FOOT LEVELERS

CHIROPRACTIC HOMEOSTASIS LECTURE SERIES: SPORTS CHIROPRACTIC & TECHNIQUE REVIEW

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Clinic 21+ years

Certified Electromyographer

Editorial Board Member, Journal of Reward Deficiency and Addiction

Published in areas of Addiction Science & Pain, Cognitive Decline, Electrotherapeutics & Bone Metabolism

Beacon award winner 2022 Chiropractor of the Year by the New York Chiropractic Council

Anish Bajaj, D.C.

Brain Health based Anti-Aging Executive Program:

Brain Electrical Activity Mapping (QEEG)

Correlate brain function to every part of the body screening of Cognitive Function, Attention, Memory, Personality, Emotional Inventory; Head-to-toe Ultrasound, DEXA Bone Density & Body Composition; Peripheral Vascular Function; NCV/EMGAdvanced Imaging with 3T MRI, PET/CT, PET/MRI

Becoming a Patient

Reactive Patient ~20 years	Proactive Patient ~26 years
Asthma & Allergies from early childhood	Chiropractic Care [**KLEIN**]
Inhalers, Nebulizers, Pills, Shots	Breathing
Ankle…Knee…Hip pain started with soccer/tennis	Yoga
Advil 1x, 2x, 3x, 4x, 5x daily	Hydration
Chronic upper respiratory infections	Nutrition
Antibiotics	Advanced Nutrition

DNA Directed Pro-Dopamine Regulation Coupling Subluxation Repair, H-Wave® and Other Neurobiologically Based Modalities to Address Complexities of Chronic Pain in a Female Diagnosed with Reward Deficiency Syndrome (RDS): Emergence of Induction of "Dopamine Homeostasis" in the Face of the Opioid Crisis

by Anish Bajaj [1], Kenneth Blum [2,3,*], Abdalla Bowirrat [4], Ashim Gupta [5], David Baron [2], David Fugel [1], Ayo Nicholson [1], Taylor Fitch [1], B. William Downs [6], Debasis Bagchi [7], Catherine A. Dennen [3] and Rajendra D. Badgaiyan [6]

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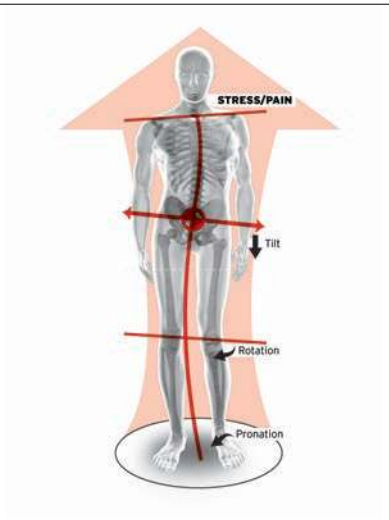
Respiratory Crisis

Opioid Crisis: respiratory depression

Covid-19: lung infection complications

Wildfires: Canada



Cultural Ecology

Cultural Ecology is the study of human adaptations to social and physical environments.

environmental asymbiosis to an emphasis on human-made life designs.

cognitive overload (extra somatic data)

Patients

1)Poor Guidance
2)Poor Self-Regulation
3)Need Priorities
4)Need Time / Life management

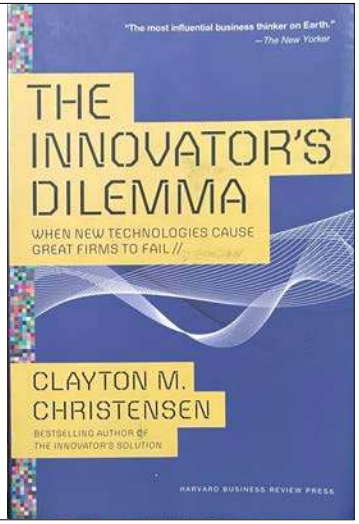
Health Care System

1)Reactive vs. Proactive
2)Over-linear
3)Doesn't handle chronic conditions very well
4)Opioid and other addictive problems have persisted

The Chiropractor

-Scope of Practice (State)
-Spine + ? (Awareness + Responsiveness)
-Xray (safety, education)
-Extremities? (Receptors)
-Physical Therapy? (Metabolism: Neurotransmission + Fluid Movement)
-Modalities? (Discernment)
-Home Care? (Independence)
-Vitamins, Herbs (Interdependence + Sustainability)
-Nutraceuticals (Collaboration)
-Pharmaceuticals (Choice, Consent)
-Regenerative, Anti-Aging (Future)

Solutions
1) Focus on the spine
2) Imaging perspective
3) Identify and close the gaps
4) Identify sequence of care
5) Integrate tools



Journal of Neurology, Psychiatry and Brain Research
Kosmos Publishers
Review Article
Jou Neu Psy Brain. JNPB-103

Chiropractic and Mental Health: History and Review of Putative Neurobiological Mechanisms

Christopher Kent*

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Subluxation Mechanisms

Vertebral Subluxation
Cord Compression
Nerve Root Compression
Local Irritation
Vertebral Artery Compromise
Anatomic Dysfunction
Coherence
Dysafferentation
Dyskinesia
Dysponesis
Dysautonomia

"In terms of knowledge and understanding of patients, I'm working to catch up to my hands."

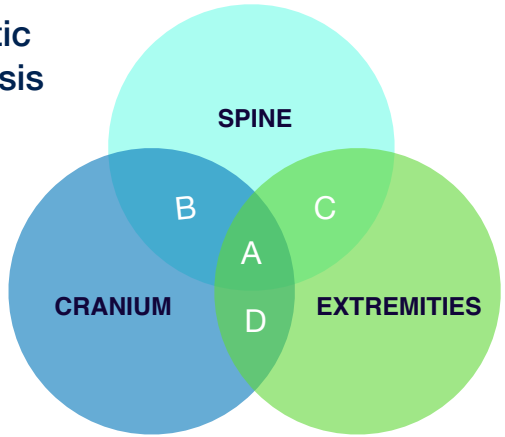
Inherited vs Designed Care Models

Bone	Structural/MSK focus by region
Nerve	Modality-Based Physical Therapy
Muscle	Overspecialization
Ligament	Value network: referral system, language, coding, etc
Tendon	
Disc	Chronic Pain Management: CRISIS
	GAPS IN CARE

Inherited vs Designed Care Models

Bone	Movement
Nerve	Stability
Muscle	Electrical Activity
Ligament	Blood
Tendon	CSF
Disc	Lymph

Chiropractic Homeostasis



CHIROPRACTIC EDUCATION VS. MEDICAL EDUCATION

CLEVELAND CHIROPRACTIC COLLEGE
Kansas City

People are often surprised to discover that the education received at a chiropractic college is quite similar to the education received in medical school. Candidates for chiropractic college must complete a minimum of three years of college-level courses prior to entering school, and completion of a doctor of chiropractic degree requires four to five years of professional coursework. Also, the education of a chiropractor is similar in total classroom hours to that of a medical doctor.

Comparison of Overall Curriculum Structure

Characteristics	Chiropractic Schools		Medical Schools	
	Average	Percentage	Average	Percentage
Total Contact Hours	4826	100	4667	100
Basic Sciences hours	1420	29	1200	26
Clinical Sciences hours	3406	71	3467	76
Chiropractic Sciences hours	1975	41	N/A	N/A
Clerkship	1405	29	3467	76

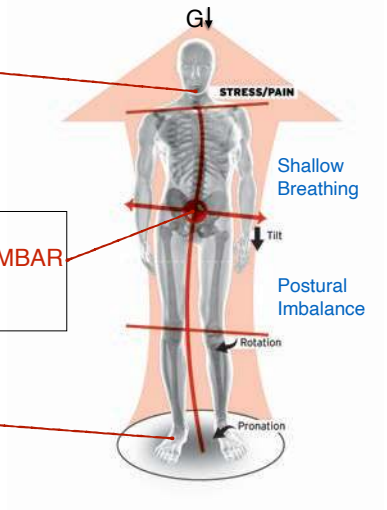
Chiropractic vs. Medical

Chiropractic	Subject	Medical
540	Anatomy-Physiology	508
240	Physiology	326
360	Pathology-Geriatrics-Pediatrics	401
165	Chemistry	325
120	Microbiology	114
630	Diagnosis, Dermatology, Ears, Eyes, Nose, Throat	324
320	Neurology	112
360	Radiology	148
60	Psychology-Psychiatry	144
60	Obstetrics-Gynecology	148
210	Orthopedics	156
3065	**Total**	**2706**

ANTERIOR HEAD CARRIAGE/ HYPOLORDOTIC CERVICAL CURVE

PELVIC TILT/ HYPERLORDOTIC LUMBAR CURVE/ FACET SYNDROME

BILATERAL ASYMMETRICAL PRONATION



Brain Atrophy with chronic LBP

Attention deficits after 5 minutes of pain

Increased Sympathetic Tone

Reduced inhibition of the Sympathetic Nervous System

NYS Chiropractic

"independent health care professionals who treat many conditions as they relate to the spine, emphasizing the dependency of health on the correct functioning of the central nerve system…

Chiropractors adjust or manipulate misaligned vertebrae (the bones of your spinal column) to restore correct functioning of your central nerve system…

They may also work with other parts of your body affected by the misaligned vertebrae.

Definition and Position Statement on the Chiropractic Subluxation

"We currently define a chiropractic subluxation as a self-perpetuating, central segmental motor control problem that involves a joint, such as a vertebral motion segment, that is not moving appropriately, resulting in ongoing maladaptive neural plastic changes that interfere with the **central nervous system's ability to self-regulate, self-organize, adapt, repair and heal."**

-The Rubicon Group, May 2017

Homeostasis

the tendency towards a relatively stable equilibrium between interdependent elements, especially maintained by physiological processes

an inclination toward a particular characteristic or type of behavior…a group within a larger political party or movement

CHIROPRACTIC HOMEOSTASIS APPLIED

BRIDGE THE GAPS to achieve Complete Spine Care

Between physical recovery and peak physical performance

And between stress recovery and peak mental performance

All towards balanced health

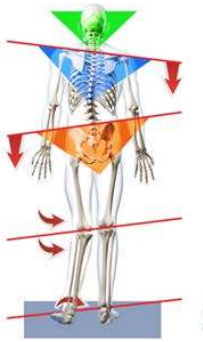
What is Structure Without Function?

Bone?
Nerve?
Muscle?
Ligament?
Tendon?
Disc?

CRANIUM

SPINE

EXTREMITIES



SOFT TISSUE ORTHOPEDICS

ELECTROTHERAPEUTICS

CUSTOM ORTHOTICS

SI = Spine + Respiration + Balance

PART ONE IS THE BOOT MECHANISM WHICH CONTROLS THE **PRIMARY SACRAL RESPIRATORY MECHANISM** AND THE TENSION OF THE DURA MATER. THIS IS A SYNOVIAL TYPE JOINT AND HAS **RECIPROCAL MOTION COORDINATION WITH RESPIRATION**

THE SECOND PART OF THE SACROILIAC JOINT IS THE **WEIGHTBEARING** PART AND THIS IS A HYALINE TYPE IMMOVABLE ARTICULATION, WHICH BASICALLY **CARRIES THE WEIGHT OF THE HUMAN IN ALL POSITIONS**. THIS PART OF THE JOING IS IMMOVABLE AFTER THE AGE OF EPIPHYSEAL CLOSURE. THIS PART OF THE JOINT IS HIGHLY INVESTED WITH PROPRIOCEPTOR FIBERS AND IS THE BASIC CAUSE OF MANY HUMAN FAILURES.

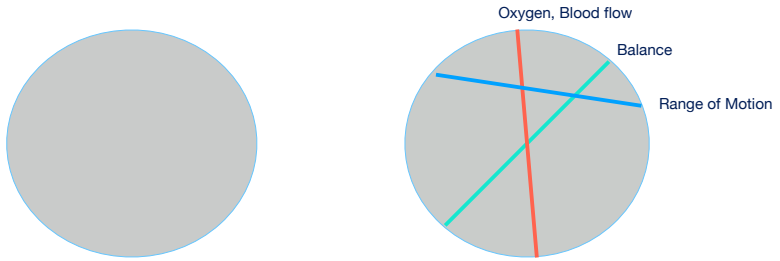
[Dejarnette]

Advance Performance: Physical & Psychological

My strategy in building protocols has been to identify the universal forces/ variables at play.

Chiropractic is unique in that it can be applied to healthy patients for prevention of stress buildup, yet it's also very effective and safe for chronic disease patients.

What is Homeostasis?



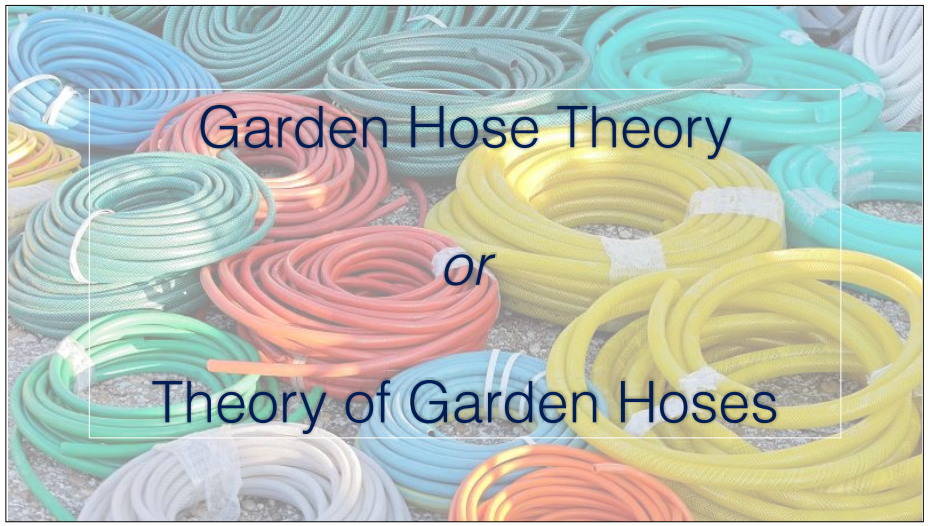
Fill in your indicators…

How Far?

[Williams/Hochman]

"We started off unplugged..but by the end we were totally plugged in"

–Robert Plant



Chiropractic Homeostasis TM
powered by essential functions

Behavior Modification as a survival tool to satisfy essential needs

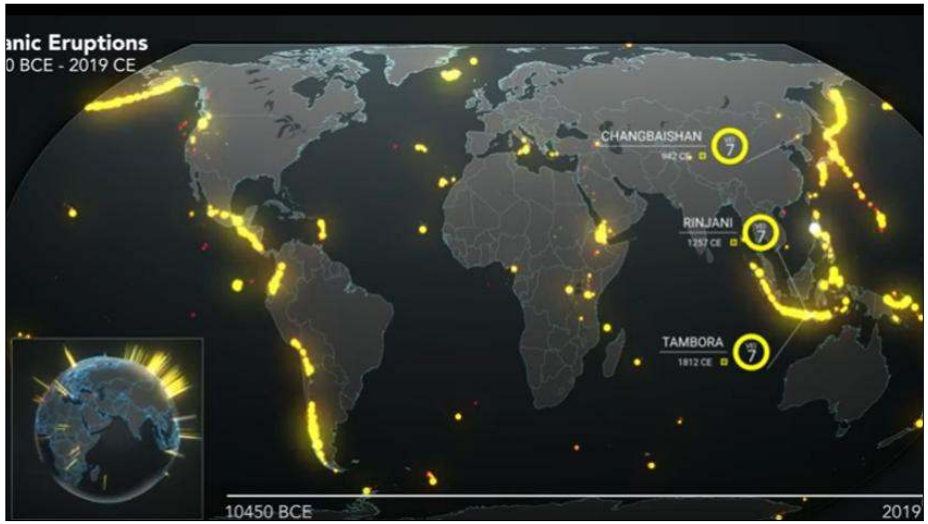
Gravity & Oxygenation driving brain data and importance of posture & breathing

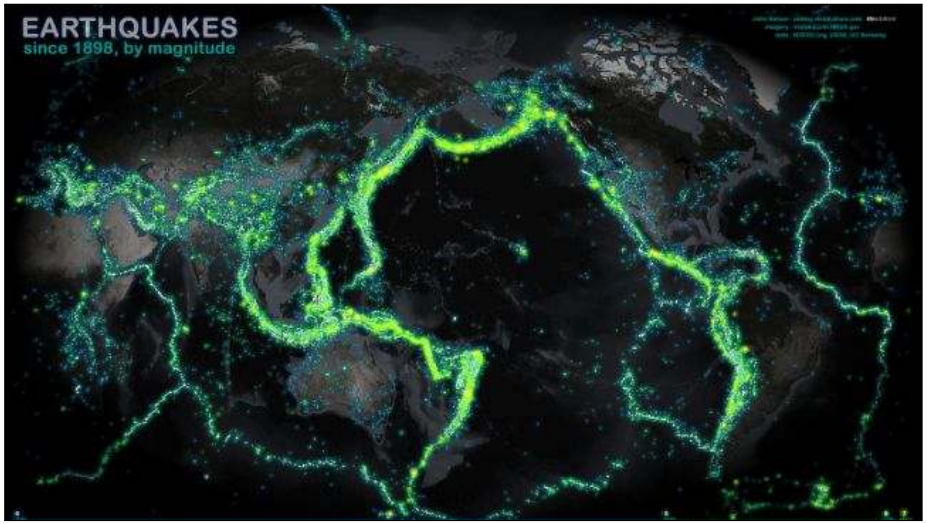
Chiropractic connection through care of spine, cranium & feet to support whole body posture & function

Build on essentials to define homeostasis based on chiropractic perspective

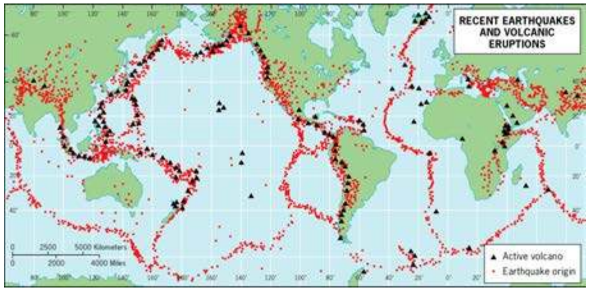
Review pertinent examination principles and techniques for reporting on foot scans

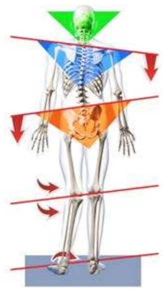
Explore chiropractic rehab & exercise practices based on respiration & posture.





MAPPING OUT PATTERNS





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Survival

#1 Survival Tool is Adaptation. Combine anticipation with behavior modification to thrive.

Anticipation w/o behavior modification = Anxiety

No longer connected to nature…Behavior is your environment

Anticipation/Fear

Values that are Aspirational/Stated/Default.

Fallacy of Arrival over Processes/Behavior

Focus on Behavior + Processes

Chain of Reasoning

Homeostasis

Constant Brain Monitoring:

Physiological Processes

Constants: Gravity, Oxygen

Equal effort between Activation & Recovery

Effort & Efficiency Matter!

Survival - Essential Functions

Breathing

Balance

Metabolic Drive

Cognition/Memory: Posture

Behavior grounded in sustainable biology

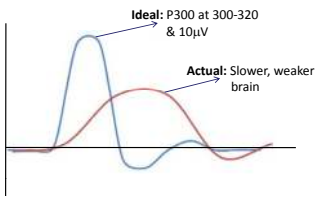
What indicators drive your care?

Chiropractic Neuroscience

The brain is our final frontier

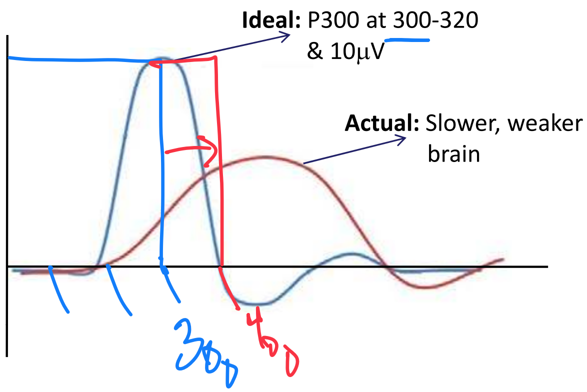
Awareness or acknowledgement of achieving satisfaction of biological needs are dependent on normal neurofeedback mechanisms associated with learning and memory to be functional - Proprioception Model

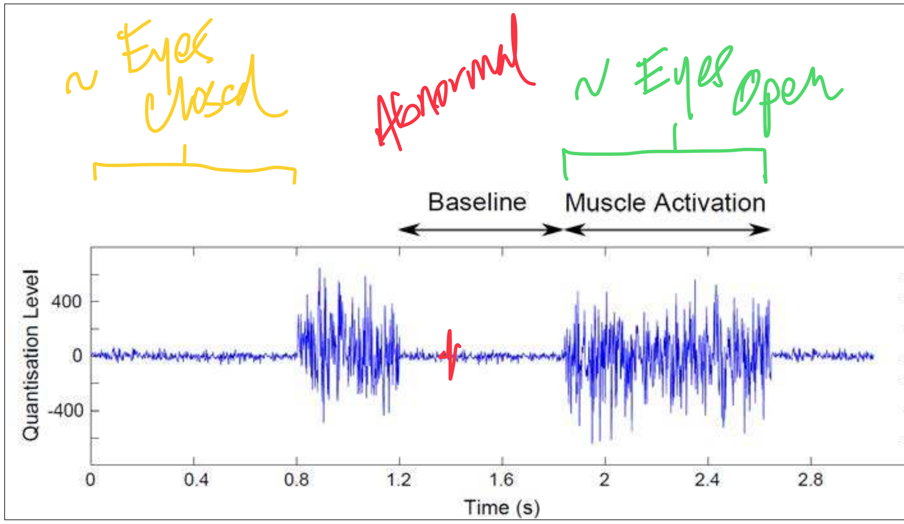
BRAIN MAPPING RESULTS GUIDE



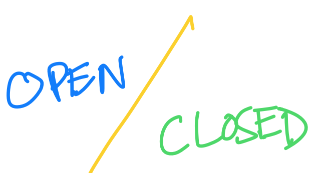
Measurement Based on 2 Coordinates

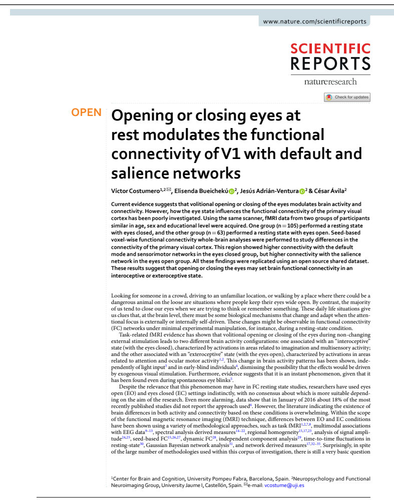
- Amplitude = Power/Dopamine
- Latency = Speed/Acetylcholine





Default Mode Network (DMN)





SCIENTIFIC REPORTS
natureresearch
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OPEN

Opening or closing eyes at rest modulates the functional connectivity of V1 with default and salience networks

Víctor Costumero[1,2]✉, Elisenda Bueichekú[2], Jesús Adrián-Ventura[2] & César Ávila[2]

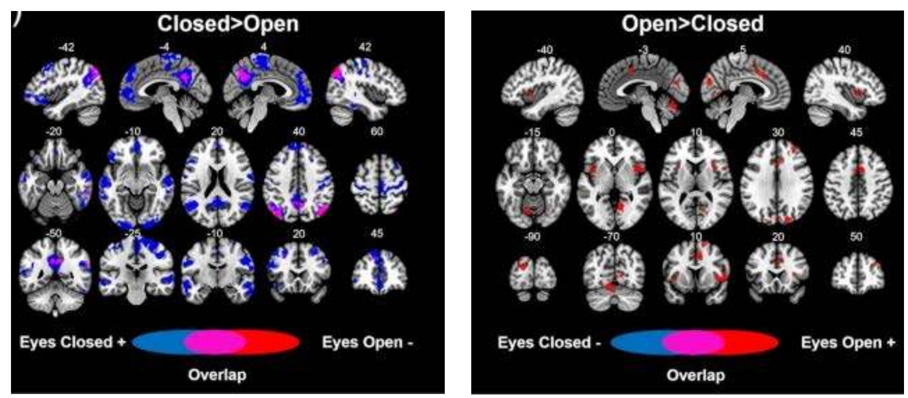
Current evidence suggests that volitional opening or closing of the eyes modulates brain activity and connectivity. However, how the eye state influences the functional connectivity of the primary visual cortex has been poorly investigated. Using the same scanner, fMRI data from two groups of participants similar in age, sex and educational level were acquired. One group (n = 105) performed a resting state with eyes closed, and the other group (n = 63) performed a resting state with eyes open. Seed-based voxel-wise functional connectivity whole-brain analyses were performed to study differences in the connectivity of the primary visual cortex. This region showed higher connectivity with the default mode and sensorimotor networks in the eyes closed group, but higher connectivity with the salience network in the eyes open group. All these findings were replicated using an open source shared dataset. These results suggest that opening or closing the eyes may set brain functional connectivity in an interoceptive or exteroceptive state.

