

C omplex

D istributed

The CDSR Pain Game™

S elf-organizing

R epresentational

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The CDSR Pain Game™

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The CDSR Pain Game™ : Yoga in Support of Chronic Pain

Yoga therapy is well suited for supporting individuals with chronic pain. The emerging neuroscience research of the past five years has revealed a new and fascinating understanding of the experience of pain. Unfortunately many of those who bill themselves as “pain relievers” continue to practice with outdated models of pain from the last century. Allow me to share a few ideas about Yoga, pain and suffering. This is a large topic so I have also listed resources at the end of this document for continued exploration.

One definition of Yoga is the science and practice of easing present suffering and preventing future suffering. Yoga is also defined as stabilizing the mind-stuff (Sutra 1.2). Here we discover the relationship between mind and suffering....Instability = suffering...Stability = ease or prevention of suffering.

So what is mind? We hear body~mind~spirit advertised for everything from stock trades to cold cream for your dog! In our western culture “mind” is currently defined by Daniel Siegel, MD of the UCLA Mindfulness Research Center as: “a process that regulates the flow of energy and information.” He further defines mind as having both interpersonal quality (i.e., the process within an individual human) and intrapersonal (the same process between humans). Therefore when this process is destabilized either within one person or between persons, suffering ensues.

In my working with novice Yoga students this has been a very practical, modern definition for the unity consciousness described across the millennia. Citing the school and Dr. Siegel’s credentials also affords the most conservative of students a safe bridge to extend their inquiry and begin to mine the riches of classical Yoga. The language further serves to initiate dialog with potential referral sources without any concerns of misunderstanding when the student discusses their experience with Yoga. Sometimes those of us who teach Yoga and live the lifestyle underestimate how foreign and exotic what has become our second nature is to the majority of potential students and their respective healthcare support team.

Returning to the connection of mind and suffering, suffering in Yoga is said to occur when the mind (individual and collective) errs in ignorance (Avidya) as the integrity and unity of all of creation is forgotten. Said another way, suffering occurs when we lose our “minds” as individuals and human communities. The Sutras (2.3) further delineates this ignorance in describing the kleshas or roots of misery. They include believing the “small-mindedness” of the self or ego; attraction toward some illusion as relief from suffering; avoidance of some illusion to prevent suffering; and, fear of death or annihilation of the small self. Your specific training program should have gone into this in great detail and this document is intended to facilitate your ability to bridge from the classical instruction to the modern western science.

So how does chronic pain fit in? The old pain understanding was the light-switch model....a bad thought or piece of tissue (a cut) creates a pain. Fix the thought or cut, the pain is gone (turn off the switch). Depressed? Think positive thoughts. Massive headaches? Take the strong stuff. Treat each individual symptom mechanistically by applying the right “fix”. More recently, name the malady and prescribe the “right” set of asanas! The subtle mind-trap of using the technologies to apply a “fix” to a human complaint is pervasive and persistent, especially in our western culture.

We now know pain is a very complex experience of the brain created not by a single switch, but a distributed, constantly reorganized network to include the body, thoughts, emotions, culture, environment and those with whom we live. Together they form a matrix which allows athletes to complete performances with fractures and paper cuts to cause disproportionate pain. This pain experience (both *energy and information*) is then interpreted by various centers of the brain that evaluate it (*a process*) and *regulate* the individual's response to the experience. The centers include that of pain and fear memories, as well as centers projecting future outcomes. Ultimately the experience is our reality of the moment in which we either react with a habituated behavior (samskara) or create a novel, detached response to modify the experience or decrease future suffering (new karma).

The name of this document includes the acronym "CDSR". Beware the subtle marketing here as the subliminal "see DSR" is a play on words for "see Dynamic Systems Rehabilitation (DSR)", my business name! It is also a handy mnemonic for when you are having tea with a potential referral source and you want to share how your Yoga therapy services might support their client with a chronic pain condition.

