

**UNDERSTANDING EMDR
EYE MOVEMENT DESENSITIZATION
AND REPROCESSING:**

**HOW AND WHY IT IS
EFFICACIOUS FOR TRAUMA
AND CHRONIC PAIN
PATIENTS**

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ALTHOUGH THE WORLD IS
FULL OF SUFFERING,
IT IS ALSO FULL OF THE
OVERCOMING OF IT.

Helen Keller

RESEARCH ON PAIN, DEPRESSION, AND PTSD

- 50% of people who suffer from chronic pain also suffer from depression.

RD Kerns, PhD, National Program Director for Pain Management for the Veterans Health Administration and Director of the Pain Research, Informatics, Medical comorbidities and Education, 1996

- 50% of people with Post-Traumatic Stress Disorder (PTSD) also suffer from Major Depressive Disorder (MDD).

JD Flory, PhD and RY Yehuda, PhD, 2015

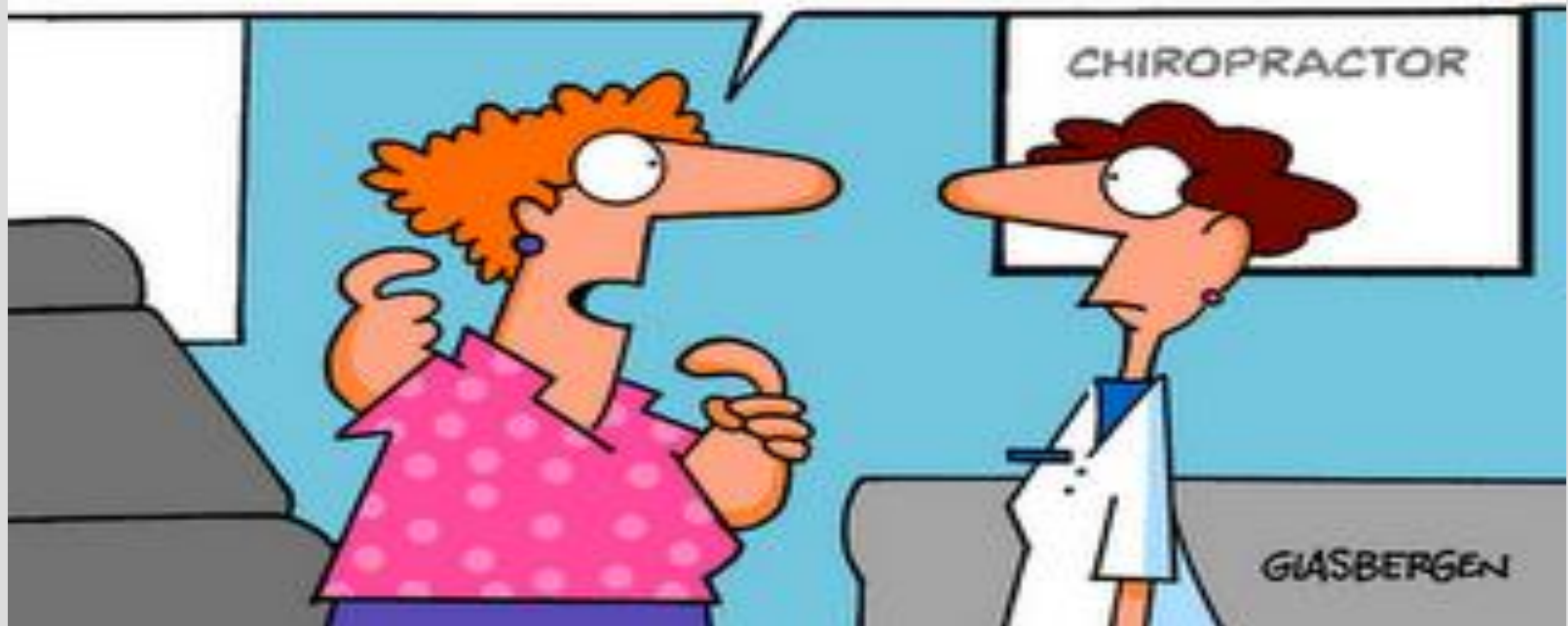
- 40 - 75% of people who suffer from PTSD also suffer from chronic pain.
 - Among those presenting for pain treatment, approximately 40% have PTSD or significant PTS symptomatology.
 - Among those presenting for PTSD treatment, approximately 75% report issues with chronic pain.