Looking for someone in a crowd, driving to an unfamiliar location, or walking by a place where there could be a dangerous animal on the loose are situations where people keep their eyes wide open. By contrast, the majority of us tend to close our eyes when we are trying to think or remember something. These daily life situations give us clues that, at the brain level, there must be some biological mechanisms that change and adapt when the attentional focus is externally or internally self-driven. These changes might be observable in functional connectivity (FC) networks under minimal experimental manipulation, for instance, during a resting-state condition.

Task-related fMRI evidence has shown that volitional opening or closing of the eyes during non-changing external stimulation leads to two different brain activity configurations: one associated with an "interoceptive" state (with the eyes closed), characterized by activations in areas related to imagination and multisensory activity; and the other associated with an "exteroceptive" state (with the eyes open), characterized by activations in areas related to attention and ocular motor activity[1,2]. This change in brain activity patterns has been shown, independently of light input[3] and in early-blind individuals[4], dismissing the possibility that the effects would be driven by exogenous visual stimulation. Furthermore, evidence suggests that it is an instant phenomenon, given that it has been found even during spontaneous eye blinks[5].

Despite the relevance that this phenomenon may have in FC resting state studies, researchers have used eyes open (EO) and eyes closed (EC) settings indistinctly, with no consensus about which is more suitable depending on the aim of the research. Even more alarming, data show that in January of 2016 about 18% of the most recently published studies did not report the approach used[6]. However, the literature indicating the existence of brain differences in both activity and connectivity based on these conditions is overwhelming. Within the scope of the functional magnetic resonance imaging (fMRI) technique, differences between EO and EC conditions have been shown using a variety of methodological approaches, such as task fMRI[1,2,7,8], multimodal associations with EEG data[9–13], spectral analysis derived measures[14–22], regional homogeneity[15,17,23], analysis of signal amplitude[24,25], seed-based FC[15,26,27], dynamic FC[28], independent component analysis[29], time-to-time fluctuations in resting-state[30], Gaussian Bayesian network analysis[31], and network derived measures[17,32–35]. Surprisingly, in spite of the large number of methodologies used within this corpus of investigation, there is still a very basic question

[1]Center for Brain and Cognition, University Pompeu Fabra, Barcelona, Spain. [2]Neuropsychology and Functional Neuroimaging Group, University Jaume I, Castellón, Spain. ✉e-mail: vcostume@uji.es



Mental acuity has both a passive determining factor in the process by which our biology learns survival and can have through focus and attention a larger role in that process towards thriving. Keep cognitive Load in mind, not just physical load.

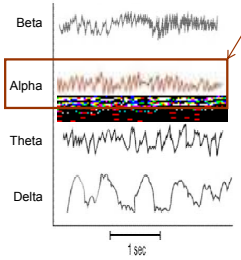
AEP/VEP: Quantitative Comparison

STIMULUS

RESPONSE

Anticipation turns to anxiety as response is overly active compared to stimulus. Correlates with commission errors on TOVA.

SPECTRAL ANALYSIS : Frequency %



CES puts brain on training wheels & despite increased set frequency, relaxation is achieved. Focused/controlled circuit relaxes brain for calm & rest while recharging batteries for **Edge Effect**.

RECOVERY SPECTRUM

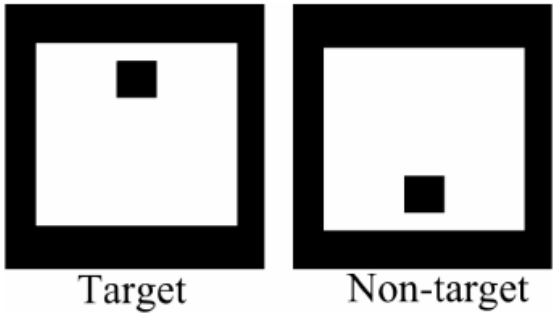
FUNCTIONAL

RANGE OF MOTION

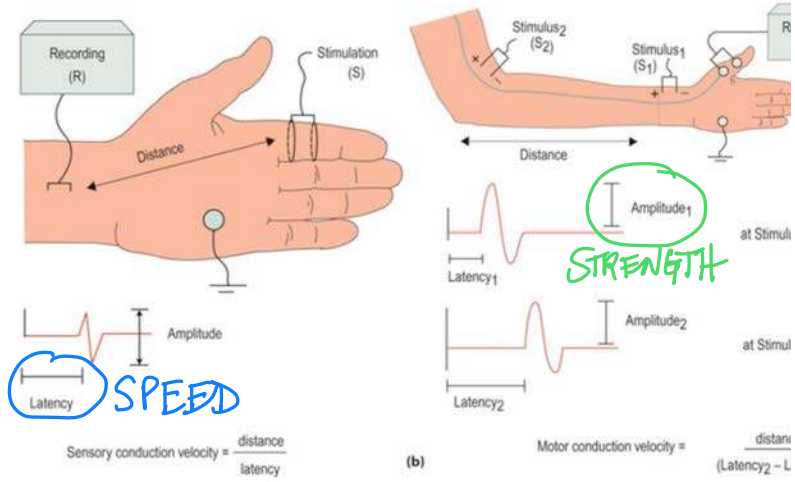
NEUTRAL POSTURE

BALANCE

STABILITY



TOVA
Test of Variables of Attention



DMN - Guardian Role

Thirty years of brain imaging research has converged to define the brain's default network-a novel and only recently appreciated brain system that participates in internal modes of cognition. Here we synthesize past observations to provide strong evidence that the default network is a specific, anatomically defined brain system preferentially **active when individuals are not focused on the external environment.** Analysis of connectional anatomy in the monkey supports the presence of an interconnected brain system. Providing insight into function, the default network is active when individuals are engaged in internally focused tasks including autobiographical memory retrieval, envisioning the future, and conceiving the perspectives of others. Probing the functional anatomy of the network in detail reveals that it is best understood as multiple interacting subsystems. The medial temporal lobe subsystem provides information from prior experiences in the form of **memories and associations that are the building blocks of mental simulation**. The medial prefrontal subsystem facilitates the flexible use of this information during the construction of **self-relevant mental simulations.** These two subsystems converge on important nodes of integration including the posterior cingulate cortex. The implications of these functional and anatomical observations are discussed in relation to possible **adaptive roles of the default network for using past experiences to plan for the future,** navigate social interactions, and maximize the utility of moments when we are not otherwise engaged by the external world. We conclude by discussing the relevance of the default network for understanding mental disorders including autism, schizophrenia, and Alzheimer's disease.

[Annals of the New York Academy of Science]

Pain - Cognitive Distraction

Differences in fMRI resting-state connectivity of the default mode network (DMN) seen in chronic pain patients are often interpreted as brain reorganization due to the chronic pain condition. Nevertheless, patients' pain at the time of fMRI might influence the DMN because **pain, like cognitive stimuli, engages attentional mechanisms** and cognitive engagement is known to alter DMN activity. Here, we aimed to dissociate the influence of chronic pain condition (trait) from the influence of current pain experience (state) on DMN connectivity in patients with fibromyalgia (FM). We performed resting-state fMRI scans to test DMN connectivity in FM patients and matched healthy controls in two separate cohorts: (1) in a cohort not experiencing pain during scanning (27 FM patients and 27 controls), (2) in a cohort with current clinical pain during scanning (16 FM patients and 16 controls). In FM patients without pain during scanning, the connectivity of the DMN did not differ significantly from controls. By contrast, FM patients with current clinical pain during the scan had significantly increased DMN connectivity to bilateral anterior insula (INS) similar to previous studies. Regression analysis showed a positive relationship between DMN-midINS connectivity and current pain. We therefore suggest that transient **DMN disruptions (nerve interference) due to current clinical pain** during scanning (current pain state) may be a substantial contributor to DMN connectivity disruptions observed in chronic pain patients.

[NeuroImage]

Chronic vs Acute

It has been proposed that **pain competes with other attention-demanding stimuli for cognitive resources**, and many chronic pain patients display significant attention and mental flexibility deficits. These alterations may result from disruptions in the functioning of the default mode network (DMN) which plays a critical role in attention, memory, prospection and self-processing, and recent investigations have found alterations in DMN function in multiple chronic pain conditions. Whilst it has been proposed that these DMN alterations are a characteristic of pain that is chronic in nature, we recently reported altered oscillatory activity in the DMN during an acute, **5 minute noxious stimulus in healthy control subjects.** We therefore hypothesize that altered DMN activity patterns will not be restricted to those in chronic pain but instead will also occur in healthy individuals during tonic noxious stimuli. We used functional magnetic resonance imaging to measure resting state infra-slow oscillatory activity and functional connectivity in patients with chronic orofacial pain at rest and in healthy controls during a 20-minute tonic pain stimulus. We found decreases in oscillatory activity in key regions of the DMN in patients with chronic pain, as well as in healthy controls during tonic pain in addition to changes in functional connectivity between the posterior cingulate cortex and areas of the DMN in both groups. The results show that similar alterations in DMN function occur in healthy individuals during acute noxious stimuli as well as in individuals with chronic pain. These DMN changes may reflect the presence of pain per se and may underlie alterations in attentional processes that occur in the presence of pain.

[Neuroimage Clinical]

Spine injury = Brain injury

The role of the brain in chronic pain conditions remains speculative. We compared brain morphology of 26 chronic back pain (CBP) patients to matched control subjects, using magnetic resonance imaging brain scan data and automated analysis techniques. CBP patients were divided into neuropathic, exhibiting pain because of sciatic nerve damage, and non-neuropathic groups. Pain-related characteristics were correlated to morphometric measures. Neocortical gray matter volume was compared after skull normalization. Patients with CBP showed 5-11% less neocortical gray matter volume than control subjects. The magnitude of this decrease is equivalent to the gray matter volume lost in 10-20 years of normal aging. The decreased volume was related to pain duration, indicating a 1.3 cm3 loss of gray matter for every year of chronic pain. Regional gray matter density in 17 CBP patients was compared with matched controls using voxel-based morphometry and nonparametric statistics. Gray matter density was reduced in bilateral dorsolateral prefrontal cortex and right thalamus and was strongly related to pain characteristics in a pattern distinct for neuropathic and non-neuropathic CBP. Our results imply that **CBP is accompanied by brain atrophy and suggest that the pathophysiology of chronic pain includes thalamocortical processes.**

[Journal of Neuroscience]

Pain Over Life

Chronic pain can result in anxiety, depression and reduced quality of life. However, its effects on cognitive abilities have remained unclear although many studies attempted to psychologically profile chronic pain. We hypothesized that performance on an emotional decision-making task may be impaired in chronic pain since human brain imaging studies show that brain regions critical for this ability are also involved in chronic pain. Chronic back pain (CBP) patients, chronic complex regional pain syndrome (CRPS) patients, and normal volunteers (matched for age, sex, and education) were studied on the Iowa Gambling Task, a card game developed to study emotional decision-making. Outcomes on the gambling task were contrasted to performance on other cognitive tasks. The net number of choices made from advantageous decks after subtracting choices made from disadvantageous decks on average was 22.6 in normal subjects (n = 26), 13.4 in CBP patients (n = 26), and -9.5 in CRPS patients (n = 12), indicating poor performance in the patient groups as compared to the normal controls ($P < 0.004$). Only pain intensity assessed during the gambling task was correlated with task outcome and only in CBP patients ($r = -0.75$, $P < 0.003$). Other cognitive abilities, such as attention, short-term memory, and general intelligence tested normal in the chronic pain patients. Our evidence indicates that **chronic pain is associated with a specific cognitive deficit, which may impact everyday behavior especially in risky, emotionally laden, situations.**

[Pain]

Variables of Attention

1. Reaction Time - 100ms ? 6
2. Variability - consistency
3. Commissions - impulsivity
4. Omissions - focus/**vigilance**

Attention Reaction Time

Correct Response Time is the **processing time** (in milliseconds) taken to **respond** correctly to a target. Counterintutively, persons with ADHD may respond slower than the normative sample, especially in the infrequent (boring) first half of the test. d 0 or Response Sensitivity d 0 or Response Sensitivity (the ratio of hit rate to false alarm rate) is a measure derived from Receiver Operating Characteristics (ROC) which is part of Signal Detection Theory. It is a measure of performance decrement, the rate of deterioration of performance over time. Most individuals tend to fatigue over time, especially with a boring task. The performance of individuals with ADHD tends to deteriorate faster than others.

Attention - Variability

Response Time Variability Response Time Variability ("RTV") is a measure of variability **(consistency)** of response time. RTV is the the standard deviation of correct response times, and thus directly measures the spread of the subject's response times. Individuals with ADHD tend to have inconsistent response times on the 10 - 100 millisecond time scale, and thus have a wider RTV. RTV is the most sensitive measure of the T.O.V.A. Because changes in RTV are on the 10 - 100 millisecond time scales, timing measurements must be very accurate; hence, the need for accurate timing (the T.O.V.A. USB device), an accurate and repeatable subject input device (the T.O.V.A. microswitch), and the need to calibrate out delays and variability in the computer screen (the T.O.V.A. microswitch's calibration photodiode).

Attention - Commissions

Errors of Commission are a measure of **impulsivity** and/or **disinhibition** and occur when the subject incorrectly responds to the nontarget; that is, the subject pushes the button when they shouldn't have. In the T.O.V.A., commission errors are far more frequent in the second half (high response demand). Since excessive commission errors can affect the other variables, they are also an important measure of test validity. Generally, excessive commission errors decrease omission errors, shorten response times, and increase variability. When a report states that the results are 'invalid' because of excessive commission scores, it means that we must interpret the results cautiously since the other variables may or may not be valid. Of course, impulsivity is a hallmark of ADHD.

Attention Omissions

Errors of Omission are a measure of **focus** and **vigilance** and occur when the subject does not respond to a target stimulus; that is, the subject omits pressing the button when a target appears or is played. This may be due to inattention, distractibility, or hyperactivity (looking away from the computer). Omission errors are rare in adults, and long strings of omission errors should be investigated. Use the Observation Form (page 71) to record behaviors during the test to determine and record the reason(s) for Omission errors. When evaluating omissions, always look at the absolute or raw numbers of omission errors on the Summary page and/or the Tabulated Data page. In some cases one or two errors reach statistical significance because of the lack of omission errors in especially older ages of the T.O.V.A. normative study, yet there may be little or no clinical significance to one or two errors. As an example, a single error early in quarter 1 may signify that the subject was surprised when the test began even though the practice session preceded the test. Always interpret standard score data alongside actual raw data to determine clinical significance of the results.

Vigilance is the state of being watchful or alert for danger or some other kind of trouble.

THRIVE

Memory = Survival

Survival = Effective Processes

Thrive = Memory + Processes

Chiropractic integration of the spine to breathing and balance: SI Joint

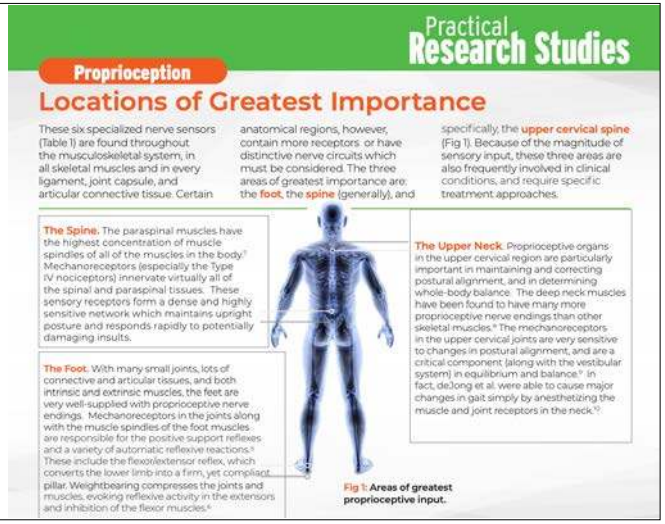
PART ONE IS THE BOOT MECHANISM WHICH CONTROLS THE PRIMARY SACRAL RESPIRATORY MECHANISM AND THE TENSION OF THE DURA MATER. THIS IS A SYNOVIAL TYPE JOINT AND HAS RECIPROCAL MOTION COORDINATION WITH RESPIRATION

THE SECOND PART OF THE SACROILIAC JOINT IS THE WEIGHTBEARING PART AND THIS IS A HYALINE TYPE IMMOVABLE ARTICULATION, WHICH BASICALLY CARRIES THE WEIGHT OF THE HUMAN IN ALL POSITIONS. THIS PART OF THE JOING IS IMMOVABLE AFTER THE AGE OF EPIPHYSEAL CLOSURE. THIS PART OF THE JOINT IS HIGHLY INVESTED WITH PROPRIOCEPTOR FIBERS AND IS THE BASIC CAUSE OF MANY HUMAN FAILURES.

[Dejarnette/SOT]

Chiropractic Neuroscience: Proprioceptive Model

Proprioceptive Sensory Organs
Proprioceptive sensory organs are found in two distinct groups. Some are located in muscles and tendons, while others are within the connective tissues (ligaments and capsules) of the joints (Table 1). There is a constant flow of information regarding the status and function of the musculoskeletal system from these structures to the spinal cord, the cerebellum, and the brain.2 When there is a breakdown in communication, or when improper information is supplied by one or more of these sensors, efficiency of movement decreases. This can become harmful or even injurious to the muscles and joints. Often this breakdown causes minor- to-severe problems with postural coordination and/or joint alignment. Sometimes it is just annoying, or it can be the source of chronic, unresolving pain.



Chiropractic Neuroscience: Proprioceptive Model

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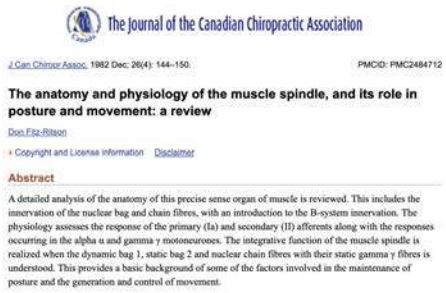
Muscle Spindle Sense Organ

Spindle density is highest in the hand, foot and neck muscles…

Generally speaking, high spindle densities- characterize muscles initiating fine movement (i.e. lumbricals, extraocular muscles and small vertebral muscles) or maintaining posture (i.e. soleus), low densities in those initiating gross movement (i.e. gastrocnemius).

'Background muscles'


The Journal of the Canadian Chiropractic Association

J Can Chiropr Assoc. 1982 Dec; 26(4): 144–150. PMCID: PMC2484712

The anatomy and physiology of the muscle spindle, and its role in posture and movement: a review

Don Fitz-Ritson

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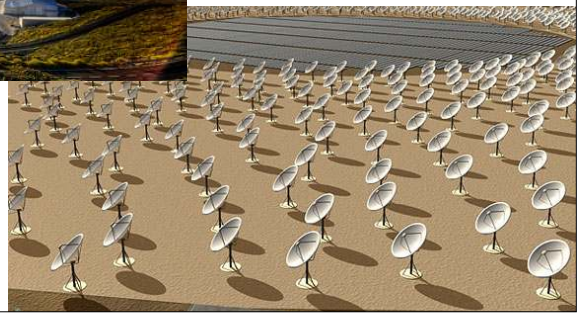
Abstract

A detailed analysis of the anatomy of this precise sense organ of muscle is reviewed. This includes the innervation of the nuclear bag and chain fibres, with an introduction to the B-system innervation. The physiology assesses the response of the primary (Ia) and secondary (II) afferents along with the responses occurring in the alpha α and gamma γ motoneurones. The integrative function of the muscle spindle is realized when the dynamic bag 1, static bag 2 and nuclear chain fibres with their static gamma γ fibres is understood. This provides a basic background of some of the factors involved in the maintenance of posture and the generation and control of movement.

Eyes
Open

Eyes
Closed



PROPRIOCEPTORS DEFINED

Proprioceptors are specialized nerve endings which furnish information from all parts of the body to the vestibular apparatus of the body. They also furnish information to the equilibrium centers of the brain stem (before being transmitted to the cerebral cortex).

[REES]

Chiropractic
Homeostatic Set Points
neutral postures
normal ranges of motion

Earth & Venus are the right size to hold a sufficient-sized atmosphere. Earth's atmosphere is about 100 miles thick. It keeps the surface warm & protects it from radiation & small- to medium-sized meteorites.