The acronym is the following:

C = complex...no simple light switch model, but recognizing that pain is a natural perception of the brain which is a matrix of multiple inputs and processes.

D= distributed...this matrix is distributed not only throughout the brain and physical body, but as offered in the earlier mind definition, includes intrapersonal phenomenon as well...leaving room for the various subtle bodies described in various teachings.

S= self-organizing...connotes the fluidity and impermanence of the experience as the experience is "held together" by many factors, of which many can be modified to recreate the experience (re-organize) through what we understand as neuroplasticity and to establish what Siegel describes as attunement both inter and intrapersonally.

R= representational...this "reality" to the student is not direct knowing, but a representation based on all of the various contributors to the "hologram" of reality. One can see the natural description of maya and chitta in the language of neuroscientists.

Yoga has technologies that we can now understand modify (*stabilize*) these various centers of the brain as well as the related hormonal responses throughout the body. These centers are listed in this table along with the limbs of Yoga that most directly affect those centers. It should be understood that in an integral understanding every limb affects every center, but for ease of learning some categorization helps develop this more complex frame of reference and relationship.

Table 1 Most Direct Correlates of Neuroanatomy and Yoga Technologies

Prefrontal cortex...reconstructing the filter of the worrier/planner with mindfulness, Yamas, Niyamas and Pratyahara

Amygdala: exploring the roots of the fear, fear conditioning and addiction with Pratyahara
Anterior singulate complex ...Improving concentration and focus with Dharana

Sensory motor homunculus...Refreshing the virtual map of existence with Asana, Pranayama and Pratyahara.

Thalamus...motivation/stress response modification with Yamas, Niyamas, Asana, Pranayama and Pratyahara

Cerebellum... enhance movement, coordination and cognition with Asana, Dharana and Pratyahara

Hippocampus...re-order memory, fear conditioning, spatial cognition with Yamas, Niyamas, Asana, Pranayama and Pratyahara

Spinal cord...up and down regulators/governors of information/energy with Asana, Pranayama and Pratyahara

Basal Ganglia...automatic unconscious movements, dependent on dopamine and serotonin for proper function with Asana, Dhyana and Pranayama.

I know ...a lot of Latin with very little frame of reference. Be patient, this is what motivated me to develop the Pain Game that follows. But first, let me share a bit more background with the promise to tie this all together at the conclusion.

An example of how all of these centers relate might be someone with chronic back pain on ‘permanent’ disability. Plagued by past pain experiences with activities, they become trapped in a descending cycle of inactivity, social withdrawal, increased physical tension and collapse, and consequent sleep disruption. The gentle, graded initiation of a complete practice of Yoga allows the cycle of instability to be broken as they remember glimpses of ease, awareness and insight that seemed lost in the vortex of building chaos within the systems that occurs with chronic pain. Again, by the modern definition of mind, not limited to their internal experience, but affecting those they live and work with, as well as the systems of health care and societal support that are intended to be helpful in addressing their condition. As we all know too well, often these more indirect system influences generate more stress and challenge, which requires even greater resiliency (metaphoric firm and stable asana) on the part of the individual.

The then ongoing modification of this web of interaction in modern terms is called neuroplasticity (changeable nervous system). In Yoga we define the process of stability as nirodha (1.2)...both a process and a state. The eight limbs of Yoga through emerging science are now understood to impact all of these various centers of the brain and with practice quite literally change the connections, thickness and reactivity of each center. This table further delineates these new understandings of these ancient technologies in terms that may strain classic Yoga nuance and description, but offer a bridge to those with whom we are communicating that have little or no Yoga frame of reference.