JL Murphy, PhD, Veterans Health Administration, 2017

PAIN CAN BE COMPLICATED

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THE PAIN STARTS IN MY HUSBAND'S LOWER BACK,
THEN IT TRAVELS UP HIS SPINE TO HIS NECK,
THEN IT COMES OUT HIS MOUTH AND INTO MY EARS.
AND THAT'S WHY I GET THESE HEADACHES.



PAIN SOLUTIONS CAN ALSO BE COMPLICATED

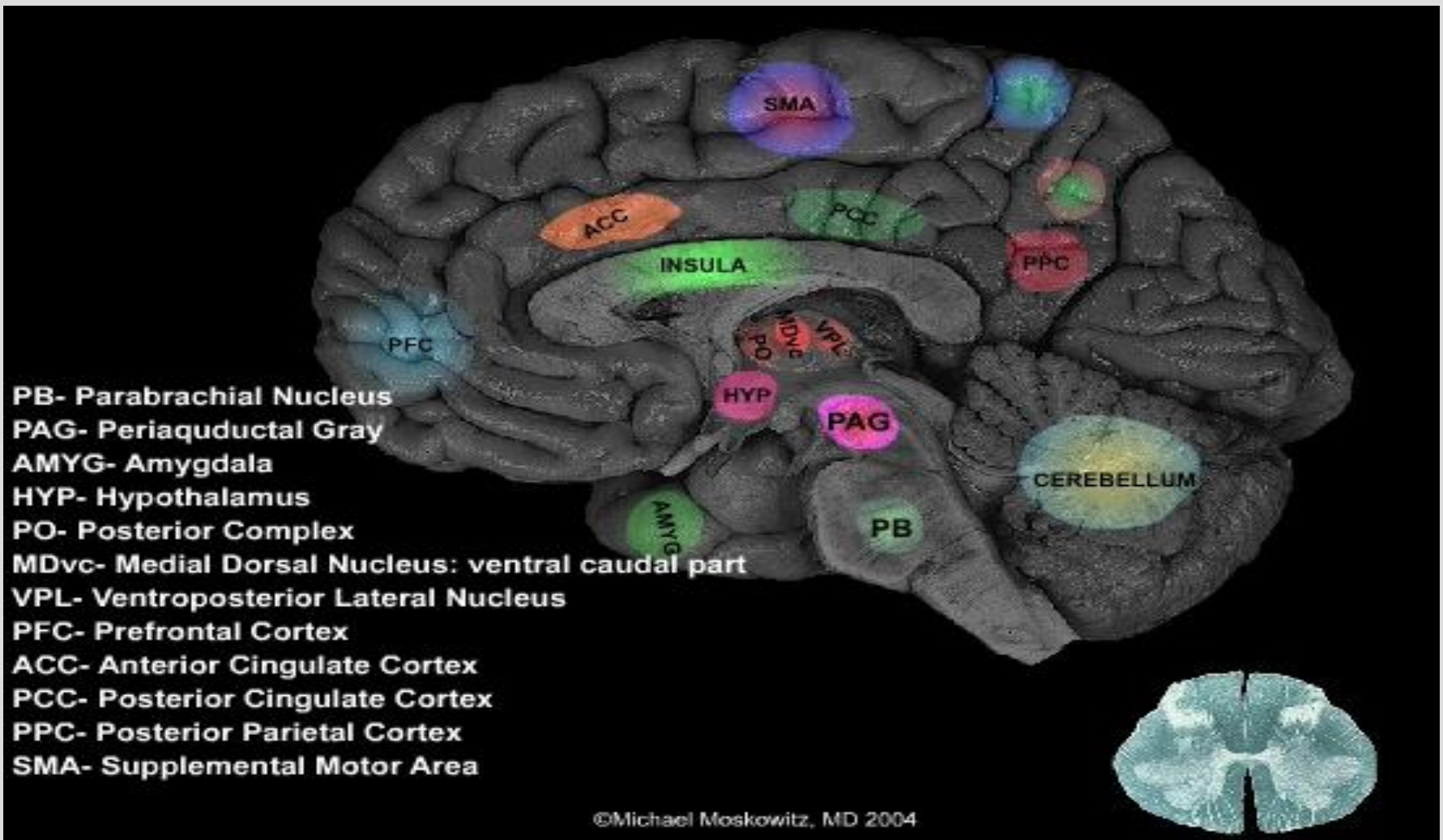


THERE IS NO PAIN WITHOUT THE BRAIN

- *Central nerves* connect areas within the brain and spinal cord.
 - *Cranial nerves* connect sense organs to the brain
- *Peripheral nerves* connect the limbs with the spinal cord.
 - *Autonomic nerves* are neurons that connect organs with the spinal cord and brain.
- *Sensory nerves* carry signals from the outer parts of the body into the central nervous system.
- Pain signals originate in our peripheral nervous system and travels to and through the spinal cord, and then to and through the conscious brain.
- Nociceptive pain is activated when sensory neurons are stimulated to release Substance P.
 - Nociception is an electrical-chemical signaling process, **not pain**.
- Neuropathic pain is produced by damage to or irritation of the neurons in the peripheral and central nervous systems.
 - Often involves sensitization of these systems.
 - Still a relay system that occurs from the peripheral nervous system up the spinal cord, and then to and through the conscious brain.
- ***Only when it reaches the conscious brain does it become pain.***