Chiropractic Homeostasis ™
neutral postures
normal ranges of motion

Which Structure?
Bone
Nerve
Muscle
Ligament
Tendon
Disc

Chiropractic vision
Exam
Xray/MRI
Foot Scan

Functional Mechanism?
Electrical Activity
Stability
Movement
Blood Flow
CSF Flow
Lymphatics

DNA Directed Pro-Dopamine Regulation Coupling Subluxation Repair, H-Wave® and Other Neurobiologically Based Modalities to Address Complexities of Chronic Pain in a Female Diagnosed with Reward Deficiency Syndrome (RDS): Emergence of Induction of "Dopamine Homeostasis" in the Face of the Opioid Crisis

by Anish Bajaj [1], Kenneth Blum [2,3,*], Abdalla Bowirrat [4], Ashim Gupta [5], David Baron [2], David Fugel [1], Ayo Nicholson [1], Taylor Fitch [1], B. William Downs [6], Debasis Bagchi [7], Catherine A. Dennen [3] and Rajendra D. Badgaiyan [6]

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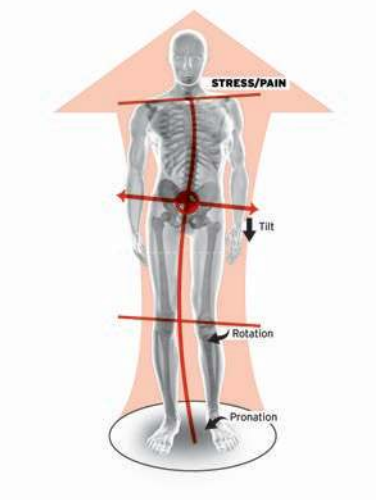
[3] The Kenneth Blum Institute on Behavior & Neurogenetics, Austin, TX 78701, USA
[4] Department of Molecular Biology, Adelson School of Medicine, Ariel University, Ariel 40700, Israel
[5] Future Biologics, Lawrenceville, GA 30043, USA
[6] Department of Psychiatry, South Texas Veteran Health Care System, Audie L. Murphy Memorial VA Hospital, Long School of Medicine, University of Texas Medical Center, San Antonio, TX 78229, USA
[7] Department of Pharmaceutical Sciences, Southern University College of Pharmacy, Houston, TX 77004, USA



Strengthening the Brain-Spine-Foot Connection

Blind Spot #1 (GAP) Neurodiagnostics

Chiropractic Perspective In Demand

Dependence We must properly identify the universal survival factors that which we DEPEND on once known (respiration and balance), we can focus our efforts to prioritize them:

- Now we can be proactive in reinforcing the associate behaviors
- We can start with the end goal in mind
- Keep track of priorities that persist from beginning to end

Independence Independence is when we achieve a level of internal balance through identification of the correct healthcare priorities and match that with corresponding behaviors:

- Think win-win as in satisfying needs of multiple variables
- Understand the outside variables first before we engage with them
- With balance we combine those efforts effectively for efficiency

Interdependence Interdependence is defined as maintaining mastery of established healthy behaviors while engaging in progressively more complex lifestyle endeavors

Innate - Physiological Processes

Sustainable campaign

self regulation

making life work is our responsibility

What indicators drive your care?

Chiropractic Perspective

Chiropractic (Stability + Movement Perspective)

Survival: Generation, Month, Days, Hours, Seconds

Constants: Live Continuous Monitoring (Pulse Oximetry)

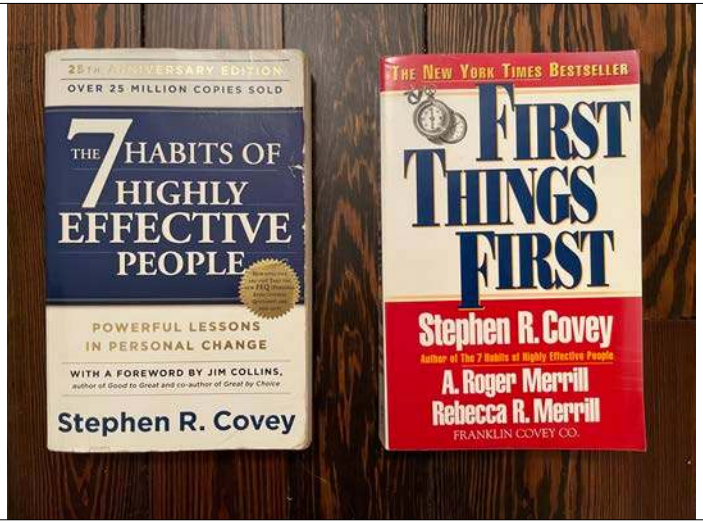
Personal Monitoring Wearables design Limitations apply chiropractic perspective

Chiropractic
(Stability + Movement)

Survival:
Generation
Month
Days
Hours
Minutes
Seconds

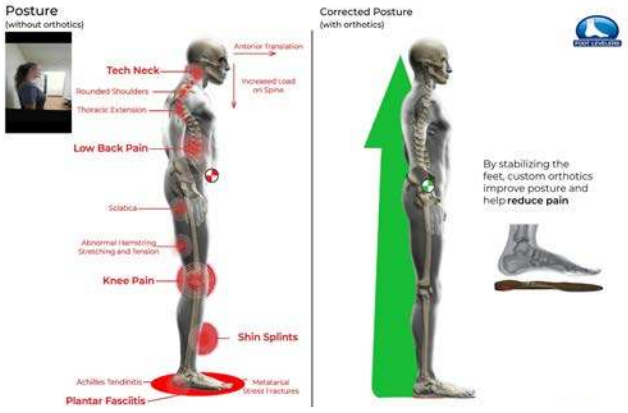
Constants: Live Continuous Monitoring

Chiropractic Exam



Report of Findings

- Check for **forward head carriage** and posture
- Helps explain foot-spine connection
- Reminder about benefits of multiple pairs of custom orthotics

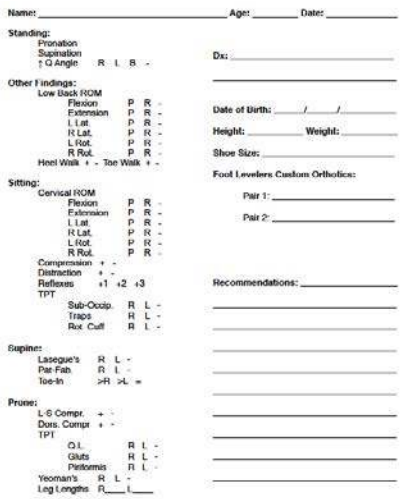


Intake Form

Weight Bearing/
Balance/
Posture/
Feet

Ranges of Motion

Chiropractic/
Hands On



Physical Examination of the Spine & Extremities

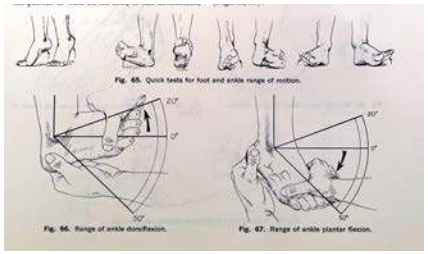
Range of Motion (Active & Passive) differentiate not separate structure/function

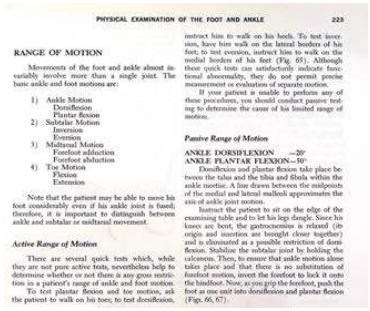
Neurological Examination: muscle testing, sensation, reflex, special tests

Related areas: all other joints in the lower extremity should be examined in conjunction with the complete examination of the foot and ankle, since it is possible for pathology in the knee, hip, or lumbar region to refer pain to the foot and ankle.

[Hoppenfeld]

Heel/Toe Walk





PHYSICAL EXAMINATION OF THE FOOT AND ANKLE 223

RANGE OF MOTION

Movements of the foot and ankle almost invariably involve more than a single joint. The basic ankle and foot motions are:

1) Ankle Motion
   Dorsiflexion
   Plantar flexion
2) Subtalar Motion
   Inversion
   Eversion
3) Midtarsal Motion
   Forefoot adduction
   Forefoot abduction
4) Toe Motion
   Flexion
   Extension

Note that the patient may be able to move his foot considerably even if his ankle joint is fused; therefore, it is important to distinguish between ankle and subtalar or midtarsal movement.

Active Range of Motion

There are several quick tests which, while they are not pure active tests, nevertheless help to determine whether or not there is any gross restriction in a patient's range of ankle and foot motion. To test plantar flexion and toe motion, ask the patient to walk on his toes; to test dorsiflexion, instruct him to walk on his heels. To test inversion, have him walk on the lateral borders of his feet; to test eversion, instruct him to walk on the medial borders of his feet (Fig. 65). Although these quick tests can satisfactorily indicate functional abnormality, they do not permit precise measurement or evaluation of separate motion.

If your patient is unable to perform any of these procedures, you should conduct passive testing to determine the cause of his limited range of motion.

Passive Range of Motion

ANKLE DORSIFLEXION —20°
ANKLE PLANTAR FLEXION—50°

Dorsiflexion and plantar flexion take place between the talus and the tibia and fibula within the ankle mortise. A line drawn between the midpoints of the medial and lateral malleoli approximates the axis of ankle joint motion.

Instruct the patient to sit on the edge of the examining table and to let his legs dangle. Since his knees are bent, the gastrocnemius is relaxed (its origin and insertion are brought closer together) and is eliminated as a possible restriction of dorsiflexion. Stabilize the subtalar joint by holding the calcaneus. Then, to ensure that ankle motion alone takes place and that there is no substitution of forefoot motion, invert the forefoot to lock it onto the hindfoot. Now, as you grip the forefoot, push the foot as one unit into dorsiflexion and plantar flexion (Figs. 66, 67).

[Hoppenfeld]

Palpation/Observation

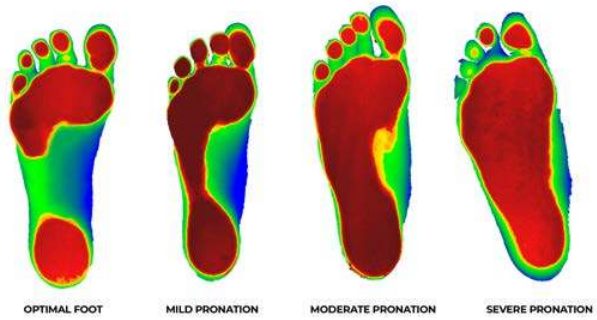
Sub-Occipital

Trapezius

Gluteal

*spinal level specific indicators (dejarnette part 2)

Who needs orthotics?



The vast majority of patients have overpronation

Posture

Primary Respiratory Mechanism links spine and breathing

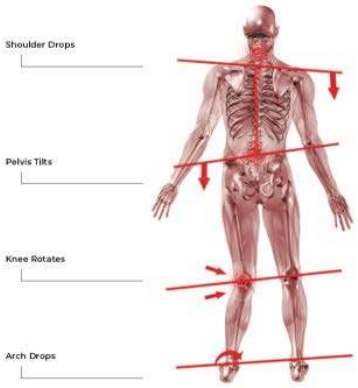
Subluxation Patterns

Brain States

Upright Bipedalism

Movement + Stability requires constant monitoring and adjustments

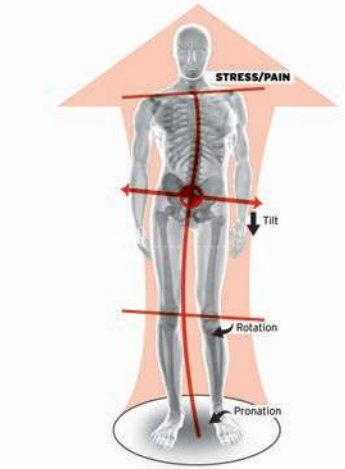
Rest is disrupted by many diseases, posture can tax the brain 24/7



Imbalances can cause…

Anterior Head Carriage
Pelvic Unleveling
Low Back Pain
Hip Pain
Piriformis Syndrome
Knee Pain

Functional LLI
Stress Fractures
Shin Splints
Achilles Tendonitis
Plantar Fasciitis
Metatarsalgia



Report of Findings

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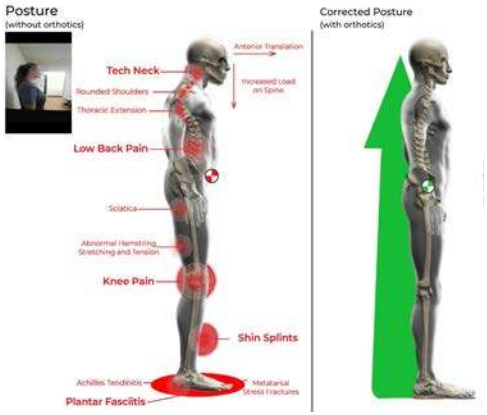


SAME PERSON
DIFFERENT FEET

Scanning the feet shows immediately
asymmetrical overpronation

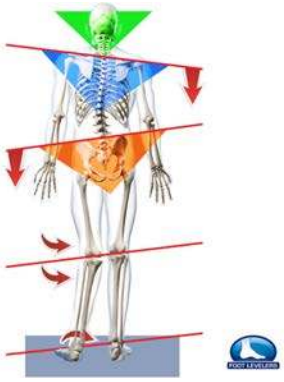
WHAT IS PRONATION

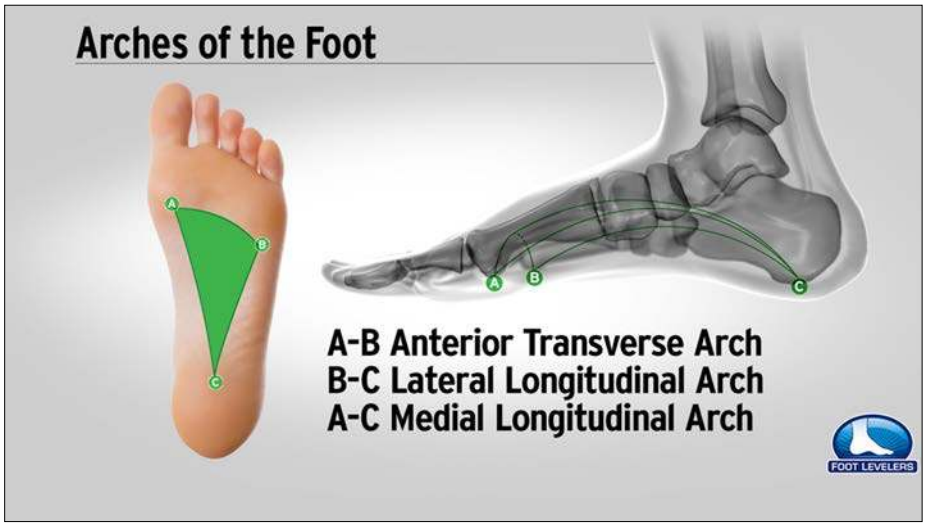
EXTERNAL ROTATION

EVERSION

INTERNAL KNEE ROTATION TIGHT HAMSTRINGS

Conditions Associated with

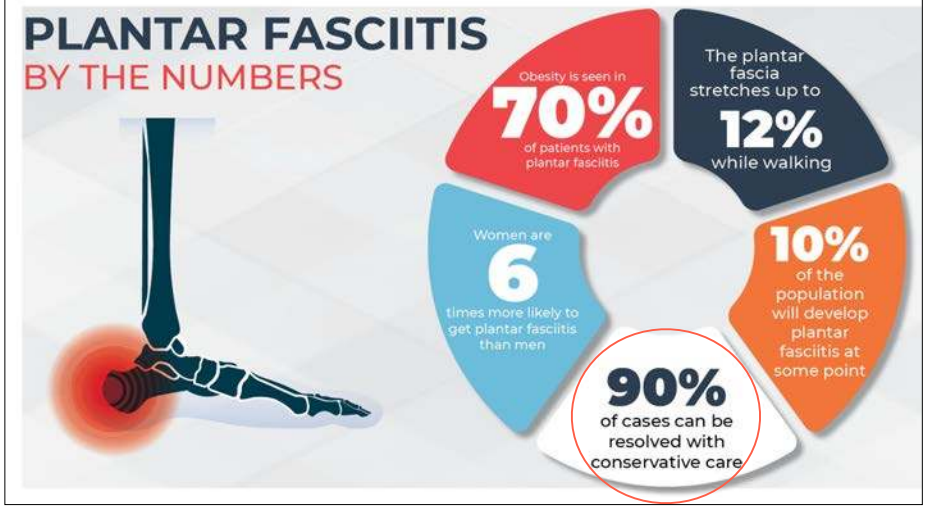




The red areas on the V7+ scan show where your feet are applying pressure. Loss of arch height – which shows more red in the middle of the foot, such as the image shown – can cause flattening and rolling of the feet.

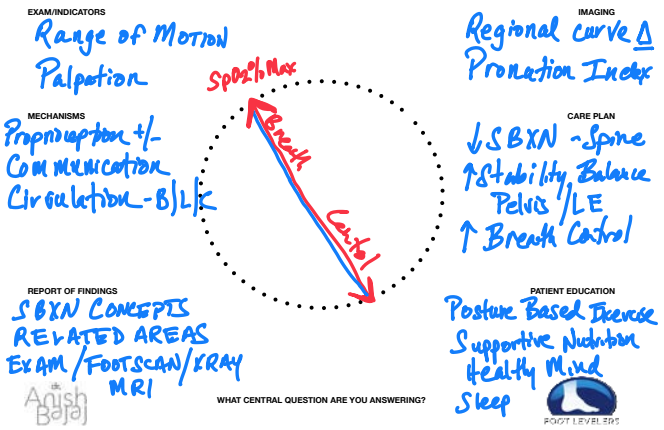
The scan also shows the percentage of imbalance for each foot. The higher number indicates greater instability on that side of the body.

Patient Self Reporting



anish@bajajchiropractic.com

Stories The Feet Can Tell
So easy a _____ could do it

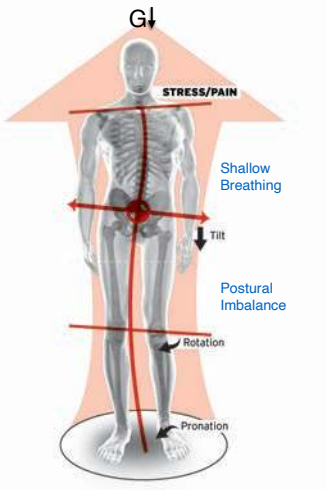


1

ANTERIOR HEAD CARRIAGE
HYPOLORDOTIC CERVICAL CURVE

PELVIC TILT
HYPERLORDOTIC LUMBAR CURVE
FACET SYNDROME

BILATERAL ASYMMETRICAL PRONATION



Brain Atrophy with chronic LBP

Attention deficit after 5 minutes of pain

Increased Sympathetic Tone

Reduced inhibition of the Sympathetic Nervous System

Chiropractic integration of the spine to breathing and posture

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SPINE + SOT

SOT is a chiropractic analysis and adjusting technique developed by Dr. DeJarnette which brought together many important mechanisms of action as they relate to chiropractic and **self-regulation (homeostasis)**. The primary premise from page one of the 1984 SOT Manual addresses the **functional and structural relationship between the spine and respiration and balance.**

The technique offers protocols for detecting and correcting issues related to subluxation including nerve interference, musculoskeletal dysfunction patterns and movement deficiencies related to nerve flow, blood flow, joint and cerebrospinal fluid flow and lymphatic drainage, to name a few. SOT is a parent-technique to chiropractic craniopathy and STO as they serve within the same premise.

Principles that can be applied to any technique

Breathing

Essential Function & Natural Reward

Breath Control

Meditation = Breath Control + Thought

Yoga = Breath Control + Movement + Thought

Breath Control:

Inhale & exhale through the nose

Abdominal vs neck/chest muscles

Maintain ‘space’ between breath cycles (1s)

Maintain ~2:1 exhale to inhale ratio (4:2s, 6:3s, 8:4s)

Benefits of Breath Control

Increase gas exchange

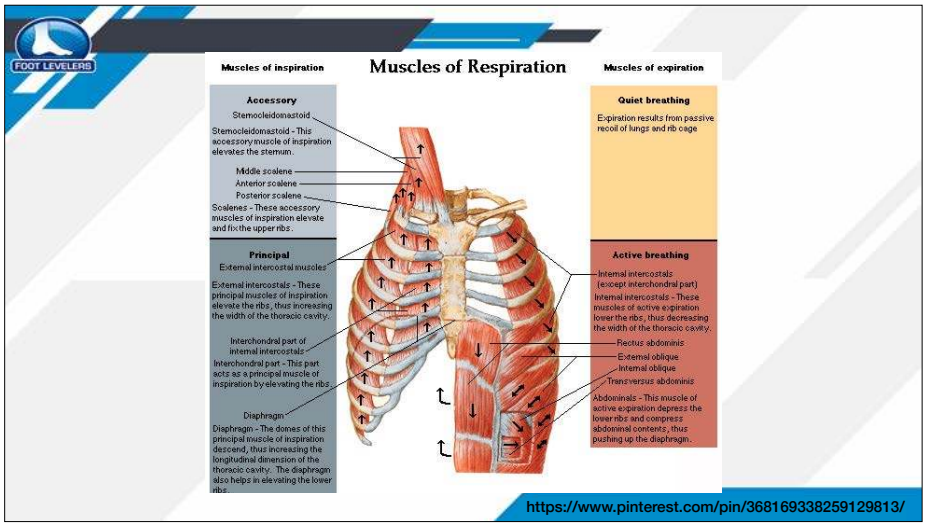
Autonomic NS tone

Unifies Brain/Heart/Lungs

Can be set intentionally

Applied from stress recovery to dynamic performance - Essential Function

Drive metabolism aerobically



Sympathetic Tone and Breathing

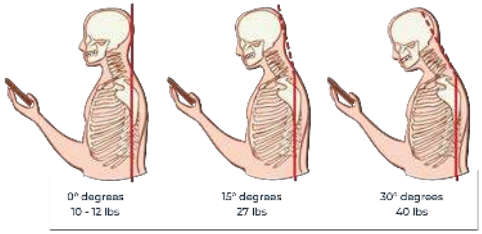
Reduced exhalation phase of breathing associated with diminished inhibition of the sympathetic nervous system.

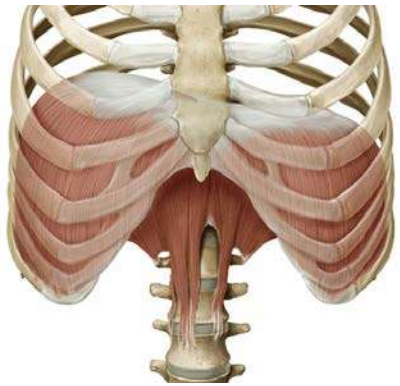
Loss of Normal Cervical Lordosis associated with increased sympathetic tone.

Addressing Anteriorty

Avoid the common imbalance of P-A dominant adjusting especially in the cervical and lumbar spine. Balancing common postural abnormalities like anterior head carriage and forward pelvic tilt require more specific line of correction to induce stability.