Table 2 Some Technologies of Yoga

Path	Description
Yamas	Moral precepts: non-harming, truthfulness, non-stealing, chastity, greedlessness Key is especially non harming out of trying to rush rehab and quit elevating the central nervous system into more hypervigilance and post-trauma stress cascading the HPA(hypothalamus/pituitary/adrenal) axis.
Niyamas	Qualities to nourish: purity, contentment, austerity (exercise), self-study, devotion to a higher power Focusing on goals (short and long term), self knowledge of anatomy, prevention, long term maintenance, and quality of life, etc.
Asana	Postures/movements: A calm, firm steady stance in relation to life

	Emphasis on proper alignment and therapeutic progression while experiencing the other 7 aspects of practice.
Pranayama	Breathing exercises: The ability to channel and direct breath, attention and awareness as well as life energy (<i>prana</i>).
Pratyahara	Decreased reactivity to sensation: Focusing senses inward; non-reactivity to stimuli Includes fear avoidance, non reactivity to pain, addressing kinesiophobia and PTSD e.g., through yoga nidra.
Dharana	Concentration; unwavering attention, commitment Applying full attention to the experience of the moment, goals and recognition of distractions/harmful substitutions, etc ...given most of the population now has ADD (pay attention I'm writing to you!!!) ...this goes to compliance issues, distractability etc in rehab.
Dhyana	Meditation; mindfulness, being attuned to the present moment Read sensorimotor integration; also includes the use of guided and visual imagery for healing and motor planning.
Samadhi	Ecstatic union; flow; "in the zone"; spiritual support/connection Critical for significant trauma and life changing events...how much was the individual's identity tied to prior abilities etc that now they can't perform or participate in?...how to find meaning and purpose through accurate identification within their reality...that's what Yoga therapy offers.

How do we communicate this information and new perspective to our students? How do we ourselves better grasp this amorphous, changing perception of the chronic pain experience? I have discovered that by creating an experiential, participatory learning activity you can easily share these concepts and build on your understanding as well. So let's play The CDSR Pain Game™!

The CDSR Pain Game™

What: A fun, interactive learning tool for groups to gain an understanding of how humans experience pain. The game can take as little as 10 minutes to as long as you like creating new scenarios to play through.

Who: Yoga teachers, Yoga therapists, students, referral sources, workshop audiences, public relations presentations, schools, and nearly everyone who has or supports those with pain.

How: Adapt the introduction statement to your audience. Assign roles and distribute cue cards. Assemble the group in approximate anatomical physical relationship at the front of the room. Then create scenarios or let the group create their own.

When: There are multiple uses...as the educational portion of a Yoga class...a movement break during formal Yoga training...center point of a Yoga for Pain workshop for local physicians...and many more.

Why: If they are in your audience, there's a pretty good bet the majority are either kinesthetic or visual learners...The CDSR Game is both. Embodying the principles through voice and movement also increases the learning inputs for better retention and recall. The humor and stories that are portrayed further anchor learning.

The Introductory Statement:

We are now going to play the CDSR Pain Game™ (there will be nervous laughter around combining Pain and Game...laugh with them). We call it CDSR because we now understand pain has four basic attributes:

C = complex...no simple light switch model, rather pain is a natural perception of the brain which is a *complex* matrix or collage of multiple inputs and processes.

D= distributed...this matrix/collage is *distributed* not only throughout the brain and physical body of the individual, but includes intrapersonal phenomenon as well. It hurts a lot more to fall down and scrape your knee coming down steps in front of an audience than to fall alone in your backyard.

S= self-organizing...connotes the fluidity and impermanence of the pain experience as the experience is "held together" by many factors, of which many can be modified to recreate the experience (*re-organize*) through what we understand as neuroplasticity (the changeable nervous system) and to establish what is described at UCLA as attunement both inside yourself and with others.

R= representational...this "reality" to the student is not direct knowing, but a *representation* based on all of the various contributors to the matrix/collage we think of as reality. Depending on how the brain assembles the various contributions of the centers one person sobs from a skinned elbow running in fear while the triumphant ball player that scores the final winning run at the plate doesn't notice theirs until in the shower. Same injury to the body...completely different pain experiences.

That's **C** as in Complex, **D** as in Distributed, **S** as in Self-organizing, and **R** as in Representational.