(MH Moshkowitz, MD and MD Golden, DO, 2013)

THE BRAIN AND PAIN



BRAIN'S PAIN MAP

- There 16 places in the brain where pain signals are received, and 9 of these places are in the conscious part of our brain.
- Only when the electrical-chemical signals arrive at the conscious areas of the brain is it experienced as pain.
- These 9 areas are referred to as the **Brain's Pain Map** as they are the structures involved in processing pain.

MH Moshkowitz, MD and MD Golden, DO, 2013

THE BRAIN'S PAIN MAPS

Anterior Cingulate Cortex

Pain, Emotional Self-control, Sympathetic Control, Problem Solving, Conflict Detection and Resolution

Supplementary Motor Area

Pain, Planned Movement, Mirror Neurons

Somatosensory 1 & 2

Pain, Touch, Temperature, Pressure, Position, Vibration, Proprioception

Prefrontal Cortex

Pain, Executive Function, Creativity, Planning, Action, Emotional Balance, Empathy, Intuition, Morality, Understanding

Insula

Pain, Temperature, Itch, Empathy, Emotional Self-awareness, Pleasure, Disgust, Sensual Touch, Quiets the Amygdala, Connects Emotion to Bodily Sensation, Mirror Neurons

Amygdala

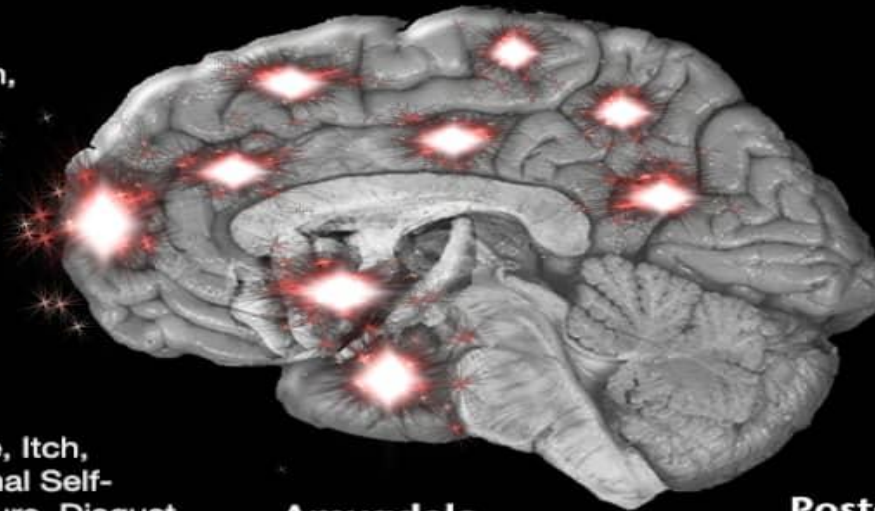
Pain, Fight/Flight Scent, Sight, Ecstasy Emotional Extremes, Post Traumatic Stress, Emotional Response

Posterior Parietal Cortex

Pain, Sensory, Visual, Auditory Perception, Internal Location of Stimuli, Location of External Space, Mirror Neurons

Posterior Cingulate Cortex

Pain, Visual Spatial Cognition, Autobiographical Memory Retrieval

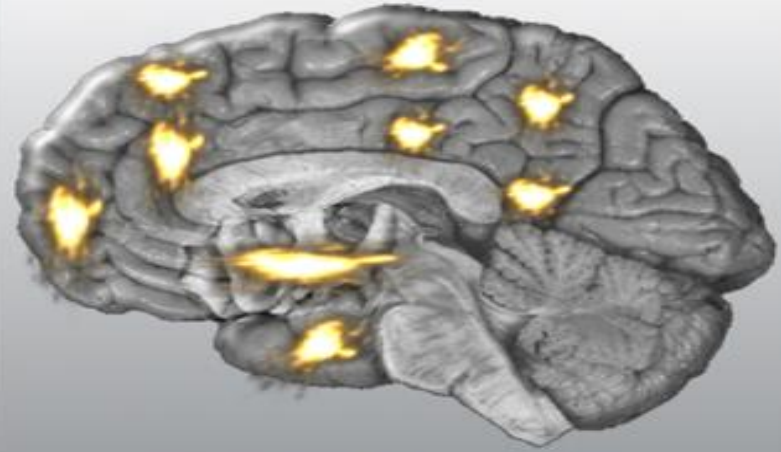


THE BRAIN CHANGES WITH CHRONIC PAIN

Persistent, chronic pain results in pain pathways in the brain being strengthened and **hard-wired** over time where the brain is **rewired** to experience more pain.