The cervical spine anatomy allows better access to contact points need to achieve A-P LOC, whereas the lumbar spine may require more tools (blocks, soft tissue work)

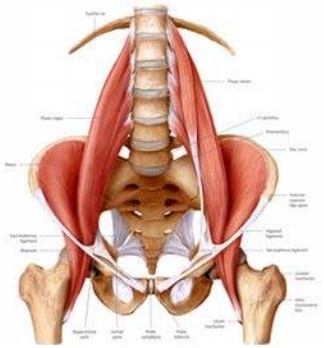




Diaphragm

https://www.inpursuitofyoga.com/blog/2015/3/11/chest-breath-vs-belly-breath

PSOAS



Psoas 3 Ways demo

Plank + Breath Control

Psychology & Exercise

'Loath exercise'

'Hate exerise'

'Feel fatigued'

'Feels like punishment'

'No motivation to do it'

'Don't want to get sweaty

'Afraid I'll look to muscly & big'

'People think I look silly'

Fugel/Stapleton

5 PHASE WORKOUT PROGRAM

Name_____ Date_____

Exercise Protocol Phases 1 2 3 Int 4 5

PHASE I: POSTURE BUILDING <3 METs
↑flexibility & balance
- ❑ Static Floor Stretch
- ❑ Leg Crossover Stretch
- ❑ Cat & Dog Stretch (Modified)
- ❑ Arm Circles
- ❑ Shoulder Rotations
- ❑ Overhead Extension Stretch
- ❑ Extended Floor Traction
- ❑ Wall Sit Position

PHASE II: WARM UP 3-5 METs
↑circulation of blood & joint fluid
- ❑ Jumping Jacks/Treadmill/Bike/skip rope
- ❑ Toe Sprawl
- ❑ Ankle Circles
- ❑ Knee Circles
- ❑ Leg Swings
- ❑ Hip Circles
- ❑ Trunk Rotations
- ❑ Shoulder Shrugs
- ❑ Alternating Arm Circles
- ❑ Neck Rolls
- ❑ Knee Bends/Squats
- ❑ Single Leg Squats

PHASE III: REHABILITATION 3-5 METs
↑strength at high risk areas
- ❑ Straight Arm Lift
- ❑ Lying Arm Lift
- ❑ Inner Arm Rotation
- ❑ Back Extension
- ❑ Alternating Arm & Hip Extension
- ❑ Trunk Rotation
- ❑ Cross Crunches

INTEGRATIVE STEP 7-9 METs
- ❑ Yoga/5 Tibetans
- ❑ Pilates

PHASE IV: AEROBIC 5-9 METs
↑metabolism/endurance ↓body fat
45-60 min @ 60-75% max HR
- ❑ Running (Best weight loss)
- ❑ Rowing (targets core)
- ❑ Elliptical (easier on joints)
- ❑ Swimming (upper body
- ❑ Bicycle (outdoor better)
- ❑ Walking/hiking

PHASE V: WEIGHT LIFTING
↑Bone Density & Muscle Mass
- ❑ Standing Cable Crossover/Swiss Ball Press
- ❑ Seated Row
- ❑ Lounges
- ❑ Leg Curls
- ❑ Incline Press
- ❑ Lat Pull Down
- ❑ Leg Extensions
- ❑ Calf Raise (fast)
- ❑ Dips (fast)
- ❑ Bicep Curls
- ❑ Pectoral Flyes
- ❑ Deltoid Raises (front & Lateral to 90°)

15-30 lbs = 3-5 METs 30-60 lbs = 5-7 METs
60-90 lbs = 7-9 METs >90 lbs = 9+ METs

WEIGHT LIFTING RULES
1. No flat bench pressing
2. Never lift behind your head
3. Always keep your elbows where you can see them
4. No Squats/Leg Press

PHASE V: INTERVALS
↑hormones & ↓scar tissue
20-30 min duration, not incl. warm-up
1-2 min intervals @ 85-90% max HR >9METs
1-2 min recovery @ 50-60% max HR

Cool Down: (following IV or V) calm muscles
- ❑ Easy bike ride/treadmill
- ❑ Stretching

CALISTHENICS GOALS
Push Ups (54 over 10 sets: 10, 9, 8, 7, 6….)
Sit Ups (60 total, 60 straight, 60 in 60 seconds)

Rehab

Pre-Yoga

Pre-exercise

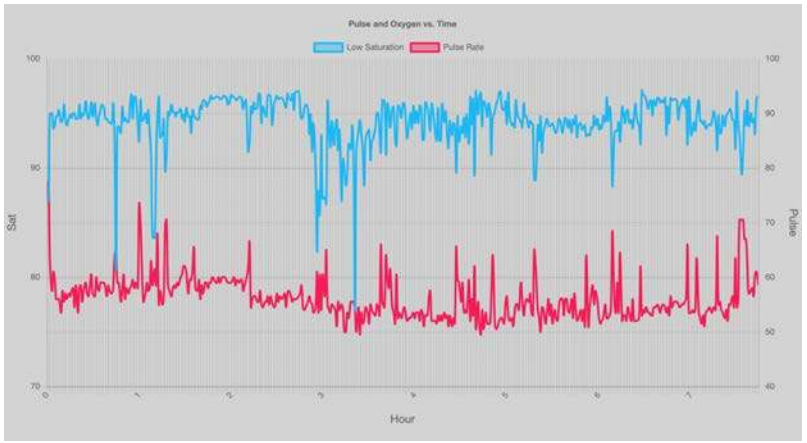
"Postions"

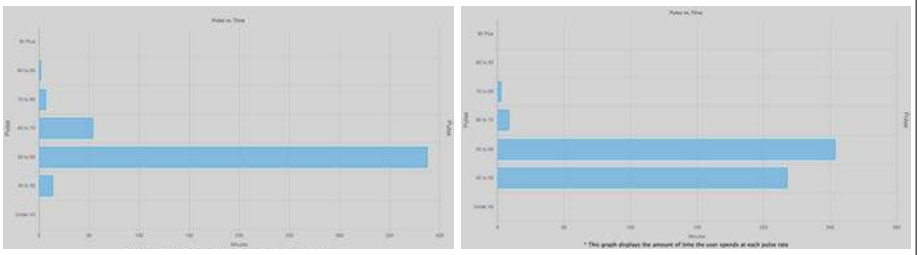
Small movements

Yoga Calisthenics

Whole body movements coordinated with breath

Maintain Breath Control & Posture

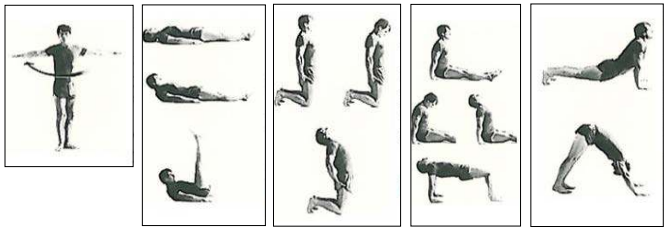




Exercise Phase I: Posture Building/Stability

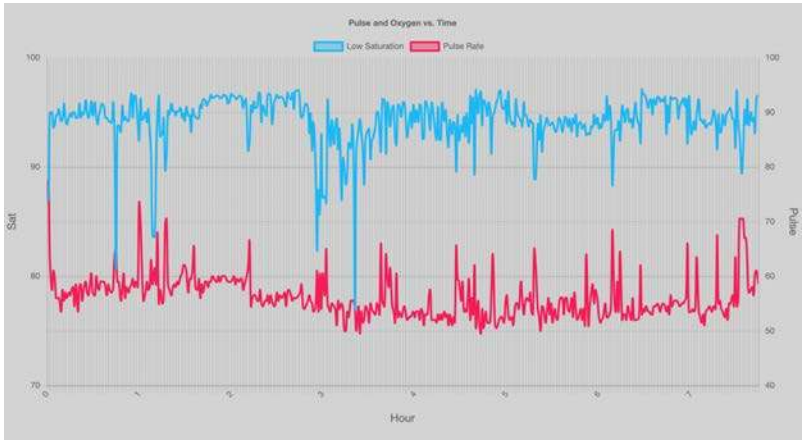
Exercise Phase II: Warm Up/Circulation

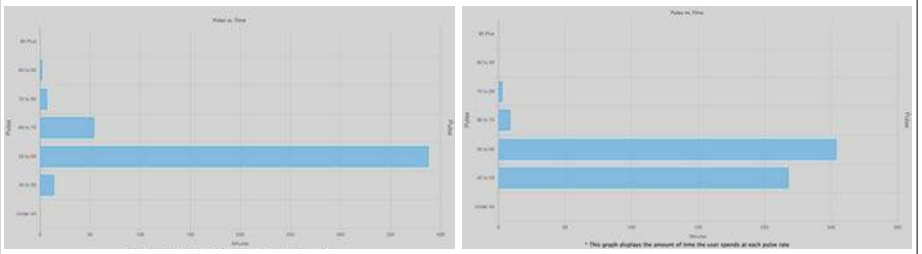
Movement Integration: Phase 1-3 Combined



Isometric holds with breath pauses (space between the breaths) also feature use of agonist/antagonist muscle pairs to self stretch

Transitional movements between flexion and extension coordinated with phases of breathing





Imaging with Chiropractic Perspective

anish@bajajchiropractic.com

Blind Spot #2 Imaging

Brain + Spine

EXAM: MRI BRAIN, CERVICAL SPINE, THORACIC SPINE, AND LUMBAR SPINE.

HISTORY: PET/CT examination dated 8/29/2017.

TECHNIQUE: Multiplanar multisequence MRI examination of the brain, cervical spine, thoracic spine, and lumbar spine was performed.

COMPARISON: No prior study is available for comparison.

FINDINGS:

There is no midline shift, hydrocephalus, abnormal extra-axial fluid collection, or evidence of recent territorial infarct. Ventricular and sulcal caliber is within normal limits for age. No parenchymal signal abnormality is detected. The cerebellar tonsils are normally located. The pituitary gland is not enlarged. The intracranial arterial flow voids appear intact.

Scattered mucosal thickening affects the frontal sinuses, ethmoid air cells, right sphenoid sinus, and bilateral maxillary sinuses.

The anterior atlantoaxial articulation and craniocervical articulations are unremarkable. Straightening of the normal cervical lordosis is demonstrated, which may be related to muscle spasm or patient positioning. Mild retrolisthesis at C5-C6 is observed. Cervical vertebral body heights are maintained. Multilevel cervical disc space narrowing is demonstrated. Associated multilevel discogenic degenerative endplate changes are observed, including endplate osteophyte formations.

There appear to be disc/osteophyte complexes at the C4-C5, C5-C6, and C6-C7 levels. Contact appears to be made with the adjacent ventral spinal cord at these levels. No definitive spinal cord edema/myelomalacia is detected. Mild disc bulges/herniations are also observed at the C3-C4 and C7-T1 levels. Multilevel bilateral cervical facet arthropathy is demonstrated with multilevel cervical foraminal narrowing of varying degrees.

Thoracic vertebral body heights are maintained. There is no malalignment of thoracic vertebral body heights in the sagittal plane. Mild multilevel thoracic discogenic degenerative endplate changes are observed.

Mild disc bulges/herniations are demonstrated at the T1-T2 and T2-T3 levels. There is no associated spinal cord

Brain + Spine

compression. There appears to be moderate-severe bilateral foraminal narrowing at T1-T2 secondary to facet arthropathy. Mild bilateral foraminal narrowing at T2-T3 is demonstrated, secondary to facet arthropathy. Small disc herniation/bulges are also observed at the T9-T10, T10-T11 and, T11-T12, and T12-L1 levels. There is no associated spinal cord compression. No definitive abnormal signal is detected within the thoracic spinal cord.

Mild lumbar levoscoliosis is observed. There is mild right lateral vertebral body offset at L1-L2. Lumbar vertebral body heights are maintained. There is no lumbar vertebral body malalignment in the sagittal plane. Presumed discogenic degenerative endplate changes centered at L2-L3 are observed.

Disc bulges/herniations are demonstrated at the L1-L2, L2-L3, L3-L4, L4-L5, and L5-S1 levels. There appears to be at least mild central canal stenosis at L3-L4, and at least moderate central canal stenosis at L4-L5. Posterior element hypertrophy at the L2-L3, L3-L4, L4-L5, and L5-S1 levels is observed. Mild-moderate multilevel foraminal narrowing is observed throughout the lumbar spine. There appears to be a superimposed broad-based left foraminal disc herniation at L1-L2 which approximates the exiting left L1 nerve root. There appears to be a broad-based right foraminal disc herniation L2-L3 which approximates the exiting right L2 nerve root. There appears to be a broad-based right foraminal disc herniation at L3-L4 which approximates the exiting right L3 nerve root.

IMPRESSION:

Unremarkable MRI examination of the brain. No recent territorial infarct, hydrocephalus, or intracranial mass is detected.

Paranasal sinus inflammatory changes, as detailed above.

Multilevel cervical spine, thoracic spine, and lumbar spine degenerative changes, as detailed above.

Thank you for the opportunity to participate in the care of this patient.

High Risk Areas

EXAM **SCREENING MUSCULOSKELETAL EXAMINATION**

HISTORY: Asymptomatic patient. Screening exam. Prior bilateral knee stem cell injections. Prior right shoulder surgery.

TECHNIQUE: Multiplanar, multisequential MRI examinations of both shoulders, hips, and knees were performed on a 3-Tesla scanner according to a standardized protocol.

COMPARISON: None available.

FINDINGS:

SHOULDER:

-- LEFT shoulder: Mild cartilage wear at the glenohumeral joint is associated with small osteophytes. There is degenerative signal throughout the labrum without evidence of a detached or displaced tear. Biceps anchor appears intact. No joint effusion.
Moderate supraspinatus/infraspinatus tendinosis with a low-grade concealed interstitial delaminating tear at the supraspinatus/infraspinatus junctional zone fibers. There is also mild subscapularis tendinosis. No high-grade rotator cuff tears. Teres minor tendon is unremarkable. Mild acromioclavicular joint arthrosis. No selective muscle atrophy.
-- RIGHT shoulder: Mild glenohumeral joint cartilage wear is associated with small osteophytes. The posteroinferior and posterosuperior aspect of the labrum are diminutive and irregular; most likely related to degenerative labral tearing. Biceps anchor appears intact.
There is evidence of prior rotator cuff repair with a suture anchors traversing the greater tuberosity. Scattered punctate foci of signal hypointensity around the glenohumeral joint are likely related to prior surgery and small remote hemorrhagic foci.
There is mild supraspinatus tendinosis with broad areas of mild bursal sided fraying along the posterior tendon. There is also mild-moderate infraspinatus tendinosis with a small high-grade concealed interstitial tear at the anterior tendon footprint, the tear measures approximately 6 x 4 mm (transverse, AP dimensions) and involves just over 50% of the tendon thickness. No full-thickness rotator cuff tear. The subscapularis and teres minor tendons are unremarkable. No selective muscle atrophy. Mild-moderate acromioclavicular joint arthrosis.

High Risk Areas

HIP:

Mild cartilage wear and small osteophytes in the superior aspect of both hips, without gross full-thickness cartilage defects. No joint effusions. No evidence of superior labral detachment on either side. Mild gluteus medius and gluteus minimus tendinosis with mild peritendinitis bilaterally, greater on the left. No tendon tear. The hamstring, iliopsoas, rectus femoris, and adductor longus tendons are unremarkable.
Sacroiliac joints and the symphysis pubis are unremarkable. No selective muscle atrophy.

KNEE:

- Left knee: Anterior and posterior cruciate ligaments are intact. Quadriceps and patellar tendons are intact. The medial meniscus posterior horn segment is diminutive and blunted by fluid signal, in keeping with prior partial meniscectomy. Elevated oblique signal within the posterior horn/body junction is indeterminate for postoperative scarring or recurrent meniscal tear. No evidence of a lateral meniscal tear.
An osteochondral lesion along the far-posterior aspect of the medial femoral condyle measures approximately 1.2 x 1.0 cm (transverse, craniocaudad dimensions). Weightbearing femorotibial cartilage surfaces are otherwise preserved. There is focal cartilage fissuring along the central patellar surface. Trochlear cartilage is grossly preserved. Small popliteal cyst. No joint effusion. There is nonspecific mild selective atrophy of the proximal medial gastrocnemius muscle.
-- Right knee: Anterior and posterior cruciate ligaments are intact. Quadriceps and patellar tendons are intact. There is complex oblique tearing of the medial meniscus posterior horn/body junction, possibly also with a radial component. No evidence of a lateral meniscal tear.
There is high-grade (near-full-thickness) cartilage wear along the posterior weightbearing medial femorotibial surfaces. Mild lateral compartment cartilage wear. Partial-thickness cartilage fissure along the central patellar surface.
Large, multilocular popliteal cyst. Moderate joint effusion. No muscle atrophy.

IMPRESSION: Musculoskeletal MRI screening examination demonstrates:

1. **Hips: Mild bilateral hip joint arthrosis. Mild bilateral gluteus minimus and gluteus medius tendinosis and peritendinitis bilaterally (greater on the left).**
2. **Left shoulder: Mild glenohumeral and acromioclavicular joint arthrosis. Moderate supraspinatus/infraspinatus tendinosis with low-grade concealed interstitial delaminating tear. Mild subscapularis tendinosis.**
3. **Right shoulder: Mild glenohumeral and mild-moderate acromioclavicular joint arthrosis. Degenerative posterior labral tearing. Postsurgical changes related to prior rotator cuff repair. Supraspinatus and infraspinatus tendinosis with small, high-grade concealed interstitial tear at the anterior infraspinatus tendon footprint.**

High Risk Areas

4. **Left knee: Prior partial medial meniscectomy. Signal abnormality within the remnant posterior horn/body junction is indeterminate for postoperative scarring versus recurrent meniscal tear; this could be further evaluated with dedicated knee MRI arthrography. Osteochondral lesion along the posterior medial femoral condyle and small cartilage fissure along the central patellar surface. Small popliteal cyst. Nonspecific medial gastrocnemius muscle atrophy.**
5. **Right knee: Complex oblique tear of the medial meniscus. Tricompartmental arthrosis, with high-grade cartilage wear in the medial compartment. Large, multilocular popliteal cyst and moderate joint effusion.**
6. **For discussion of findings related to the brain, spine, abdomen, and pelvis, please refer to the dedicated subspecialty dedicated reports for these areas.**

MASTERING MOVEMENT

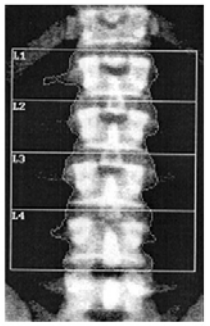
IDENTIFYING CHRONIC ELEMENTS OF PAIN

- Imaging: 3T Magnetic Resonance Imaging (MRI); Dual Energy Xray Absorptiometry (DXA)
- Functional: Nerve Conduction & Electromyography (NCV/EMG)
- Acute Phase Reactants: C-Reactive Protein (CRP); Erythrocyte Sedimentation Rate (ESR)

Bone Mineral Densitometry

Reports typically present the average of L1-4 vs each individual vertebral level

Diagnostic criteria focussed on pathology and medication guidelines
Images are not for diagnostic use



Region	Est. area (cm^2)	Est. BMC (grams)	BMD (g/cm^2)
L1	17.11	30.42	1.778
L2	16.82	31.47	1.871
L3	19.02	34.69	1.824
L4	21.13	39.85	1.886
Total	74.08	136.43	1.842

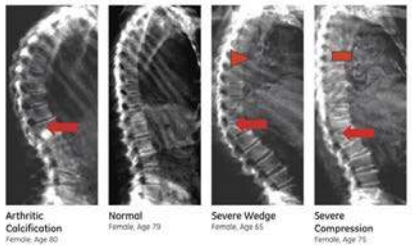
BMD (L1–L4) = 1.842 g/cm²

Region	BMD	T(30)		Z	
L1	1.778	+6.1	161%	+6.1	161%
L2	1.871	+6.09	156%	+6.09	156%
L3	1.824	+5.57	151%	+5.57	151%
L4	1.886	+5.72	150%	+5.72	150%
L1–L4	1.842	+5.85	154%	+5.85	154%

• Age, sex, and ethnicity matched
T = peak BMD matched
Z = age matched

Blind Spot #2 Imaging
BMD/Fracture Assessment

VFA images closer to plain film quality Assessment of individual vertebral levels. Better integration with subluxation data and chiropractic model of correction and management



BMC Endocrine Disorders

BioMed Central

Research article

Open Access

Age-related increases in parathyroid hormone may be antecedent to both osteoporosis and dementia

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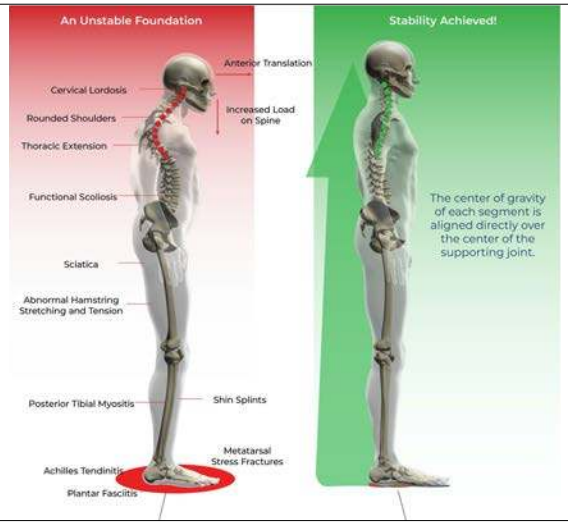
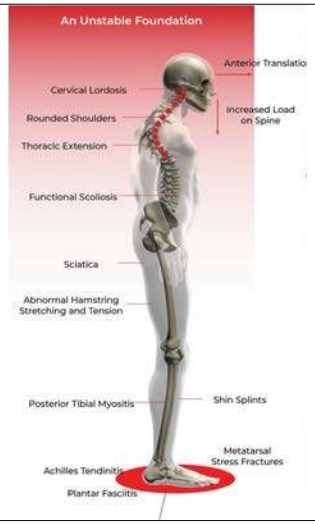
Cognition & Bone Health
Age-related increases in parathyroid hormone may be antecedent to both osteoporosis and dementia

Our findings of a statistically lower bone density and prolonged P300 in patients with high parathyroid hormone levels may suggest that increased parathyroid hormone levels coupled with prolonged P300 latency may become putative biological markers of both dementia and osteoporosis and warrant intensive investigation.

[Bajaj, BMC Endocrine Disorders]

The Phases of a Musculoskeletal Injury





Spine + Brain

Osteoporosis/Sarcoporosis begins with Osteopenia/Sarcopenia, which begins with disrupted foundational elements overloading cognitive resources

Movement

Isolate and focus on essential functions

Biomechanical exam related to detection and correction of subluxation: FOCUS ON INDICATORS

From resting state to Quality of dynamic movement

Capacity for exercise: ranges of motion, alignment, stability, coordination

Movement - PUMPS

A) Joint fluid, B) Cerebrospinal fluid (CSF), C) Blood, D) Lymph

Public Health Case - Opioid Crisis

Chiropractic Perspective In Demand

Dependence We must properly identify the universal survival factors that which we DEPEND on once known (respiration and balance), we can focus our efforts to prioritize them:

- Now we can be proactive in reinforcing the associate behaviors
- We can start with the end goal in mind
- Keep track of priorities that persist from beginning to end

Independence Independence is when we achieve a level of internal balance through identification of the correct healthcare priorities and match that with corresponding behaviors:

- Think win-win as in satisfying needs of multiple variables
- Understand the outside variables first before we engage with them
- With balance we combine those efforts effectively for efficiency

Interdependence Interdependence is defined as maintaining mastery of established healthy behaviors while engaging in progressively more complex lifestyle endeavors

Chiropractic Outcomes

Patients under chiropractic care spend 85% less on pharmaceuticals than those who do get spinal adjustments for chronic pain.

Patients who first saw a chiropractor for care elected for surgery 1.5% of the time compared to 42% in those who saw a surgeon first.