The challenge with this new understanding is there are a lot of complicated Latin words used to describe the various centers of the brain. The Game has made this easier to both remember the names of the centers and their roles in pain perception. I need nine volunteers to play these centers and the rest of us will help create the pains.

Distribute the roles below to the volunteer and roughly assemble them in this arrangement, describing their relative relationship to the audience as they take their positions.

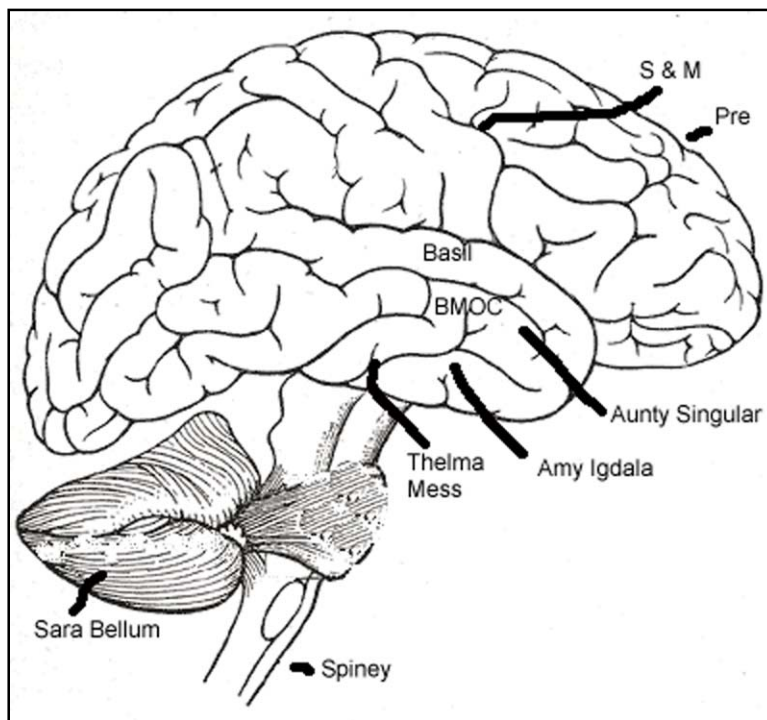


Figure 1. Relative locations of the Cast of Characters.

Cast of Characters:

Pre ...Prefrontal cortex...you are the worrier/planner...you take everything to the nth degree of complexity and wrong turns, you like to catastrophize every situation. You judge or determine good and bad, better and best, same and different, future consequences of current activities, working toward a defined goal, prediction of outcomes, expectation based on actions, and social "control" (the ability to suppress urges that, if not suppressed, could lead to socially unacceptable or illegal outcomes!). In chronic pain you KNOW this is really going to hurt.

Amy Igdala...Amygdala: you are all about memories and anticipating fear, fear conditioning and addiction... In humans, the amygdalae perform primary roles in the formation and storage of memories associated with emotional events. Research indicates that during fear conditioning you form associations with memories of the stimuli. The association between stimuli and the aversive events they predict may create a lingering potential for you to react more readily...read you are jumpy and quickly predicting the worst from the past (oh my this will be like when Mom was down for weeks, then her surgery went bad and she died) Memories of emotional experiences are imprinted in you. Your behavior patterns Amy are many fear responses, including freezing (immobility), tachycardia (rapid heartbeat), increased respiration, and stress-hormone release.

Aunty Singular...Anterior Cingulate Cortex (ACC) ...concentration and focus;...the “oops” or sixth sense...mediates between reason and emotion, on the look out from many parts of the brain as part of the “executive decision maker”. Her functions such as error detection, anticipation of tasks, motivation, and modulation of emotional responses get overloaded with chronic pain. She’s got her radar up and looking at everything, but gets a little frantic when she’s been on alert too long....kind of an over caffeinated Aunty!

