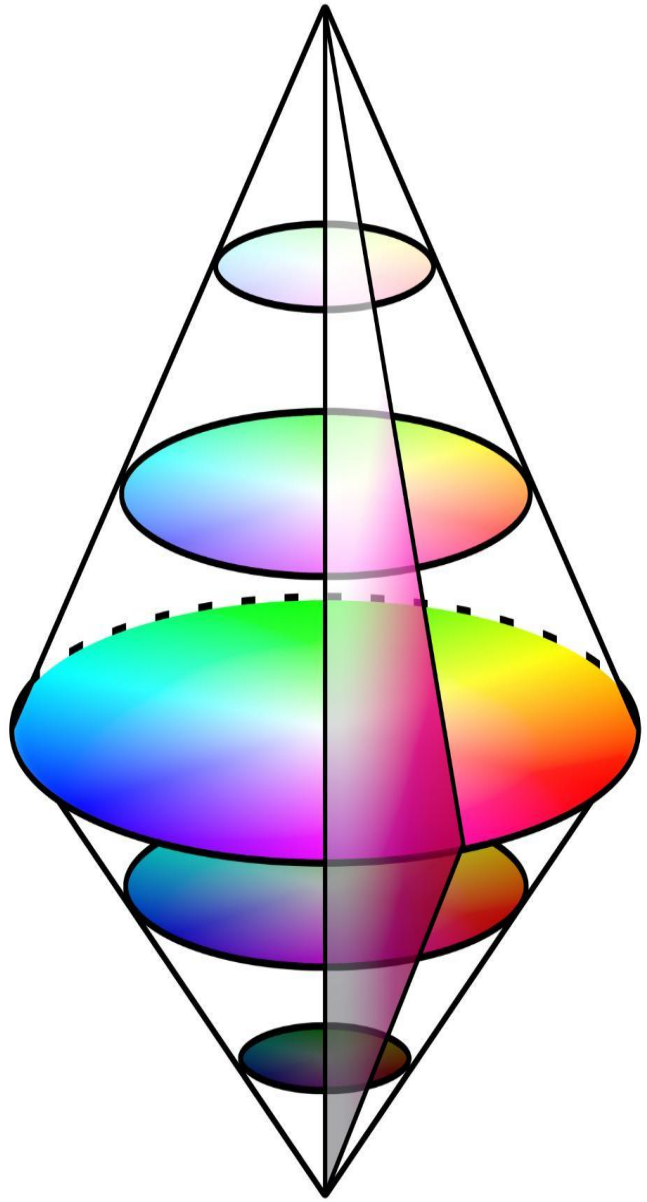
AI-Enabled Care Pyramid

Technology Across All Layers

AI and data analytics weave through every level to connect signals, workflows, and outcomes.

Data Flow and Feedback Loops

Predictive insights continuously update care decisions and enable dynamic adjustments over time.



AI Across the Stacked Care Model

Neuro | HRV / Stress Tracking

Cellular | Sleep / Recovery Data

Structural | Imaging Insights

Functional | Rehab Guidance

AI = Integration + Personalization

Personalized AI Care

AI-driven digital therapeutics tailor programs to each patient.

Personalized exercise + behavioral interventions update based on adherence and symptom signals.

Dynamic adaptation improves engagement and outcomes while lowering overall care costs.

Studies in *The Lancet Digital Health*, *JAMA*, and *Nature Medicine*, show that AI boosts diagnostic accuracy and efficiency and enables more personalized, data-driven treatment—especially when paired with clinician expertise.

Sources: The Lancet Digital Health; JAMA; Nature Medicine.

>50%

Average reduction in pain scores reported in clinical trials across Hinge Health, SWORD Health, and Kaia Health

CASE EXAMPLES

>80%

Patients reported improved pain management and functional outcomes with AI-enabled care

Evidence from platforms such as Hinge Health, SWORD Health, and Kaia Health

AI Outcomes

92%

Predictive accuracy for pain flare-ups

35% improvement in patient movement metrics after AI integration

Source: Internal clinical pilot evaluation (2025).
92% retrospective validation accuracy (pain flare-up prediction); 35% improvement in movement metrics after AI-assisted plan adjustments.

ROLE OF AI IN CARE

↑25%

Improvement in patient adherence with AI-driven digital therapeutics.

AI integrates biometric, behavioral, and imaging data to personalize interventions and monitor progress in real time.

AI IN CONTEXT

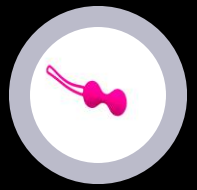
Pain Tech Future - Overview

Wearable Biosensors

Continuous monitoring of physiological signals to detect pain episodes early and support tailored interventions.

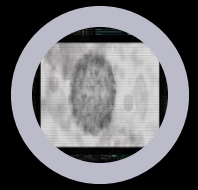
Neuromodulation Devices

Electrical or magnetic stimulation that modulates pain pathways for targeted chronic pain relief.



Regenerative Medicine

Stem cells, growth factors, and tissue engineering to repair damage and address pain at its source.



AI Digital Therapeutics

AI-driven personalized programs that improve engagement, adherence, and pain outcomes beyond traditional care.

NEUROMODULATION – FOR NOCIPLASTIC

TRANSCRANIAL MAGNETIC STIMULATION:
a non-invasive procedure that uses magnetic fields to stimulate nerve cells in the brain, primarily targeting the motor cortex to reduce chronic, treatment-resistant pain.

FOCUSED ULTRASOUND
Mechanism: Targeted ultrasound modulates circuits; higher intensity enables focal ablation. Evidence: Clinical tremor; trials for nociplastic pain ongoing.

VAT: Low-frequency sound via chair; relaxation/sleep; evidence variable.
Binaural/isochronic: Two-tone or pulsed audio rhythms; mixed evidence for relaxation/anxiety, attention, sleep.

AI-ENHANCED CARE

Holistic, Layered Care

Move beyond medication and surgery with integrated, multi-level pain care.

Stacked Care Model

Neurological regulation, cellular optimization, structural restoration, functional reprogramming.

AI Personalization

Adaptive, data-informed plans to optimize sequencing and individual response.

Better Outcomes

Technology-enhanced, non-invasive care can improve pain outcomes and quality of life.

AI is not replacing clinicians—it's amplifying them.

It improves diagnostic precision and accelerates clinical workflows,

allowing us to tailor care to each individual patient at a level we've never been able to achieve before.

Sources: Gulshan et al., JAMA (2016); McKinney et al., Nature (2020); Topol, Nature Medicine (2019)

THANK YOU & CONTACT INFO

COLUMBIA BASIN
CHIROPRACTIC CENTER

COLUMBIA BASIN
MEDICAL CENTER

Appreciation and Invitation

Thank you for attending. We invite you to reach out with any questions or concerns you may have.

Clinic Address

Our clinic is located at 1305 Fowler St., Suites 1B & C, Richland, WA 99352, providing easy access for all visitors.

Contact Numbers

For inquiries, call 509-582-3549 or 509-585-6318. We're here to assist with any medical questions.