Respiratory Crisis

Opioid Crisis: respiratory depression

Covid-19: lung infection complications

Wildfires: Canada

Respiratory Depression

The human body is critically dependent on the ventilatory control system for adequate uptake of oxygen and removal of carbon dioxide (CO_2). Potent opioid analgesics, through their actions on μ-opioid receptor (MOR) expressed on respiratory neurons in the brainstem, depress ventilation.

[Rutger van der Schier]

New York Chiropractic Council

Welcome to the New York Chiropractic Opioid Crisis home page. New York Chiropractors have been providing essential wellness care to New Yorkers for over a hundred years. Our members offer safe, drug free solutions to resolve many forms of stress. The value of our services in the opioid crisis is just now being discovered by many, and this page will serve to provide both the public and professionals key information to preventing opioid exposure and how to collaborate care for those who have been exposed and may be dealing with addiction.

Patients seek out chiropractors for our tremendous track record (www.f4cp.com/f4cp_opioid_white_paper.pdf, https://www.jmptonline.org/article/S0161-4754(07)00076-0/abstract) helping recover some of the most common forms of stress with non-invasive care. Even in obvious cases involving spine injury, patients are not always referred for chiropractic care. Equally misunderstood is the importance the spine plays in a balanced nervous system, a key factor in fighting addictive pattens of behavior.

To combat the crisis council has launched a campaign led by our Opioid task force: A crucial point that drives our movement is the realization that the recovery community is looking for chiropractic solutions. As a fragmented field, recovery efforts vary greatly from one community to another. Read more about our campaign to improve access to chiropractic care and help lead our collective recovery from opioid addiction.

New York Chiropractic Council

Changing Policy

Watch Dr. Joe Baudille & Dr. John Lamonica speak in front of the NYS Senate on Opioid Addiction and Prevention.
https://nycouncil.com/Public/NYS-Senate-Public-Hearing-on-Opioids-Addiction-and-Prevention.aspx

Senator David Carlucci acknowledges Dr Bryan Ludwig's testimony at the public hearing of the Joint Senate Task Force on Opioids, Addiction & Overdose Prevention
https://nycouncil.com/Public/News/Current_News_Articles/Public/Current_News.aspx?hkey=5d3160df-7009-40a7-98fc-8d4a21443ebd

Educating the Public

Community Connect On Opioids - Albany

Community Connect On Opioids - New York City

Educating Practitioners

Recovery Conference: Bridging the gap between chiropractors and the recovery community - Bryan Ludwig, D.C. & Anish Bajaj, D.C.

Continuing Education for practitioners - Anish Bajaj, D.C.

Opioid Crisis Ambassador Program

Recovery Community

Recovery Conference

Friends of Recovery New York (FOR-NY), October 2019 Introduction of Chiropractic to New York: Presentation by Anish Bajaj and Bryan Ludwig

-Our mission is to demonstrate the power and promise of recovery from addictions and its value to individuals, families and communities throughout New York State and the nation.

-Friends of Recovery – New York (FOR-NY) is a 501(c)3 non-profit organization with a mission to demonstrate the power and promise of recovery from addictions and its value to individuals, families and communities throughout New York State and the nation. We actively seek to advance public policies and practices that promote and support recovery.

What can Science Do?

Explain what happened

Bring clarity and relieve guilt

Give biological ways to support the healing brain (Build the bridge to Chiropractic through education)

Show possible lessons of risk of relapse

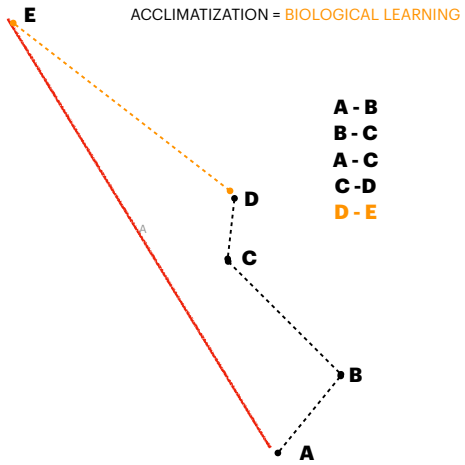
Reduce time wandering on “the dark side”

The moment of crisis

What happened?

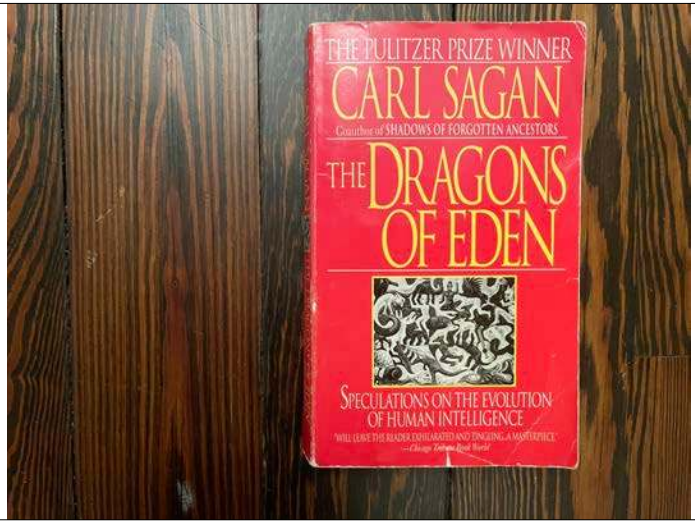
1. In response to abnormal high fluxes of dopamine, the cells of the NAC down regulate the dopamine receptor (D2R2). This was demonstrated in the 90’s with cocaine, alcohol, methamphetamine and heroin, with heroin having the most profound effect.
2. The Nucleus Accumbens gives negative feedback to the VTA shutting down NT synthesis (dopamine)
3. The Hypothalamus becomes aware of the situation, sends Corticotroping Releasing Factor (CRF) as the messenger acting on the Hippocampal Pituitary Adrenal Axis (HPA) resulting in fear. Now the person is using the drug not to feel good (Satisfaction) but to not feel bad (Avoid Withdrawal). The full power of the Limbic system is focussed on getting the drug {misery and destruction}

[Helman, Koob]



ACCLIMATIZATION = BIOLOGICAL LEARNING

A - B
B - C
A - C
C - D
D - E



Recovery…How do we compete?

Natural Rewards

Opioid

biological resilience & mental acuity

"Gravity Always Wins"

–Radiohead

What is Homeostasis?

Fill in your indicators…

Chiropractic Homeostasis TM powered by essential functions

Behavior Modification as a survival tool to satisfy essential needs

Gravity & Oxygenation driving brain data and importance of posture & breathing

Chiropractic connection through care of spine, cranium & feet to support whole body posture & function

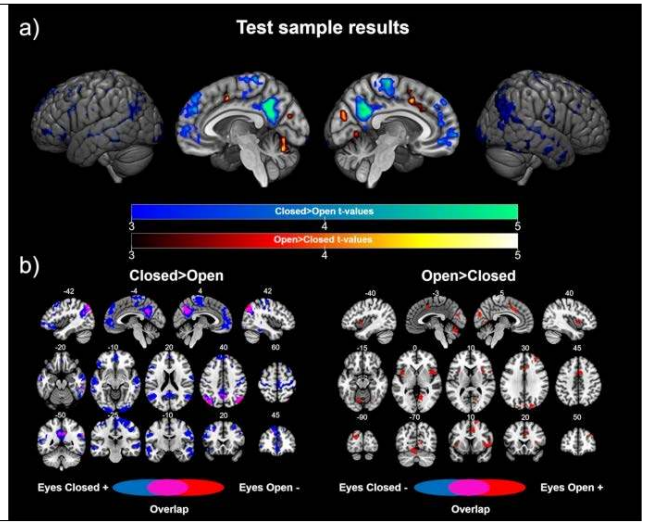
Build on essentials to define homeostasis based on chiropractic perspective

Review pertinent examination principles and techniques for reporting on foot scans

Explore chiropractic rehab & exercise practices based on respiration & posture.

Vigilance is the state of being watchful or alert for danger or some other kind of trouble.

Default Mode Network (DMN)



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Independence Independence is when we achieve a level of internal balance through identification of the correct healthcare priorities and match that with corresponding behaviors:

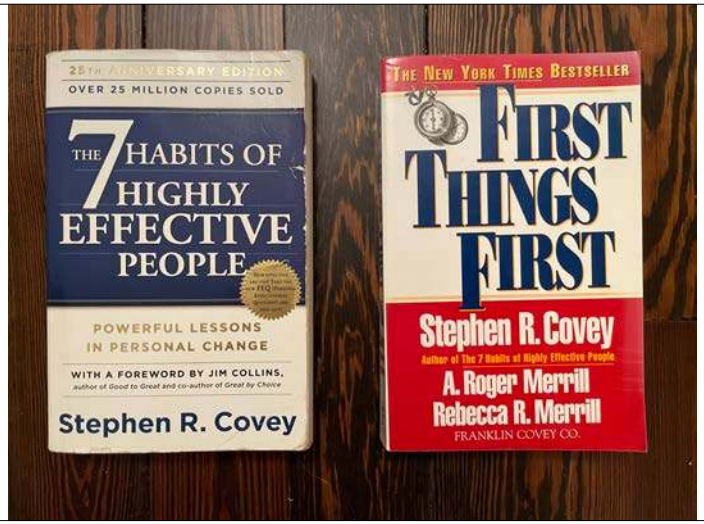
- •Think win-win as in satisfying needs of multiple variables
- •Understand the outside variables first before we engage with them
- •With balance we combine those efforts effectively for efficiency

Interdependence Interdependence is defined as maintaining mastery of established healthy behaviors while engaging in progressively more complex lifestyle endeavors

Guardian Role?

Thirty years of brain imaging research has converged to define the brain's default network-a novel and only recently appreciated brain system that participates in internal modes of cognition. Here we synthesize past observations to provide strong evidence that the default network is a specific, anatomically defined brain system preferentially active when individuals are not focused on the external environment. Analysis of connectional anatomy in the monkey supports the presence of an interconnected brain system. Providing insight into function, the default network is active when individuals are engaged in internally focused tasks including autobiographical memory retrieval, envisioning the future, and conceiving the perspectives of others. Probing the functional anatomy of the network in detail reveals that it is best understood as multiple interacting subsystems. The medial temporal lobe subsystem provides information from prior experiences in the form of memories and associations that are the building blocks of mental simulation. The medial prefrontal subsystem facilitates the flexible use of this information during the construction of self-relevant mental simulations. These two subsystems converge on important nodes of integration including the posterior cingulate cortex. The implications of these functional and anatomical observations are discussed in relation to possible adaptive roles of the default network for using past experiences to plan for the future, navigate social interactions, and maximize the utility of moments when we are not otherwise engaged by the external world. We conclude by discussing the relevance of the default network for understanding mental disorders including autism, schizophrenia, and Alzheimer's disease.

[Annals of the New York Academy of Science]

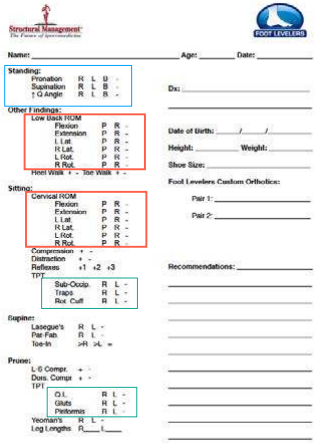


Intake Form

Weight Bearing/Balance/Posture/Feet

Ranges of Motion

Chiropractic/Hands On



Patient Self Reporting

Neurophysiology

Addiction Models

Brain States

Functional Brain Connectivity

Cognition/Learning Process

Survival

#1 Survival Tool is Adaptation. Combine anticipation with behavior modification to thrive.

Dopamine - The ink used to document what is working

Learning Process

Latency = metabolic rate, cognitive speed, processing speed, memory recall [P300 Study]

Voltage = metabolic energy [P300 Study] (storm picture, stone etching)

AEP/VEP Anticipation (self referential) Anxiety, Attention errors

Rest / Recovery
High Point = Sleep

Survival - Essential Functions

Essential Structural & Functional Needs

Breathing

Balance

Metabolic Drive - Where is your power going?

Cognition: Memory

Addiction Models

Behavior Plasticity

Incentive Sensitization (craving Dopa)

Habit-based circuit recruitment

Reward Deficiency - hard & soft loss of capacity

Opponent Process Theory (H)

[Nelson]

Reward System

Conditioning by Incentive - Satisfaction

Dopamine Homeostasis

Satisfying Needs is Biologically tied to Desire

Reward System Function

The Midbrain reward circuit is tasked with using a surge of the neurotransmitter dopamine to tag/mark anything - substance, behavior - that has relevance for survival. The endogenous opioid system is involved in relaying this information into memory. Both systems are ancient evolutionarily and both were likely first linked to pain — Learn to avoid painful things and learning from painful situations.

Dopamine

A key discovery in addiction science was that all drugs (and later behaviors) associated with addiction caused abnormal fluxes of dopamine in the reward pathways

GABA - Gamma Amino Butryc Acid

Determines balance between arousal & calm that the brain and body have to SET for each moment in time

Opioids hit the Nervous system, specifically the reward center, mimicking endorphins, flooding it with dopamine, raising GABA and decreasing Glutamic Acid which represents the “relief” or recovery

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Chronic Stress - Allostatic Loading

A period of high demand would leave you without enough co-factor for mood stabilization related to NT synthesis and more vulnerable to seeking exogenous correction from a drug.

Reward Deficiency Syndrome is a brain disorder characterized by a clinically significant deficiency of the essential neurotransmitter - Dopamine - in the brain’s reward center, specifically the midbrain and prefrontal cortex. It is primarily acquired genetically but can also result from prolonged stress.

Stress - Addiction

Genetic Predisposition

Psychosocial Complications

Epigenetics - altered dna methylation in hippocampus and nucleus accumbens (Gal)

Stress Disruption of Homeostatic Set Point

Nervous System Stress leading to Limbic ‘Lock and Load’

Endocrine - Stabilizing Mood/Emotion with DHEA (Neurosteroid)

Homeostasis

Constant Monitoring ‘Sentinel’ ‘Guardian’

Physiological Processes

Constants: Gravity, Oxygen

Give Biological ways to support the brain

“Making life work is you’re responsibility”

Chiropractic - Proactive Recovery

Movement:

Trauma

Pain: Avoid the Trap at every level

Stress Model

Pain- Avoid the Trap

Nociception - Communication tool of survival. Non-adapting on-purpose

Indicator based chiropractic systems to detect and correct subluxation

Subluxation -Adding to Disruption

Impact on Homeostasis, Reward System, Cognitive Function & Behavior

Reduced NT Synthesis + Subluxation = Reduced Coping Capacity + Altered Reality

Stress mechanism: Poor NT synthesis leads to inability to integrate sensory systems.

The amygdala & hippocampus need to normalize in order for recovery to be possible

[Stewart, Buerger]

Disruption of Functional Networks in Addiction:

Affects Cognition & Emotion

Facilitates Craving & Relapse

Affects Self Related Decisions

Linked to Dopamine dysfunction

[Volkow, Zhang]

Guardian Role?

Thirty years of brain imaging research has converged to define the brain's default network-a novel and only recently appreciated brain system that participates in internal modes of cognition. Here we synthesize past observations to provide strong evidence that the default network is a specific, anatomically defined brain system preferentially active when individuals are not focused on the external environment. Analysis of connectional anatomy in the monkey supports the presence of an interconnected brain system. Providing insight into function, the default network is active when individuals are engaged in internally focused tasks including autobiographical memory retrieval, envisioning the future, and conceiving the perspectives of others. Probing the functional anatomy of the network in detail reveals that it is best understood as multiple interacting subsystems. The medial temporal lobe subsystem provides information from prior experiences in the form of memories and associations that are the building blocks of mental simulation. The medial prefrontal subsystem facilitates the flexible use of this information during the construction of self-relevant mental simulations. These two subsystems converge on important nodes of integration including the posterior cingulate cortex. The implications of these functional and anatomical observations are discussed in relation to possible adaptive roles of the default network for using past experiences to plan for the future, navigate social interactions, and maximize the utility of moments when we are not otherwise engaged by the external world. We conclude by discussing the relevance of the default network for understanding mental disorders including autism, schizophrenia, and Alzheimer's disease.

[Annals of the New York Academy of Science]

Pain - Cognitive Distraction

Differences in fMRI resting-state connectivity of the default mode network (DMN) seen in chronic pain patients are often interpreted as brain reorganization due to the chronic pain condition. Nevertheless, patients' pain at the time of fMRI might influence the DMN because pain, like cognitive stimuli, engages attentional mechanisms and cognitive engagement is known to alter DMN activity. Here, we aimed to dissociate the influence of chronic pain condition (trait) from the influence of current pain experience (state) on DMN connectivity in patients with fibromyalgia (FM). We performed resting-state fMRI scans to test DMN connectivity in FM patients and matched healthy controls in two separate cohorts: (1) in a cohort not experiencing pain during scanning (27 FM patients and 27 controls), (2) in a cohort with current clinical pain during scanning (16 FM patients and 16 controls). In FM patients without pain during scanning, the connectivity of the DMN did not differ significantly from controls. By contrast, FM patients with current clinical pain during the scan had significantly increased DMN connectivity to bilateral anterior insula (INS) similar to previous studies. Regression analysis showed a positive relationship between DMN-midINS connectivity and current pain. We therefore suggest that transient DMN disruptions due to current clinical pain during scanning (current pain state) may be a substantial contributor to DMN connectivity disruptions observed in chronic pain patients.

[NeuroImage]

Chronic vs Acute

It has been proposed that pain competes with other attention-demanding stimuli for cognitive resources, and many chronic pain patients display significant attention and mental flexibility deficits. These alterations may result from disruptions in the functioning of the default mode network (DMN) which plays a critical role in attention, memory, prospection and self-processing, and recent investigations have found alterations in DMN function in multiple chronic pain conditions. Whilst it has been proposed that these DMN alterations are a characteristic of pain that is chronic in nature, we recently reported altered oscillatory activity in the DMN during an acute, 5 minute noxious stimulus in healthy control subjects. We therefore hypothesize that altered DMN activity patterns will not be restricted to those in chronic pain but instead will also occur in healthy individuals during tonic noxious stimuli. We used functional magnetic resonance imaging to measure resting state infra-slow oscillatory activity and functional connectivity in patients with chronic orofacial pain at rest and in healthy controls during a 20-minute tonic pain stimulus. We found decreases in oscillatory activity in key regions of the DMN in patients with chronic pain, as well as in healthy controls during tonic pain in addition to changes in functional connectivity between the posterior cingulate cortex and areas of the DMN in both groups. The results show that similar alterations in DMN function occur in healthy individuals during acute noxious stimuli as well as in individuals with chronic pain. These DMN changes may reflect the presence of pain per se and may underlie alterations in attentional processes that occur in the presence of pain.

[Neuroimage Clinical]

Spine injury = Brain injury

The role of the brain in chronic pain conditions remains speculative. We compared brain morphology of 26 chronic back pain (CBP) patients to matched control subjects, using magnetic resonance imaging brain scan data and automated analysis techniques. CBP patients were divided into neuropathic, exhibiting pain because of sciatic nerve damage, and non-neuropathic groups. Pain-related characteristics were correlated to morphometric measures. Neocortical gray matter volume was compared after skull normalization. Patients with CBP showed 5-11% less neocortical gray matter volume than control subjects. The magnitude of this decrease is equivalent to the gray matter volume lost in 10-20 years of normal aging. The decreased volume was related to pain duration, indicating a 1.3 cm3 loss of gray matter for every year of chronic pain. Regional gray matter density in 17 CBP patients was compared with matched controls using voxel-based morphometry and nonparametric statistics. Gray matter density was reduced in bilateral dorsolateral prefrontal cortex and right thalamus and was strongly related to pain characteristics in a pattern distinct for neuropathic and non-neuropathic CBP. Our results imply that CBP is accompanied by brain atrophy and suggest that the pathophysiology of chronic pain includes thalamocortical processes.

[Journal of Neuroscience]

Pain Over Life

Chronic pain can result in anxiety, depression and reduced quality of life. However, its effects on cognitive abilities have remained unclear although many studies attempted to psychologically profile chronic pain. We hypothesized that performance on an emotional decision-making task may be impaired in chronic pain since human brain imaging studies show that brain regions critical for this ability are also involved in chronic pain. Chronic back pain (CBP) patients, chronic complex regional pain syndrome (CRPS) patients, and normal volunteers (matched for age, sex, and education) were studied on the Iowa Gambling Task, a card game developed to study emotional decision-making. Outcomes on the gambling task were contrasted to performance on other cognitive tasks. The net number of choices made from advantageous decks after subtracting choices made from disadvantageous decks on average was 22.6 in normal subjects ($n = 26$), 13.4 in CBP patients ($n = 26$), and -9.5 in CRPS patients ($n = 12$), indicating poor performance in the patient groups as compared to the normal controls ($P < 0.004$). Only pain intensity assessed during the gambling task was correlated with task outcome and only in CBP patients ($r = -0.75$, $P < 0.003$). Other cognitive abilities, such as attention, short-term memory, and general intelligence tested normal in the chronic pain patients. Our evidence indicates that chronic pain is associated with a specific cognitive deficit, which may impact everyday behavior especially in risky, emotionally laden, situations.

[Pain]

Iatrogenic opioid dependence is endemic and legal

The mounting endemic of prescription iatrogenic opioid dependence in pain patients provoked this treatise about an alternative method that can be used to treat pain, improve function and reduce the risk of opioid dependence. It is well known that as well as the side effects reported for chronic opioid therapy, genetically predisposed individuals are at risk for opioid dependence. We propose the use of the Genetic Addiction Risk Score (GARS) assessment to identify patients early in treatment who should avoid narcotic pain medications.

[Health]

GARS Addiction and Behavior

Benefits of GARS® for People with Known Substance and Non-Substance Abuse

GARS® can play a major role with personalizing the recovery approach for an individual. There are 6 important factors where GARS® can provide more insight to help better guide recovery management for that person:

DENIAL

It is well-known that many patients in treatment programs deny that they have a biological problem and are therefore able to control addictions. Providing real evidence genetically (GARS®) to predict risk for both substance and non-substance severity helps remove DENIAL.

GUILT

A very common response from people already addicted is a profound sense of shame and guilt, not realizing that they are not alone. Providing biological and genetic (GARS®) evidence to predict risk for both substance and non-substance severity helps remove GUILT.

GENOGRAM CONFIRMATION

In most chemical and non-chemical dependency programs the patients are usually asked to provide a family history of addiction in the form of a family tree called a GENOGRAM. Offering GARS™ to family members is the best way to confirm the risk of addiction in the family

Reward Deficiency Behaviors

People continually lacking dopamine don't feel satisfaction in their lives, have difficulty coping with stress and carry an elevated risk for behaviors that are known to artificially increase dopamine in the pleasure centers of the brain.

What can genetics tell us?

Drug Addition Risk

If you have a GARS score of 4 (alleles) or more, then you are at high risk for drug addiction.

Alcohol Addiction Risk

If you have a GARS score of 7 (alleles) or more, then you are also at high risk for alcohol addiction.