S & M...Sensory Motor Homunculus... You are the virtual map of existence or picture of the body’s shape and movement or position in space. You are like a constantly refreshing computer picture which can get smudged and smeared in the presence of chronic pain. Am I straight, is my shoulder straight? Which foot has more weight on it? Why can’t I feel myself leaning left all the time? Etc...very insecure and trying to see the world through a very dirty windshield.

Thelma Mess...Thalamus...motivation/stress response;... Thelma you are a routing station for all incoming sensory impulses except those of smell, transmitting them to higher (cerebral) nerve centers. In addition, you connect various brain centers with others, so act like a traffic cop between the other parts trying to shepherd everyone into order. Thus the thalamus is a major integrative complex, enabling sensory stimuli to evoke appropriate physical reactions as well as to affect emotions. With the hypothalamus, the thalamus establishes levels of sleep and wakefulness. It is also vital to the neural feedback system controlling brain wave rhythms....think the Bush situation room on steroids without enough sleep

Sara Bellum...Cerebellum...movement, coordination and cognition;...; Sara is a region of the brain that plays an important role in the integration of sensory perception and movement output. Many neural pathways link the cerebellum with the motor/movement cortex—which sends information to the muscles causing them to move—and the spinocerebellar (Spiney) tract—which provides feedback on the position of the body in space (proprioception). You put all of these pathways together, using the constant feedback on body position to fine-tune motor movements. .. You also have a broader role in a number of key cognitive functions, including attention and the processing of language, music, and other sensory stimuli. Sara, think stage fright/first dance....clumsy and awkward, “out of balance” in thinking as well as movement, trying to understand all the others with their conflicting directions. You are the part that doesn’t function when failing a field sobriety test for the “occifurrrr”

BMOC ...Hippocampus...memory, fear conditioning, spatial cognition;... the hippocampus is among the oldest parts of the brain. Without a fully-functional hippocampus, humans may not successfully remember the places they have been to and how to get where they are going. Researchers believe that the hippocampus plays a particularly important role in finding shortcuts and new routes between familiar places. BMOC think “literally can’t remember how to bend or stoop with ease” and lack grace/fluidity when in chronic pain (falling out of triangle/warrior etc)...remembers the recent stuff and locks onto it...I can’t/shouldn’t/it will hurt again just like last night, etc.... “Reaching into the backseat is how my back went out last time, would you please get that for me?”

Spiney ...Spinal Cord...up and down regulators/governors;... You carry information up and down spine about sensation and movements. You act as a gate keeper or overwhelmed traffic cop trying to prevent a “flood” of sensation from one source generally, but in chronic pain the “governor” is lifted and there is hypersensitivity...light brushes/touches elicit “bizarre” responses. You also get very “sensitive” to adrenaline and other neurotransmitters over time...super hyper and jumpy and reacting to all the other things going on in both the body and brain.

Basil...Basal Ganglia...automatic unconscious movements, addiction to dopamine and serotonin; associated with motor and learning functions. You coordinate inputs from the thalamus and cortex...in chronic pain, becomes depleted, confused and awkward...take on a rigid, harried appearance, unable to sleep and depressed and exhausted...spent and rigid without your “drugs” of dopamine and serotoninthe really “thick” moving, awkward yoga student.

Now ask the audience to help you create the scenario this brain will be negotiating. It helps to prompt them a bit such as, “Is a man or a woman? How about he/she is coming for their first Yoga class? What kind of problems does he/she have? Fibromyalgia? Anxiety? Depression? A bad knee? What his/her social/family situation? What’s their past Yoga experience or exposure?” ...etc, they will be chiming in all sort so background. Once the scene is set, invite Pre to start, “What are you thinking Pre?” and then allow others to voice their experience...if it falls silent, call on various centers that haven’t been ‘heard’ from yet...the silent ones say the funniest things! At any point you can progress the scene forward, i.e., “OK, you made it through warm-ups, now it’s time for a forward bend (name the activity).”