[Geneus]

Genetic Variants	Behavior Predisposition Risks
People with the G allele of the dopamine COMT gene	**Substance:** Alcohol, Cannabis, Cocaine, Glucose, Nicotine, Opioids, Stimulants **Non-Substance Behavior:** ADD/ADHD, Anxiety, Internet Gaming, OCD, Oppositional Defiant Disorder, Panic Disorder, Pathological Aggression
People with the A allele of the DRD1 receptor gene	**Substance:** Alcohol, Nicotine **Non-Substance Behavior:** Novelty Seeking
People with the A1 variant of the DRD2 receptor gene	**Substance:** Alcohol, Cannabis, Glucose, Heroin, Nicotine, Opioids **Non-Substance Behavior:** ADD/ADHD, Conduct Disorder, Gambling Disorder, Hypersexuality Disorder, Internet Gambling, Novelty Seeking, Pathological Aggression, PTDS
People with the C variant of the DRD3 receptor gene	**Substance:** Cocaine, Glucose **Non-Substance Behavior:** ADD/ADHD, OCD, Pathological Aggression
People with the C variant of the DRD4 receptor gene	**Substance:** Alcohol, Cannabis, Glucose, Nicotine, Opioids **Non-Substance Behavior:** ADD/ADHD, Conduct Disorder, Hypersexuality Disorder, Novelty Seeking, Pathological Aggression
People with the G allele of the OPRM1 gene	**Substance:** Alcohol, Cocaine, Glucose, Nicotine, Opioids **Non-Substance Behavior:** Overeating, PTSD, Stress
People with the 9R allele of the DAT1 gene	**Substance:** Alcohol, Cocaine, Heroin, Nicotine **Non-Substance Behavior:** ADD/ADHD, Depression (Anhedonia), PTSD
People with the S or LG allele of the 5-HTTLPR gene	**Substance:** Alcohol, Cannabis, Cocaine, Glucose, Nicotine, Opioids **Non-Substance Behavior:** ADD/ADHD, Pathological Aggression, PTSD
People with the 4R variant of the MAOA gene	**Substance:** Alcohol, Glucose, Nicotine, Opioids **Non-Substance Behavior:** ADD/ADHD, Harm Avoidance, Novelty Seeking
People with an over-expressed 181 allele of the GABRB3 gene	**Substance:** Alcohol **Non-Substance Behavior:** PTSD

Part II

Nociception: intense stimulation of sensory nerve cells called nociceptors produces a signal that travels along a chain of nerve fibers via the spinal cord to the brain. Nociception triggers a variety of biological and behavioral responses and may also result in a subjective experience of pain.

Mechanoreception: is a sensory receptor that responds to mechanical pressure or distortion. An important inhibitory effect of mechanoreception is the presynaptic and postsynaptic inhibition of the nociceptive pathways.

Establishing an agonist/antagonist relationship that adapts to functional needs

ANISH BAJAJ, D.C.

WEAK FRAME WEAK BRAIN

MASTER MOVEMENT TO BREAK FROM PAIN STATES AND OVERCOME ADDICTIONS

Mastering Movement to inhibit persistent pain states

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Establishing an agonist/antagonist relationship that adapts to functional needs

The entire MOVEMENT SPECTRUM can be monitored

THOUGHT/INTENTIONS

BREATHING

POSTURE: FLEXIBILITY, STABILITY, CIRCULATION

DYNAMIC CALISTHENICS

ENDURANCE

STRENGTH CONDITIONING

INTERVALS

Movement Basics: Breathing

Breathing is the first and last thing we do, hence breathing is life. The quality of our breathing affects the quality of our lives.

During deep abdominal breathing, you will oxygenate your blood, which triggers the release of endorphins, while also decreasing the release of stress hormones and slowing down your heart rate. These hormones are associated with a happy, positive feeling and can help relay “stop pain” messages throughout your body.

Breathing technique (quality) determines outcome

THE WAY YOU BREATH MATTERS

INHALING THROUGH NOSE (WARMS, FILTERS, ACCELERATES AIR) DIAPHRAGMATIC BREATHING (DEEP/EFFICIENT INTAKE OF OXYGEN IN LUNGS RESULTS IN RELEASE OF NATURAL PAIN KILLERS); ISOMETRIC HOLD/PAUSE MAINTAINS SPACE BETWEEN INHALATION/EXHALATION TELLS THE BRAIN THAT STRESS RESPONSE IS NOT NEEDED

OPTIMAL MECHANORECEPTION INHIBITED NOCICEPTION

MOUTH BREATHING (EXPOSES THROAT DIRECTLY TO COLD AND UNFILTERED AIR, DECELERATES AIRFLOW) USE OF SECONDARY MUSCLES OF RESPIRATION (NECK AND SHOULDER TENSION AND FATIGUE) AND LOSS OF SPACE IN-BETWEEN BREATHS (SIGNAL STRESS STATE RESPONSE, SHALLOW/INEFFICIENT OXYGEN INTAKE, LIMITED LUNG UTILIZATION.

POOR MECHANORECEPTION INCREASED NOCICEPTION

Improving outcomes in pain management towards ending addiction

Establish intention proper system of grading emphasizing measured effort maintaining relativity

Patient education and support to remove limiting belief in circumstances and reinforce potential of intentional behavior

Contingency?

EPIGENETICS AND PAIN

THE TRUE DETERMINING FACTORS OF HEALTH ARE WHAT YOU THINK AND WHAT YOU DO. CHRONIC PAIN CAN DISTRACT US AWAY FROM HEALTHY EXPRESSION AS WE BECOME STUCK IN LOWER FUNCTIONAL STATES.

Issues with Pain as an indicator

Difficulty measuring pain objectively

Decision making based on insufficient data

Pain scales are limited to subjective data

Addiction leads to a conflict of interest in reporting and making progress

UNDERSTANDING pain means STUDYING brain activity

Brain Electrical Activity Mapping shows receptor level activity, captured as QEEG allows for isolation of valuable data for correlation with clinical presentation and differential diagnosis

Cortical activity signatures for chronic pain sufferers have been identified and can be observed as states in monitoring and directing care

Nervous System data strengthens the correlation of pain to anxiety, depression, sleep disturbance, decision making and other quality of life suppressing factors that commonly complicate addiction

DEFAULT MODE AND PAIN

CHRONIC BACK PAIN RESULTED IN REDUCED DEACTIVATION OF DEFAULT MODE NETWORK (DMN) CORTICAL REGIONS SHOWING WIDESPREAD IMPACT OF PAIN ON THE BRAIN

Teaching recovery based on natural rewards

"Begin with the end in mind"

Isolating Function

Default Mode Network/Resting State Network via EEG

Oxygenation and Balance (META functions survival) represent critical end point of rest/recovery and starting point for actions.

Chiropractic Homeostasis TM create a calm resting state that satisfies essential needs. Work the underlying biology and reinforce the sustainable habits.

Movement

Isolate and focus on essential functions

Biomechanical exam related to detection and correction of subluxation: FOCUS ON INDICATORS

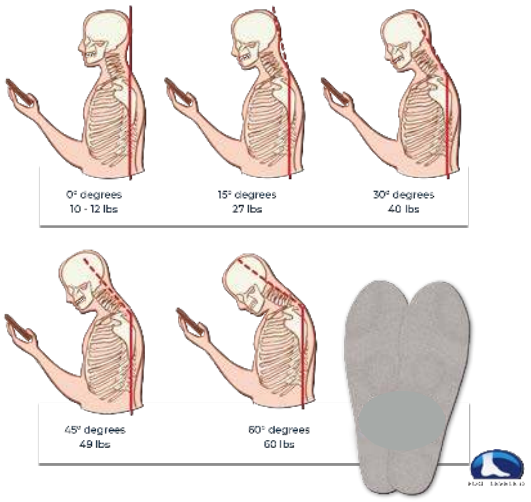
From resting state to Quality of movement

Capacity for exercise: ranges of motion, alignment, stability, coordination

Movement - PUMPS

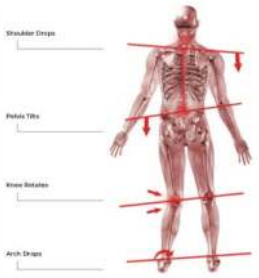
a) Joint fluid, b) Cerebrospinal fluid (CSF), c) Blood, d) Lymph

Technique Review



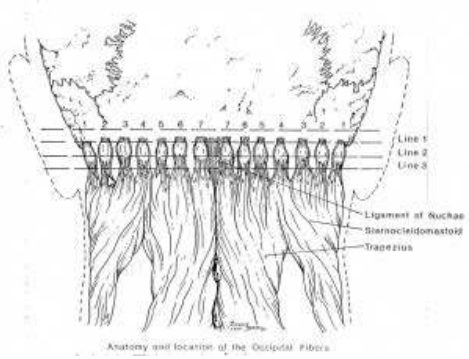
Posture

- <u>Primary Respiratory Mechanism</u> links spine and breathing
- Subluxation Patterns
- Brain States
- Upright Bipedalism
- Movement + Stability requires constant monitoring and adjustments
- Rest is disrupted by many diseases, posture can tax the brain 24/7



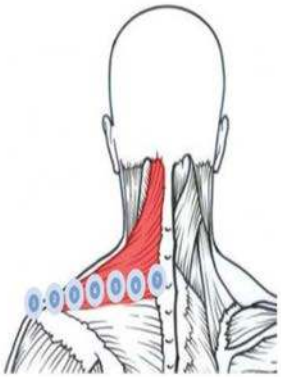
Palpatory Indicators

Sub-Occiptal



Anatomy and location of the Occipital Fibers

s



Reactive Trapezius Fibers							
Trapezius	1	2	3	4	5	6	7
Thoracic	T1, T2, T10	T3, T11, T12	T4, T5	T6	T7	T8	T9
Lumbar			L1	L2	L3	L4	L5

Technique Applications

SPINE + CRANIAL

Cranial work offers a sophisticated way to address reciprocal respiratory pumping of the spine, its relationship to meta-functions of the brain and gives the chiropractor ways to fine-tune more subtle movements at the level of the brain. Cranial work is always engaged after some degree of spinal stabilization has been achieved. From a perspective of gravity, head position is interdependent with overall body posture and even awareness of head position can be undermined by whole body posture (posture equals both neutral alignment, and stability through stillness and movement).

Specific considerations with cranial work:

NS Activation + CSF Pumping +Oxygenation +Lymphatic Drainage

“It takes too much time”

A bilateral Patrick’s test points to the Fourth Ventricle in the brain being in trouble from a distortion pull.

Patrick’s Test (Sign of Four)

Fig. 224—Left Patrick’s test

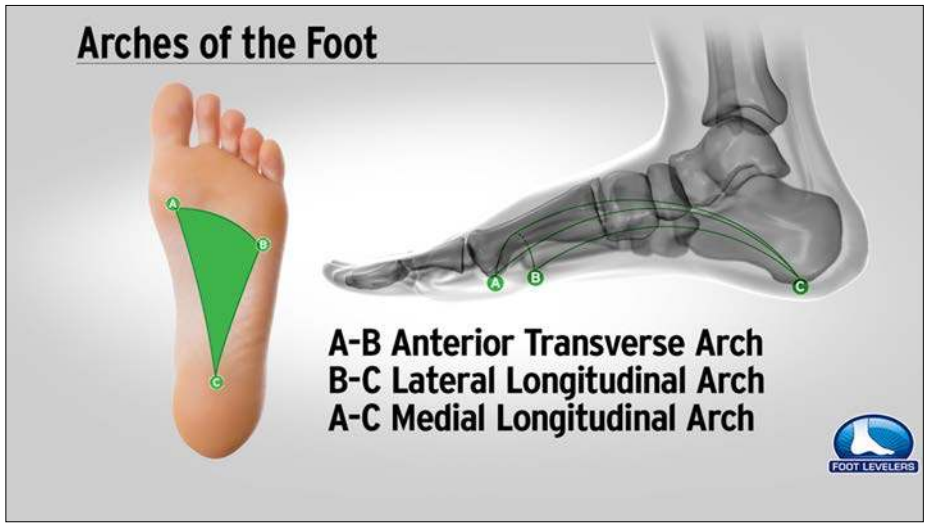
STO PAIN REFLEXES

SPINE + EXTREMITIES

Overpronation contributes to pelvic tilting and forward head carriage (compromised sagittal curves), which in turn affects quality of breathing and the ability to respirate efficiently.

It is vital that patients use custom orthotics that restore proper biomechanical foot function while they acclimate to new breath and posture work and prior to beginning endurance, strength conditioning or interval exercises to avoid further development of compensation patterns to overpronation.

If a factor like unhealthy alignment consistently and in an observable pattern affects whole body positioning in a way that compromises breathing, it should be detected and corrected, or it will continue to impact a patient’s life in a negative way



SPINE + EXTREMITIES

Whether the goal is to improve alignment and balance in the standing position or support the spine during more dynamic activities, care of the extremities (foot/ankle/knee wrist/elbows/ shoulders) is **one of our most successful strategies.**

Whether you are willing to adjust the feet or simply support them, custom orthotics offer solutions to a number of problems: 1) chronic misalignment throughout the biomechanical chain due to overpronation (usually bilateral and asymmetrical), 2) the need for dynamic flexible support of the arches, and 3) the need for stability in holding adjustments.

SPINE + SOT + STO

The primary respiratory mechanism model provides the mechanism explaining the vital relationship between the spine and essential survival functions of respiration, as well as balance. There exist significant gaps in modern healthcare between wellness and primary care which can better be identified and cared for by the chiropractor who understands this model.

Respiratory rehabilitation and balance-based rehabilitation remain under-utilized fields of physical therapy that need to be related to chiropractic's core principles. This will prove again and again to be a top priority in human health regardless of the chiropractic technique that it is applied with.

SPINE + SOFT TISSUE ORTHOPEDICS

STO is a broad integration strategy to accompany spinal work. Primary focus will be on supporting the brain, the heart and the lungs through support of:

a) NS activation through spine

b) Blood flow to all organs

c) Drainage of all organs

STO provides a chiropractic-specific approach to resuscitating organ balance of structure and function.

Focus + NS Activation + Blood Flow + Drainage all supported by hands on correction. Organ correction involves prioritization of less common soft tissue dysfunctions including but not limited to anteriorly located postural muscles (Psoas and SCM), organ muscle tension like lung, liver and kidney (viscero-somatic complexes).

Cervical Proprioceptors

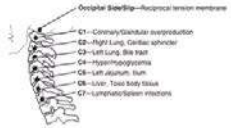


Fig. 20—Left lateral cervicals

The following instructions are for left cervical correction with changes for the right cervical correction in parenthesis.

To correct: Patient is supine. Support patient's head in right (left) hand. Lay the left (right) index finger, middle phalanx, lateral side over the palpatory painful point on the left (right) Atlas. Now perform the *STO* dynamic stretch reflex adjustment made by a sudden light anterior movement of the contacting finger. The simple secret to this technique is that you must perform this adjustment before the body's defense mechanism creates a protective muscle splint which will prevent correction. Use the red (blue) end of the Four Energy Device for 10 seconds to the meld the tissue

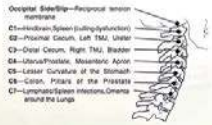


Fig. 21—Right lateral cervicals

Costochondral Junctions

Each Costochondral Junction (CCJ) has 93 information gathering organs called proprioceptors which report to the brain on conditions of the body.

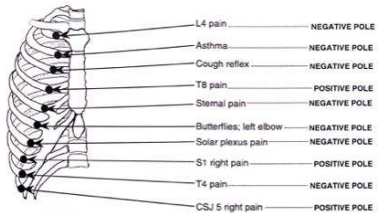


Fig. 23—Right anterior ribs

Use a mild Dynamic Stretch to each junction. Then meld with designated end of the Four Energy Device for 10 seconds.

Portal System Of Veins

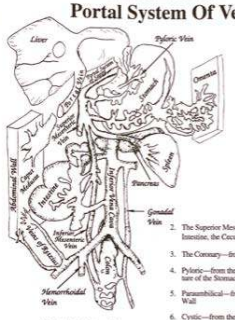


Fig. 4—Left lateral view

The portal system of veins include:

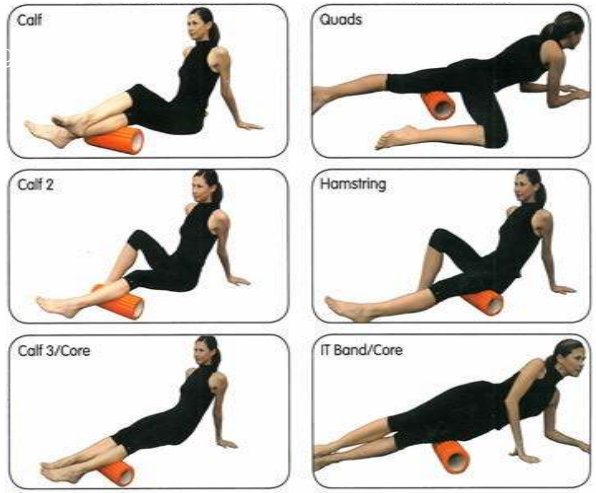
1. All veins which drain blood from the digestive tract in the abdomen.
2. All veins which drain the Spleen.
3. All veins which drain the Pancreas.
4. All veins which drain the Gallbladder.

All of the above convey blood to the liver sinusoids via the portal vein. The main portal system of veins that contribute to form the portal vein are:

1. The Splenic—from the Spleen
2. The Superior Mesenteric—from the Small Intestine, the Cecum, and Colon
3. The Coronary—from the Stomach and Esophagus
4. Pyloric—from the Pyloric and Lesser Curvature of the Stomach
5. Paraumbilical—from the anterior Abdominal Wall
6. Cystic—from the Gallbladder.
7. Hemorrhoidal—from the inferior Mesenteric

Portal obstruction of the Liver is the one most common abnormality found by the soft tissue regional orthopedics doctor. Collateral vessels circulation is the safety valve to relieve portal circulation back pressure. Here is the soft tissue trouble maker. There is no soft tissue technique that will be successful for any duration unless a method of relieving this obstruction is performed.

The problem occurs as these little used collateral pathways, forced into use in an effort to relieve the organ where swelling has occurred, becomes disabled by not being able to move freely or release normal metabolic toxins. As a result, a soft tissue disability appears.



Anterior Soft Tissue Reflex Points

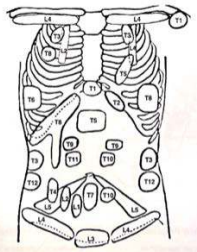


Fig. 29—Anterior torso

T1–Coronary	T10–Small Intestines
T2–Myocardial	T11–Duodenum
T3–Lungs	T12–Kidneys
T4–Bile Duct	L1–Ileocecal
T5–Stomach	L2–Cecum
T6–Pancreas	L3–Gonads
T7–Spleen	L4–Colon
T8–Liver	L5–Uterus/Prostate
T9–Adrenals	

Sternocleidomastoids

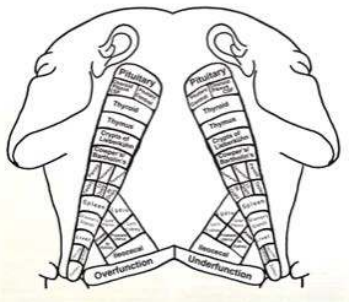


Fig. 38—Bilateral sternocleidomastoids

Viscero-Somatic Pathway

EXAM: **SCREENING BODY EXAMINATION**

HISTORY: Testicular cancer treated with orchiectomy and radiation therapy.

TECHNIQUE
Multiecho, multisequence MR imaging of the abdomen and pelvis is provided for review utilizing 3 Tesla GE magnet equipped with ideal IQ and elastography. Diffusion-weighted imaging is provided.

For any findings within the brain, spine, muscles, joints, and bones please refer to the dedicated subspecialty dedicated reports on these topics.

COMPARISON: Prior PET/CT exam images from 8/29/2017.

ABDOMEN FINDINGS

Liver- The liver is normal in size. There is no evidence for enhancing mass lesion. No intrahepatic ductal dilatation.

Fat fraction liver analysis suggests 12.3% which is considered mild fatty liver. Range of mild steatosis is between 5 and 33%

Iron overload analysis of the liver suggests average value of 62 iron milligrams per gram of liver parenchyma. This is within normal range. Normal range is up to 88 mg/g of liver parenchyma.

Elastography liver analysis of the liver as seen on the image 1 series 605 demonstrates normal appearance of liver parenchyma without evidence for stiffness or fibrosis. Average score on this image range between 1500 and 1700 P.A. Stiffness color maps are provided with stiffness scales of 0 and 20 and 0 and 8 K P.A.

Gallbladder-normal

Common bile duct-normal

Right kidney lesion measures 0.3 x 1 cm. On prior PET/CT exam from 2017, the lateral posterior aspect of this is high attenuation and on MR, the more anterior component appears to have fluid like signal. This may represent milk of

Viscero-Somatic Pathway

calcium within a cyst. Normal signal size and position.

Pancreas normal in size.

PELVIS: The prostate gland measures 3.6 x 4.6 x 3.8 cm. This is compatible with volume of 33 cc normal for patient's age. The peripheral parenchyma is grossly unremarkable without discrete suspicious mass lesion. There appears to be minimal central BPH change.

Seminal vesicles are normal.

Bowel is grossly unremarkable.

No evidence for pelvic lymphadenopathy.

Urinary bladder is normal.

IMPRESSION:
1. No evidence for pelvic lymphadenopathy, lymphadenopathy elsewhere or mass lesion to suggest metastatic prostate cancer.

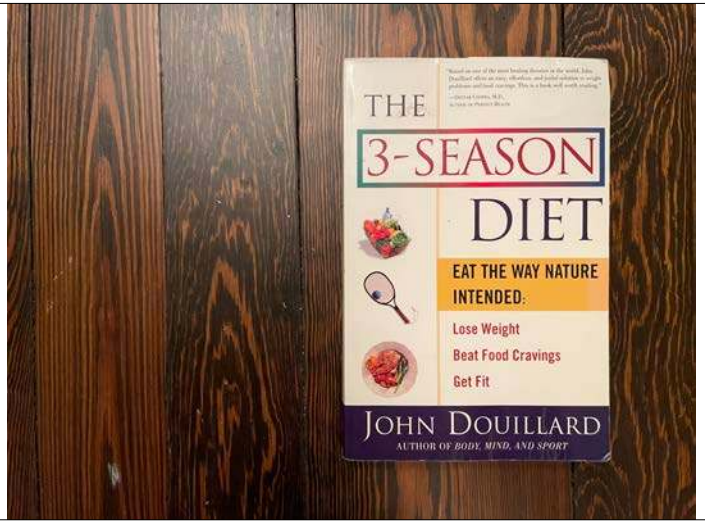
2. Mild fatty liver.

3. Small lesion in right kidney likely represents cyst with milk of calcium.

4. Mild BPH change within an otherwise normal sized prostate gland.

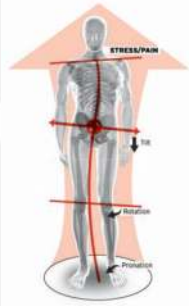
5. Due to technical error, sequences specific for the detection of prostate cancer were not obtained. The patient can come back free of charge to obtain these sequences. If the patient returns, an addendum will be placed on this report at that time.

Resuscitation: Modalities

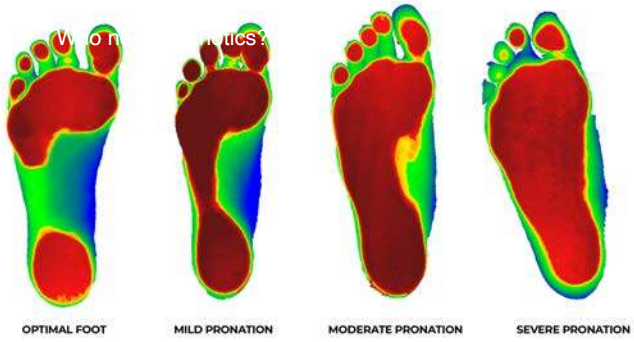


FOOT LEVELERS

Imbalances can cause…

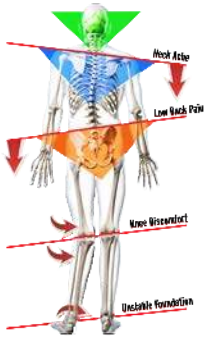


- **Anterior Head Carriage**
- Pelvic Unleveling
- Low Back Pain
- Hip Pain
- Piriformis Syndrome
- Knee Pain
- Functional LLI
- Stress Fractures
- Shin Splints
- Achilles Tendonitis
- Plantar Fasciitis
- Metatarsalgia

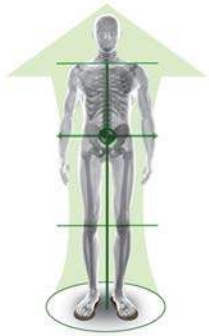


The vast majority of patients have overpronation

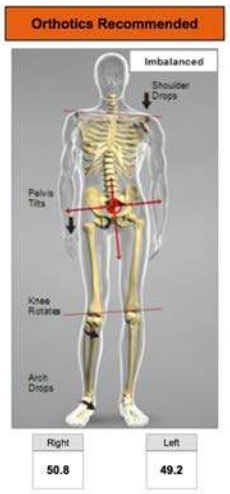
The Kinetic Chain



Without functional orthotics



With functional orthotics



Functional Orthotics Clinical Record of Necessity

In order for third parties to process insurance claims for orthotic-therapy reimbursement, they often require additional information which establishes medical necessity. Foot Levelers Inc. is providing the following sample letter of medical necessity and evaluation form as a guide only. Each description should be modified to appropriately represent the unique conditions of each case.

It is recommended that the evaluation form be completed with each new patient to uncover any underlying biomechanical conditions of the feet and lower extremities that may potentially interfere with your care.

A completed evaluation form, along with a letter of necessity, could be used to pre-certify care, accompany claims submissions, or in response to requests for further documentation. It is advisable to preempt requests for additional documentation by substantiating information early in the claims process.

A letter of necessity could include the following helpful information:

Functional orthotics are being prescribed for this patient.

This patient has a spinal condition that is complicated by a concomitant foot imbalance. This foot imbalance causes: functional leg length inequality that contributes to lateral pelvic tilt, lower extremity and spinal subluxations. This serial distortion increases the biomechanical and neurological stress contributing to the musculoskeletal pain experienced.

This patient has been fitted for Foot Levelers individually designed functional orthotics. Scientific investigation documents and verifies the effectiveness of functional orthotics for improving:

- Foot/ankle alignment[1]
- Knee alignment and Q-angle measurements[2]
- Pelvic alignment[3]
- Leg length inequality[4]
- Balance (eyes-open) and proprioception balance (eyes closed)[5]
- Gait movement patterns[6], and
- Overall functional biomechanics.[7]

To accommodate the shoe's dimensions and characteristics, one style may be needed for athletic or recreational shoes and another designed for daily wear or work shoes.

This patient needs:
___Full length individually designed orthotics for athletic recreational shoes
___Tight-fitting individually designed orthotics for dress shoes
___Individually designed orthotics in custom designed shoe wear

Examples of Common Conditions:

Cervical Conditions
- Subluxation
- Cervical Sprains

Thoracic Conditions
- Subluxation
- Thoracic Sprains

Low Back Conditions
- Subluxation
- Lumbar Sprains

Pelvic Conditions
- Leg Length Inequality
- Unlevel Pelvis

Hip Conditions
- Subluxation
- Hip Sprains

Knee Conditions
- Knee Subluxation
- Knee Sprains

Ankle Conditions
- Ankle Subluxation
- Ankle Sprains

Foot Conditions
- Flat Foot
- Foot Sprains

Establishing Necessity

References:

1.Kuhn DR, Shibley NJ, Austin WM, Yochum TR. Radiographic evaluation of weight-bearing orthotics and their effect on flexible pes planus. J Manipulative Physiol Ther 1999; 22(4): 221-226.

2.Kuhn DR, Yochum TR, Cherry AR, Rodgers SS. Immediate changes in the quadriceps femoris angle after insertion of an orthotic device. J Manipulative Physiol Ther 2002; 25(7): 465-470.

3.Kuhn DR, Smasal S, Pappas A, Nosco D. Radiographic evaluation of the effect of orthotics on the unleveled pelvis. J Chiro Ed 2003; 17(1): 64-65.

4.Woodward SP, Ball KA. Leg length inequality case study: three dimensional movement analysis of the effects of foot orthotics and heel lift. J Chiro Ed 2003; 17(1): 43.

5.Stude DE, Brink DK. Effects of nine holes of simulated golf and orthotic-intervention on balance and proprioception in experienced golfers. J Manipulative Physiol Ther 1997; 20(9): 590-601.

6.Stude DE, Gullickson J. The effects of orthotic intervention and nine holes of simulated golf on gait in experienced golfers. J Manipulative Physiol Ther 2001; 24(4): 279-287.

7.Stude DE, Gullickson J. Effects of orthotic intervention and nine holes of simulated golf on club-head velocity in experienced golfers. J Manipulative Physiol Ther 2000; 23(3): 168-174.

SPINE & CIRCULATION

Electrical stimulation where the resident waveform targets a specific band of tissue with surface application. **Small fiber** stimulators allow us several critical benefits which complement chiropractic care:

1) Stimulating muscle fibers without fatiguing them allows for extended home therapeutic utilization.

a) Electromodulation targeting mechanoreceptor-rich tissues (surrounding spinal joints).

2) It overcomes the need for supervision.

3) This method of tissue targeting (small fiber) also allows **passive activation of muscles richest in vascular and lymphatic organs**.

4) Proven to **stimulate angiogenesis**, that is, the development of new blood vessels. This in addition to NS activation, which modulates neuropathic / nociceptive pain with the power to modulate and offers correction to ischemia and ischemic pain.

5) **Lymphatic drainage** stunted by movement deficiency is also resuscitated supporting the inflammatory process.

Blum et al. Cases Journal 2010, 3:54
http://www.casesjournal.com/content/3/1/54

CASES JOURNAL

CASE REPORT Open Access

Healing enhancement of chronic venous stasis ulcers utilizing H-WAVE® device therapy: a case series

Kenneth Blum[1,4,5,6,8*], Amanda LH Chen[2], Thomas JH Chen[3], B William Downs[4], Eric R Braverman[4,5], Mallory Kerner[4], Stella Savarimuthu[7], Anish Baja[2], Margaret Madigan[4], Seth H Blum[6], Gary Reini[7], John Giordano[8], Nicholas DiNubile[9]

Abstract

Introduction: Approximately 15% (more than 2 million individuals, based on these estimates) of all people with diabetes will develop a lower-extremity ulcer during the course of the disease. Ultimately, between 14% and 20% of patients with lower-extremity diabetic ulcers will require amputation of the affected limb. Analysis of the 1995 Medicare claims revealed that lower-extremity ulcer care accounted for $1.45 billion in Medicare costs. Therapies that promote rapid and complete healing and reduce the need for expensive surgical procedures would impact these costs substantially. One such example is the electrotherapeutic modality utilizing the H-Wave® device therapy and program.

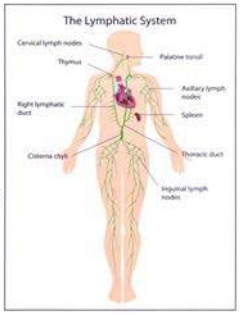
It has been recently shown in acute animal experiments that the H-Wave® device stimulation induces a nitric oxide-dependent increase in microcirculation of the rat Cremaster skeletal muscle. Moreover, chronic H-wave® device stimulation of rat hind limbs not only increases blood flow but induces measured angiogenesis. Coupling these findings strongly suggests that H-Wave® device stimulation promotes rapid and complete healing without need of expensive surgical procedures.

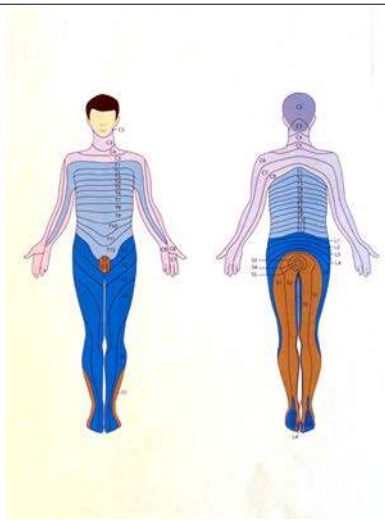
Case presentation: We decided to do a preliminary evaluation of the H-Wave® device therapy and program in three seriously afflicted diabetic patients. Patient 1 had chronic venous stasis for 6 years. Patient 2 had chronic recurrent leg ulcerations. Patient 3 had a chronic venous stasis ulcer for 2 years. All were dispensed a home H-Wave® unit. Patient 1 had no other treatment, patient 2 had H-Wave® therapy along with traditional compressive therapy, and patient 3 had no other therapy.

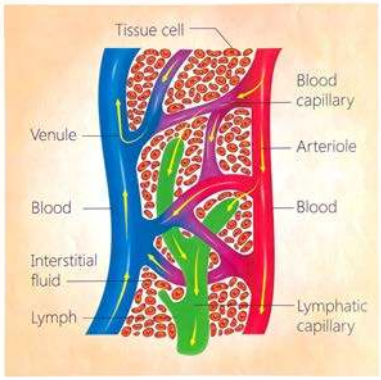
For patient 1, following treatment the ulcer completely healed with the H-Wave® device and program after 3 months. For patient 2, by one month complete ulcer closure occurred. Patient 3 had a completely healed ulcer after 9 months.

Conclusions: While most diabetic ulcers can be treated successfully on an outpatient basis, a significant proportion will persist and become infected. Based on this preliminary case series investigation we found that three patients prescribed H-Wave® home treatment demonstrate accelerated healing with excellent results. While these results are encouraging, additional large scale investigation is warranted before any interpretation is given to these interesting outcomes.

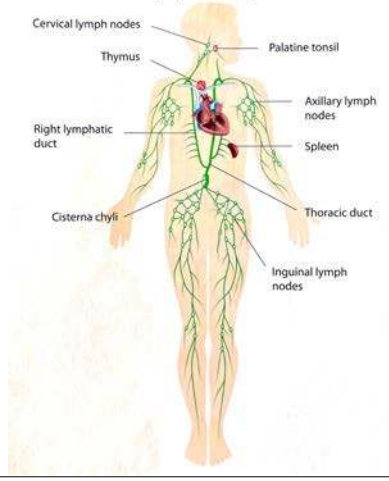
- There are between 600-700 lymph nodes in the average human body. Lymph nodes filter the lymph before it can be returned to the circulatory system.
- Lymph nodes are responsible for **Filtering waste** products and excess fluid and producing lymphocytes, specialized white blood cells that kill pathogens; experienced as swollen glands.
- When lymphatic tissues or lymph nodes have been damaged, destroyed or removed, lymph cannot drain normally from the affected area. When this happens, excess lymph accumulates and results in swelling.

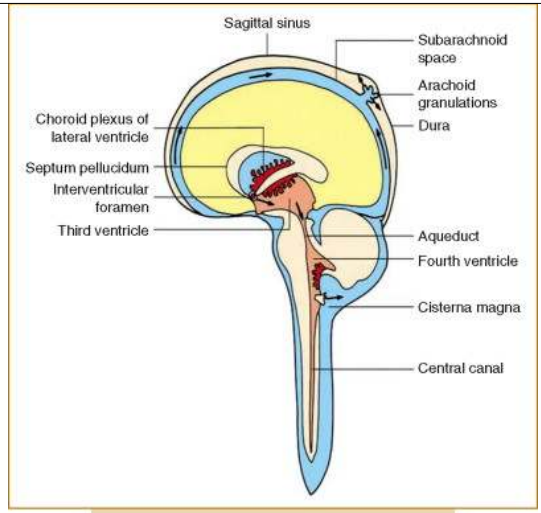






The Lymphatic System

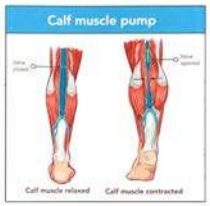




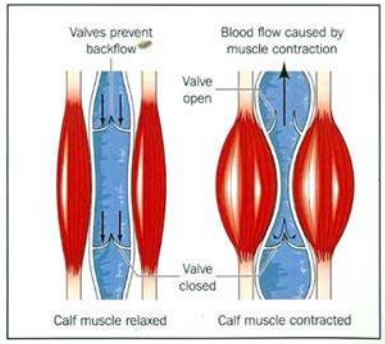
How does H-Wave assist in lymphatic drainage?

MOVEMENT WITHOUT MOTION

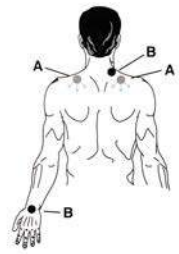
Did you know:



- Lymph is the fluid in the lymph vessels.
- Lymph is the 10% of that interstitial fluid that stays behind in the tissues and is absorbed by the lymph vessels and returned to the heart.
- Lymph flows in only one direction within its own system, upward toward the neck.
- The lymphatic system does not have a heart to pump it, its **upward movement** depends on the motion of muscle and joints.
- As lymph moves upward toward the neck, the lymph passes through the lymph nodes which filter it to remove pathogens.



CERVICAL PLACEMENT FOR RADIATING PAIN



TREATMENT NOTES

- Upper Channel B Pad should be on opposite side of spine from affected limb.
- Electrode placement may be adjusted as shown by arrows to address patient specific issues.

IMPORTANT

- The higher the intensity the better the results will be. The unit should feel strong (with low frequency a good visible contraction) but within the patient's tolerance level.
- When treating in the high frequency mode bring up the intensity high enough to desensitize any pain signals from the patient never cause cramping or muscle tetanization.

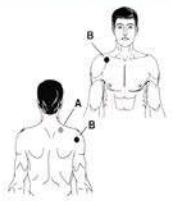
TREATMENT PLAN

Total treatment time 30+ minutes

Channels:	Frequency:	Intensity:
A	LOW	3-6
B	HIGH*	3-6

*If congestion is primary concern use Low Frequency. If pain is primary and caused by other factors use High Frequency. Or use half and half.

SHOULDER PLACEMENT



IMPORTANT

- The higher the intensity the better the results will be. The unit should feel strong (with low frequency a good visible contraction) but within the patient's tolerance level.
- When treating in the high frequency mode bring up the intensity high enough to desensitize any pain signals from the patient; never cause cramping or muscle tetanization.

NOTE:
Inside of arm between bicep and tricep at front edge of armpit.

TREATMENT PLAN
Total treatment time 30+ minutes

Channels:	Frequency:	Intensity:
A	LOW	4-9
B	HIGH*	4-9

*If congestion is primary concern use Low Frequency. If pain is primary and caused by other factors use High Frequency. Or use half and half.

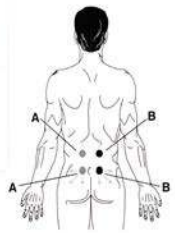
LUMBAR AND SACRAL PLACEMENT FOR MUSCLE ISSUES

TREATMENT NOTES:

- Electrode placement may be adjusted as shown by arrows to address patient specific issues.

IMPORTANT

- The higher the intensity the better the results will be. The unit should feel strong (with low frequency a good visible contraction) but within the patient's tolerance level.



TREATMENT PLAN
Total treatment time 30+ minutes

Channels:	Frequency:	Intensity:
A	LOW	7-9
B	LOW	7-9

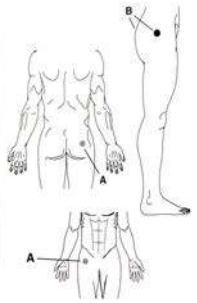
HIP PLACEMENT

TREATMENT NOTES

- Channel B pads are located on the greater trochanter of left and right hip.

IMPORTANT

- The higher the intensity the better the results will be. The unit should feel strong (with low frequency a good visible contraction) but within the patient's tolerance level.
- When treating in the high frequency mode bring up the intensity high enough to desensitize any pain signals from the patient; never cause cramping or muscle tetanization.



TREATMENT PLAN
Total treatment time 30+ minutes

Channels:	Frequency:	Intensity:
A	LOW	6-9
B	HIGH	7-9

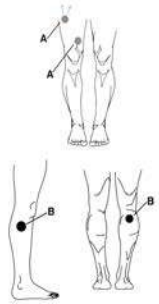
LOWER LEG CIRCULATION PLACEMENT

TREATMENT NOTES

- Electrode placement may be adjusted as shown by arrows to address patient specific issues.
- Channel B pads located on calf and over (or just behind) head of fibula.

IMPORTANT

- The higher the intensity the better the results will be. The unit should feel strong (with low frequency a good visible contraction) but within the patient's tolerance level.



TREATMENT PLAN
Total treatment time 30+ minutes

Channels:	Frequency:	Intensity:
A	LOW	8-9
B	LOW	8-9

SPINE + COLD LASER (LLLT)

1) Due to emphasis on movement of the trunk and extremities H-Wave electrical stimulation predominates in the body with cold laser used when movement can be tolerated.

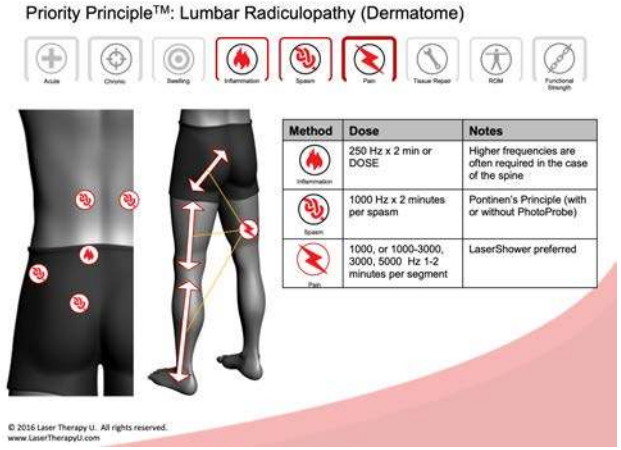
2) The cranium inverses that relationship where subtle, cellular metabolic modulation with cold laser allows for care of the skull.

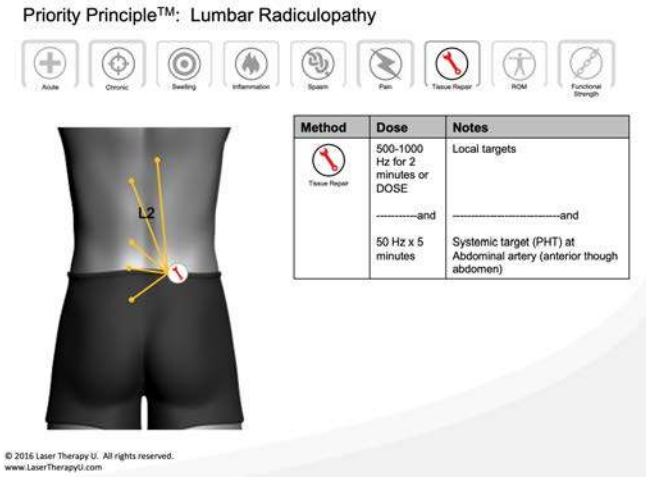
Complete Protocol:

Acute Pain, Chronic Pain, Swelling, Inflammation, Spasm

Tissue Repair, Range of Motion & Functional Strength

Sport recovery & performance enhancement compliment chiropractic adjustment





Small vs Large Fibers

Pain blocking vs increased mechanoreception and blood flow

The Phases of a Musculoskeletal Injury

unsweetened coconut yogurt.

Meats: beef, chicken, fish (those less prone to heavy metal contamination), lamb, turkey. Fish should be ocean caught, wild and with low mercury. Select hormone-free and antibiotic-free chicken, turkey and lamb. Select beef that is grass fed, hormone-free, and antibiotic-free.

Low Glycemic Organic Fruits: apples, apricots, avocados, berries, cherries, grapefruit, grapes, lemons, oranges, peaches, pears, plums.

Coconut: coconut butter, coconut cream, coconut milk, coconut oil, unsweetened coconut flakes & yogurt.

Noodles: brown shirataki yam noodles (asian grocery stores).

Herbs and Spices: basil, black pepper, cilantro, coriander, cumin, garlic, ginger, lemongrass, mint, oregano, parsley, rosemary, sage, sea salt, thyme.

Other: apple cider vinegar, herbal teas, olive oil, olives

dk Anish Bajaj

Intestinal Support Cleanse

Foods to Eat, especially in Spring time

Organic Vegetables: anise, artichoke, asparagus, beets, bok choy, broccoli, cabbage, carrots, cauliflower, celery, chives, cucumbers, garlic, kale, kohlrabi, leeks, lettuce, mustard greens, onions, parsley, radishes, rhubarb, shallots, spinach, squash, sweet potatoes, water chestnuts, watercress, yams, Zucchini.

Fermented Foods: kimchi, kombucha tea, pickled ginger, sauerkraut, unsweetened coconut yogurt.

Meats: beef, chicken, fish (those less prone to heavy metal contamination), lamb, turkey. Fish should be ocean caught, wild and with low mercury. Select hormone-free and antibiotic-free chicken, turkey and lamb. Select beef that is grass fed, hormone-free, and antibiotic-free.

Low Glycemic Organic Fruits: apples, apricots, avocados, berries, cherries, grapefruit, grapes, lemons, oranges, peaches, pears, plums, Dry Fruit.

Coconut: coconut butter, coconut cream, coconut milk, coconut oil, unsweetened coconut flakes & yogurt.

Noodles: brown shirataki yam noodles (asian grocery stores).

Herbs and Spices: basil, black pepper, cilantro, coriander, cumin, garlic, ginger, lemongrass, mint, oregano, parsley, rosemary, sage, sea salt, thyme.

Other: apple cider vinegar, herbal teas, olive oil, olives, pickles.

dk Anish Bajaj

Intestinal Support Cleanse

Foods to Eat, especially in Summer time

Organic Vegetables: anise, artichoke, asparagus, beets, bok choy, broccoli, cabbage, carrots, cauliflower, celery, chives, cucumbers, garlic, kale, kohlrabi, leeks, lettuce, mustard greens, onions, parsley, radishes, rhubarb, shallots, spinach, squash, sweet potatoes, water chestnuts, watercress, yams, Zucchini.

Fermented Foods: kimchi, kombucha tea, pickled ginger, sauerkraut, unsweetened coconut yogurt.

Meats: beef, chicken, fish (those less prone to heavy metal contamination), lamb, turkey. Fish should be ocean caught, wild and with low mercury. Select hormone-free and antibiotic-free chicken, turkey and lamb. Select beef that is grass fed, hormone-free, and antibiotic-free.