After a few scenes, finish with, “OK, session is over and you walking out the door...what are you thinking?” Once that plays through, thank the group and solicit applause from the audience. From there you can set up another scenario or bring up a whole new brain. Other scenarios that have been fun are:

- Going to the in-laws
- Helping a friend move.
- Visiting the doctor, PT, trainer, chiro, etc.
- A cross-country flight.
- Having sex.
- Going for a job interview requiring lifting or prolonged sitting.

A good way to wrap up the Game is to finish with having participants break into dyads to share for a couple minutes each some personal pain scene in their life that was brought to mind during the exercise and how the Game helped them better understand what was going on at that time. Give them each 2-3 minutes on a timer. Then bring the group together and ask for feedback/insights from the group.

The next step for teacher training is to remind them that the brain they just witnessed is also theirs as the teacher. By watching through their own personal introspection they can discover many areas for growth within themselves day to day, and especially when teaching. This takes on special importance as we conclude with these concluding thoughts and observations on Yoga and chronic pain.

Conclusion:

While all of this science is exciting to those of us that teach Yoga, it is important we also appreciate the responsibilities we as teachers and therapists have to maintaining our own practices. Too often we slip into a mechanistic model of “doing to” the students just by being part of our culture and its paradigms. This misidentification that somehow we are the healer or the doer in the relationship exposes both us and our student to the potential for future suffering. We so deeply want to “help” someone experiencing chronic pain and they by cultural training are seeking someone to help or fix them that this slip of mind is often hard to avoid. Nonetheless, if we sustain our own practice to enhance our individual stability of mind, we will be aware when emotional tugs or old patterns of misperception of power tempt us to assume roles that might generate a relationship that limits realization of wholeness on the part of both parties.

While this peer relationship has been an ethical foundation for Yoga, scientists have now discovered what are termed mirror neurons. We have portions of our nervous system that quite literally mirror the actions and attitudes of those with whom we associate. The implications of these findings are that if we arrive to teach in a harried, scattered state our students will tend to mirror our state....oops! If we haven't met our personal needs for love and support and intend to receive it by helping our students our students may end up mirroring our needy state rather than sense their own needs and be able to act with confidence and assurance rooted in their needs. For those experiencing chronic pain they know the suffering of being dependent and having unmet needs. Subsequently if their Yoga practice is to shift out of that frame of reference, then the presence of mirror neurons demands we stay rooted in our work as a peer of theirs vs. assuming the role of presumed wholeness while projecting our instabilities.

Arriving for the session in stability is the first half of this challenge. The second half is to remain stable no matter the process of the session. When tears, anger or withdrawal present, our work is to mirror contentment and stability around which science demonstrates over time the student has the potential to modify their state in life by being in community with someone who embodies the intended stability. Our goal then is to “be” in a quality of wholeness vs. “doing to” the student to change them. While simple in design, as you work with people with chronic pain you will discover the work you have to do in your practice as well.

Modern science is literally painting pictures of the process of regulation we call mind. When someone with chronic pain begins to study all the limbs of Yoga, they immerse themselves in a science that doesn't just try to flip the right switch to alter an experience. Rather, they quite literally ease their individual suffering and prevent future suffering, as well as the suffering of those with whom they interact. As Yoga teachers and therapists, we are blessed to be able to share in this sacred transformation with our students.

For more detail please refer to the following resources.

Resources:

Explain Pain by Butler, D and Moseley, L (2003)

The Mindful Brain by Daniel Siegel (2008)

Any commentary on Patanjali's Yoga Sutras...I access for it's secular readability and direct application:

A Comprehensive Sourcebook for the Study & Practice of Patanjali's Yoga Sutras: Reverend Jaganath Carrera (2006)

www.lifeisnow.ca Yoga for Chronic Pain DVD and book

www.iayt.org Neil Pearson, MSc(RHBS), BScPT, BA-BPHE Yoga for People in Pain Intl J of Yoga Therapy Vol 18, 2008.

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