Low Glycemic Organic Fruits: apples, apricots, avocados, berries, cherries, grapefruit, grapes, lemons, oranges, peaches, pears, plums.

Coconut: coconut butter, coconut cream, coconut milk, coconut oil, unsweetened coconut flakes & yogurt.

Noodles: brown shirataki yam noodles (asian grocery stores).

Herbs and Spices: basil, black pepper, cilantro, coriander, cumin, garlic, ginger, lemongrass, mint, oregano, parsley, rosemary, sage, sea salt, thyme.

Other: apple cider vinegar, herbal teas, olive oil, olives, pickles.

Rehabilitation

Breath Control:

Inhale & exhale through the nose

Abdominal vs neck/chest muscles

Maintain ‘space’ between breath cycles (1s)

Maintain ~2:1 exhale to inhale ratio (4:2s, 6:3s, 8:4s)

Sympathetic Tone and Breathing

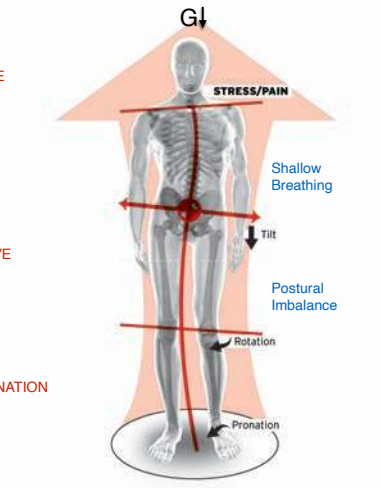
Reduced exhalation phase of breathing associated with diminished inhibition of the sympathetic nervous system.

Loss of Normal Cervical Lordosis associated with increased sympathetic tone.

ANTERIOR HEAD CARRIAGE
HYPOLORDOTIC CERVICAL CURVE

PELVIC TILT
HYPERLORDOTIC LUMBAR CURVE
FACET SYNDROME

BILATERAL ASYMMETRICAL PRONATION

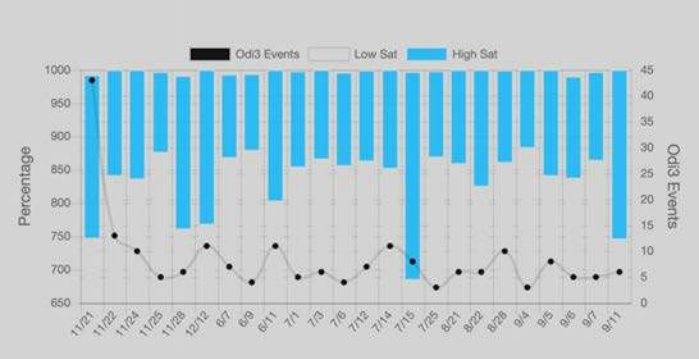


Brain Atrophy with chronic LBP

Attention deficit after 5 minutes of pain

Increased Sympathetic Tone

Reduced inhibition of the Sympathetic Nervous System



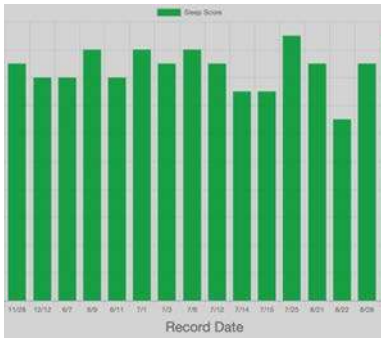
Complexity of Sleep

Imbalances of the inner organs can cause deficiencies which can lead to insomnia. Important hormones that regulate the sleep-wake cycle are metabolized and cleared by the liver. This includes both melatonin and cortisol. In patients with hepatic insufficiency, melatonin clearance is slow and the levels of melatonin is high during the daytime. This causes the modification of melatonin secretion patterns with the peak of secretion being delayed and therefore the sleep onset is delayed as well.

Patients may experience bouts of daytime fatigue or drowsiness followed by night-time alertness when the liver finally breaks down the melatonin circulating in the blood. The circadian rhythm of cortisol secretion has a waveform pattern with the nadir for cortisol occurring at about midnight. Low cortisol levels are necessary for falling asleep. Cortisol begins its rapid rise after the first morning awakening and continues for about 60 minutes. This is called the awakening response. Cortisol in the blood is supposed to be cleared by the liver during the day so that its levels are low by nighttime. Elevated cortisol levels at night can cause difficulty falling asleep. Stress, diet, and obesity can upset the liver leading to a liver deficiency. Poor liver function from a liver deficiency due to stress and anxiety can compromise the cortisol clearance and lead to an increase in cortisol levels in the body. Chronic stress or anxiety can continually overwhelm the liver leading to excess cortisol staying in the bloodstream for longer, making it difficult to fall asleep, causing chronic insomnia.

Brain - Sleep

The initiation of sleep occurs when HPA axis activity is lowest, and sleep deprivation is associated with HPA activation. Chemical imbalances in the brain can also cause insomnia. A recent study was performed on individuals with chronic insomnia that described the brains of individuals with chronic insomnia have lower levels of GABA, an inhibitory transmitter in the brain. If levels of GABA are low, then individuals have a hard time “shutting off” their brains at night time. An overactive mind is a key feature of psychophysiological insomnia. Patients who suffer from Brain Heat also typically have symptoms of restless leg syndrome and numbness in certain parts of the body.



Mental acuity has both a passive determining factor in the process by which our biology learns survival and can have through focus and attention a larger role in that process towards thriving. Keep cognitive load in mind, not just physical load.

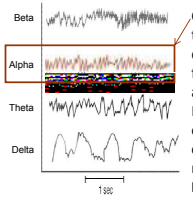
AEP/VEP: Quantitative Comparison

STIMULUS

RESPONSE

Anticipation turns to anxiety as response is overly active compared to stimulus. Correlates with commission errors on TOVA.

SPECTRAL ANALYSIS: Frequency %



CES puts brain on training wheels & despite increased set frequency, relaxation is achieved. Focused/controlled circuit relaxes brain for calm & rest while recharging batteries for **Edge Effect**.

Rite 1

Stand erect with arms outstretched, horizontal to the floor. Spin around clockwise until you become slightly dizzy. Start with 3 full circles and add gradually, keeping the same number of repetitions as the other 4 Tibetan rites.

Rite 2

First lie flat on the floor, face up. Fully extend your arms along your sides, and place the palms of your hands against the floor, keeping the fingers close together. Then raise your head off the floor, tucking the chin against the chest…As you do this, life your legs with your knees straight, into a vertical position.

Then slowly lower both the head and legs to the floor, knees remain straight. Allow all the muscles to relax and continue breathing in rhythm: Breath in deeply as you lift your legs and breath out as you lower your legs.

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Rite 3

Kneel on the floor with the body erect. The hands should be placed against the thigh muscles. Incline the head and neck forward, tucking the chin against the chest. Then, throw the head and neck backward, arching the spine. As you arch, you will brace your arms and hands against the thighs for support.

After the arching, return to the original position, and start the rite all over again. Breath in deeply you arch the spine, breath out as you return to an erect position.

Rite 4

Sit down on the floor with your legs straight out in front of you and your feet about 12 inches apart. With the trunk of the body erect, place the palms of your hands on the floor alongside the buttocks. Then, tuck the chin forward against the chest. Now, drop the head backward as far as it will go. At the same time, raise your body so that the knees bend while the arms remain straight.

The trunk of the body will be in a straight line with the upper legs, horizontal to the floor. Then, tense every muscle in the body. Finally, relax your muscles as you return the original sitting position, and rest before repeating the procedure. Breath in as you you lift your body up, hold your breath as you tense your muscles, breath out completely as you come down. Continue breathing in the same rhythm as long as you rest between repetitions.

Rite 5

When you perform the 5th rite, your body will be face-down to the floor. It will be supported by the hands, palms down against the floor, and the toes in a flexed position. Throughout this rite, the hands and feet should be kept straight. Start with your arms perpendicular to the floor, and the spine arched, so that the body is allowed to sag.

Now, throw the head back as far was possible. Then bending at the hips, bring the body up into an inverted 'V'. At the same time, bring the chin forward, tucking it against the chest. Breath in deeply as you raise your head, breath out as you lower it.

PHASE IV: ENDURANCE + BREATH CONTROL

PHASE IV: AEROBIC 5-9 METs

↑metabolism/endurance ↓body fat

45-60 min @ 60-75% max HR

- ❑ Running (Best weight loss)
- ❑ Rowing (targets core)
- ❑ Elliptical (easier on joints)
- ❑ Swimming (upper body
- ❑ Bicycle (outdoor better)
- ❑ Walking/hiking

PHASE IV: POSTURE + STRENGTH

PHASE V: WEIGHT LIFTING

↑Bone Density & Muscle Mass

- ❑ Standing Cable Crossover/Swiss Ball Press
- ❑ Seated Row
- ❑ Lounges
- ❑ Leg Curls
- ❑ Incline Press
- ❑ Lat Pull Down
- ❑ Leg Extensions
- ❑ Calf Raise (fast)
- ❑ Dips (fast)
- ❑ Bicep Curls
- ❑ Pectoral Flyes
- ❑ Deltoid Raises (front & Lateral to 90°)

WEIGHT LIFTING RULES

1. No flat bench pressing
2. Never lift behind your head
3. Always keep your elbows where you can see them
4. No Squats/Leg Press

15-30 lbs = 3-5 METs 30-60 lbs = 5-7 METs

60-90 lbs = 7-9 METs >90 lbs = 9+ METs

BREATH CONTROL + POSTURE + STRENGTH

PHASE V: INTERVALS

↑hormones & ↓scar tissue

20-30 min duration, not incl. warm-up

1-2 min intervals @ 85-90% max HR >9METs

1-2 min recovery @ 50-60% max HR

JUST A LITTLE MORE

Cool Down: (following IV or V) calm muscles

- ❑ Easy bike ride/treadmill
- ❑ Stretching

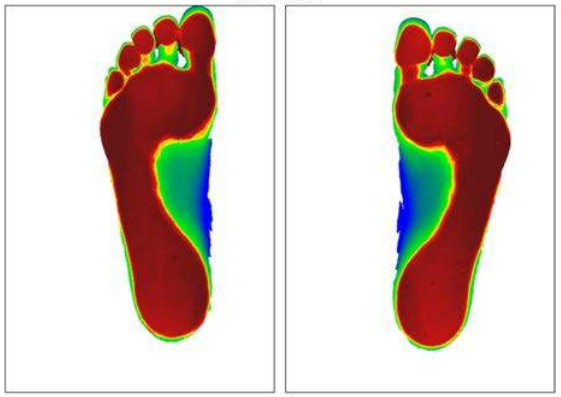
CALISTHENICS GOALS

Push Ups (54 over 10 sets: 10, 9, 8, 7, 6….)

Sit Ups (60 total, 60 straight, 60 in 60 seconds)

Stress state induced by prolonged cognitive load

Sympathetic Hyperactivity based on decreased parasympathetic activity is associated with mental fatigue induced by prolonged cognitive load (phone/computer/tablet)



Functional Orthotics Clinical Record of Necessity

In order for third parties to process insurance claims for orthotic-therapy reimbursement, they often require additional information which establishes medical necessity. Foot Levelers Inc. is providing the following sample letter of medical necessity and evaluation form as a guide only. Each description should be modified to appropriately represent the unique conditions of each case.

It is recommended that the evaluation form be completed with each new patient to uncover any underlying biomechanical conditions of the feet and lower extremities that may potentially interfere with your care.

A completed evaluation form, along with a letter of necessity, could be used to pre-certify care, accompany claims submissions, or in response to requests for further documentation. It is advisable to preempt requests for additional documentation by substantiating information early in the claims process.

A letter of necessity could include the following helpful information:

Functional orthotics are being prescribed for this patient.

This patient has a spinal condition that is complicated by a concomitant foot imbalance. This foot imbalance causes: functional leg length inequality that contributes to lateral pelvic tilt, lower extremity and spinal subluxations. This serial distortion increases the biomechanical and neurological stress contributing to the musculoskeletal pain experienced.

This patient has been fitted for Foot Levelers individually designed functional orthotics. Scientific investigation documents and verifies the effectiveness of functional orthotics for improving:

- •Foot/ankle alignment[1]
- •Knee alignment and Q-angle measurements[2]
- •Pelvic alignment[3]
- •Leg length inequality[4]
- •Balance (eyes-open) and proprioception balance (eyes closed)[5]
- •Gait movement patterns[6], and
- •Overall functional biomechanics.[7]

To accommodate the shoe's dimensions and characteristics, one style may be needed for athletic or recreational shoes and another designed for daily wear or work shoes.

This patient needs:
___Full length individually designed orthotics for athletic recreational shoes
___Tight-fitting individually designed orthotics for dress shoes
___Individually designed orthotics in custom designed shoe wear

Examples of Common Conditions:

Cervical Conditions
- •Subluxation
- •Cervical Sprains

Thoracic Conditions
- •Subluxation
- •Thoracic Sprains

Low Back Conditions
- •Subluxation
- •Lumbar Sprains

Pelvic Conditions
- •Leg Length Inequality
- •Unlevel Pelvis

Hip Conditions
- •Subluxation
- •Hip Sprains

Knee Conditions
- •Knee Subluxation
- •Knee Sprains

Ankle Conditions
- •Ankle Subluxation
- •Ankle Sprains

Foot Conditions
- •Flat Foot
- •Foot Sprains

Establishing Necessity

References:

1.Kuhn DR, Shibley NJ, Austin WM, Yochum TR. Radiographic evaluation of weight-bearing orthotics and their effect on flexible pes planus. J Manipulative Physiol Ther 1999; 22(4): 221-226.

2.Kuhn DR, Yochum TR, Cherry AR, Rodgers SS. Immediate changes in the quadriceps femoris angle after insertion of an orthotic device. J Manipulative Physiol Ther 2002; 25(7): 465-470.

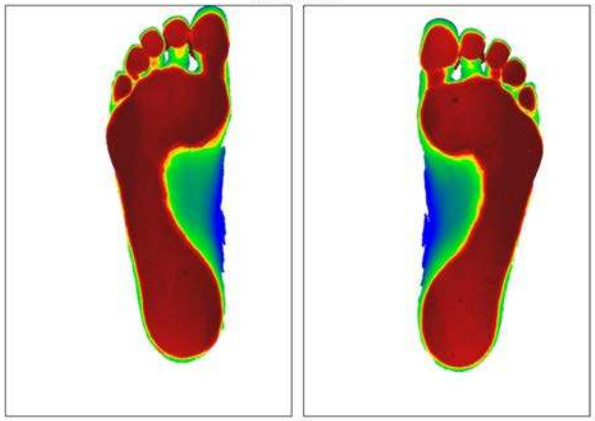
3.Kuhn DR, Smasal S, Pappas A, Nosco D. Radiographic evaluation of the effect of orthotics on the unleveled pelvis. J Chiro Ed 2003; 17(1): 64-65.

4.Woodward SP, Ball KA. Leg length inequality case study: three dimensional movement analysis of the effects of foot orthotics and heel lift. J Chiro Ed 2003; 17(1): 43.

5.Stude DE, Brink DK. Effects of nine holes of simulated golf and orthotic-intervention on balance and proprioception in experienced golfers. J Manipulative Physiol Ther 1997; 20(9): 590-601.

6.Stude DE, Gullickson J. The effects of orthotic intervention and nine holes of simulated golf on gait in experienced golfers. J Manipulative Physiol Ther 2001; 24(4): 279-287.

7.Stude DE, Gullickson J. Effects of orthotic intervention and nine holes of simulated golf on club-head velocity in experienced golfers. J Manipulative Physiol Ther 2000; 23(3): 168-174.



Diagnosis/Treatment Plans

The majority of patients who present with neuro-musculoskeletal conditions of the spine and extremities are found to have **excessive pronation of the feet**. In order to properly document your decision for these patients to receive Functional Orthotics, you must establish medical necessity through the history, examination, diagnosis and treatment plan.

History

It's important when taking a patient history to explore all conditions that could benefit from orthotic fitting beyond the typical spinal-related questions, as well as questions about shoe size/width, foot pain and activity level. Examples of specific questions are:

- Is there pain, numbness, or tingling with prolonged standing, walking or climbing stairs in your back, knees, calves, shins, ankles, feet or toes?
- Are the symptoms affected by walking, standing or climbing stairs?
- Do you avoid activity due to your pain in the feet or lower extremities?
- Do you have to elevate your feet to get comfortable?
- Do you use any type of home therapies for your feet and lower extremities?

In addition to standard evaluation and management guidelines, it is assumed that a typical history will also include asking questions about the following:

- Stiffness
- Joint pain
- Weakness
- Limitation of motion
- **Difficulty walking**
- Numbness in the spine or extremities

These findings may help establish the medical necessity of orthotics and associated spinal care.

Exam

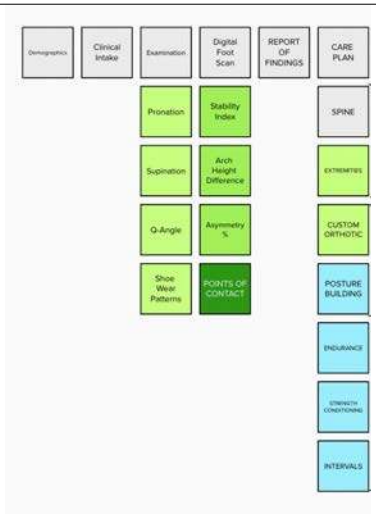
Using correct regional examination and X-ray findings will provide the objective evidence required for medical necessity to support the implementation of Functional Orthotics in a treatment program. In addition to standard evaluation and management guidelines, it is assumed that a typical exam will include one or more of the following:

- Five Red Flags of pronation
- Global postural distortions
- Structural X-ray anomalies

Treatment Plan

A crucial component in the billing and coding process is a properly written treatment plan. In order to establish the medical necessity for the use of Functional Orthotics and associated spinal care, your documentation should include the following elements:

- Recommended level of care to include duration & frequency of visits
- Methods of treatment to be utilized (i.e. adjustments, therapies, orthotics, rehab)
- Specific treatment goals
- Objective measures to evaluate treatment effectiveness
- Planned modalities



Cases & Future Direction

Case 1: A Proprioceptor based Model

Full Spine Adjusting

Breathing, Essential Function Integration

Yoga Calisthenics

Custom Orthotics

Cessation of Opioids, Sleep Meds, NSAIDS, Aspirin…

Stress Management focussed on personal responsibility, active recovery, intentional control of life

Case Study 2: A Proprioceptor based Model

Limited adjusting due to surgical fusion

Breathing, Essential Function Integration

Achieved periods of independence from use of walker

1st time in workforce in 13 years

Case Study 3: A Proprioceptor based Model

Full Spine Adjusting

Breathing, Essential Function Integration

Cessation of Opioids, Sleep Meds, Bladder Meds

Pain relief from H20 intake

Back to work from disability with output 2x any previous level of productivity “I got into a rhythm and just didn’t feel like stopping”

Anxiety/Depression/SUD

Anticipation without behavior modification is anxiety. In addition to overstimulation, metabolic inefficiency lays the ground work for addictive behavior.

Pain Over Life

Chronic pain can result in anxiety, depression and reduced quality of life. However, its effects on cognitive abilities have remained unclear although many studies attempted to psychologically profile chronic pain. We hypothesized that performance on an emotional decision-making task may be impaired in chronic pain since human brain imaging studies show that brain regions critical for this ability are also involved in chronic pain. Chronic back pain (CBP) patients, chronic complex regional pain syndrome (CRPS) patients, and normal volunteers (matched for age, sex, and education) were studied on the Iowa Gambling Task, a card game developed to study emotional decision-making. Outcomes on the gambling task were contrasted to performance on other cognitive tasks. The net number of choices made from advantageous decks after subtracting choices made from disadvantageous decks on average was 22.6 in normal subjects ($n = 26$), 13.4 in CBP patients ($n = 26$), and -9.5 in CRPS patients ($n = 12$), indicating poor performance in the patient groups as compared to the normal controls ($P < 0.004$). Only pain intensity assessed during the gambling task was correlated with task outcome and only in CBP patients ($r = -0.75$, $P < 0.003$). Other cognitive abilities, such as attention, short-term memory, and general intelligence tested normal in the chronic pain patients. Our evidence indicates that chronic pain is associated with a specific cognitive deficit, which may impact everyday behavior especially in risky, emotionally laden, situations.

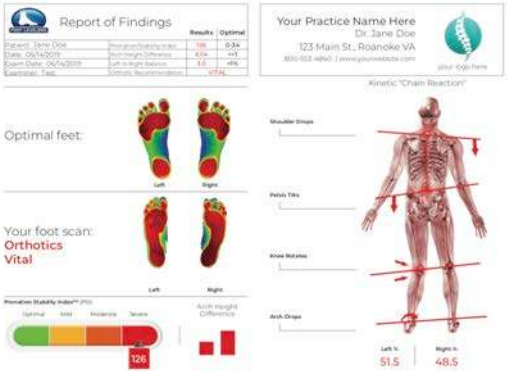
[Pain]

Recovery of Function

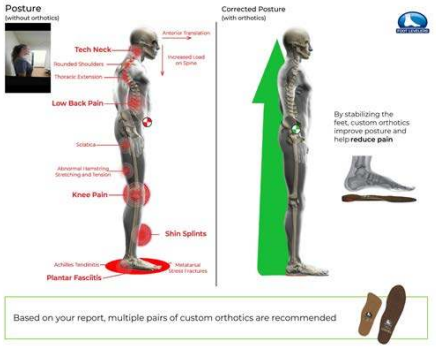
Re-establish natural reward through structure and functions to strengthen reward circuitry

Re-education Cognitive Behavior Training: Sequence starts with Breath Control

Report of Findings



Report of Findings



Homeostasis:
Inclination to Balance

: Ranges of motion, Alignment, etc

: Blood flow, Pulse Rate, Blood Pressure

Exercise

FOCUS ON SUBTLE CHANGES AND THE PRESENT

SHIFT FOCUS TO FUNCTIONAL OBSERVATION OF NERVOUS SYSTEM STATES AND PREDICTABLE VECTOR CHANGES TO PROGRESSIVE CARE

DIRECTING RESEARCH

IMPROVE OBJECTIVITY, STRENGTHENING ASSESSMENT & CARE PLANS THROUGH UTILIZATION OF NS DATA

BEHAVIOR MODIFICATION/INTENTION

DOCTORS, PATIENTS & EVERYONE IN-BETWEEN SHIFTS TO SUSTAINABLE LIFESTYLE CHANGES

Chiropractic Perspective In Demand

Dependence We must properly identify the universal survival factors that which we DEPEND on once known (respiration and balance), we can focus our efforts to prioritize them.

- Now we can be proactive in reinforcing the associate behaviors
- We can start with the end goal in mind
- Keep track of priorities that persist from beginning to end

Independence Independence is when we achieve a level of internal balance through identification of the correct healthcare priorities and match that with corresponding behaviors.

- Think win-win as in satisfying needs of multiple variables
- Understand the outside variables first before we engage with them
- With balance we combine those efforts effectively for efficiency

Interdependence Interdependence is defined as maintaining mastery of established healthy behaviors while engaging in progressively more complex lifestyle endeavors