ACUTE PAIN
PERCEPTION



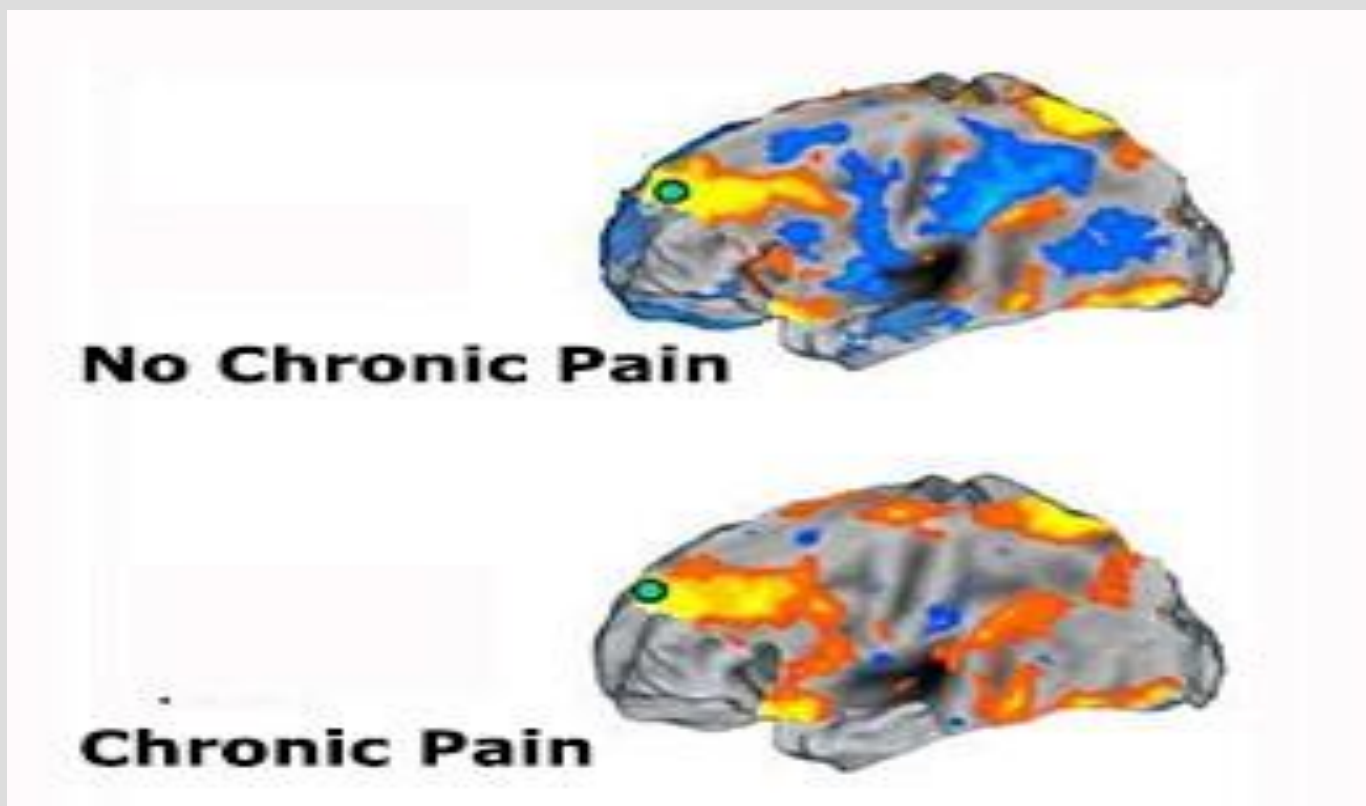
PERSISTENT PAIN
PERCEPTION

IN PERSISTENT PAIN THE BRAIN PAIN MAP EXPANDS UP TO 5 TIMES

THE BRAIN LEARNS PAIN

THE BRAIN CHANGES WITH CHRONIC PAIN

The brain loses its ability to balance pain and emotion as the excitatory regions of the brain are structurally strengthened and destabilized at the expense of the soothing and calming regions of the brain.

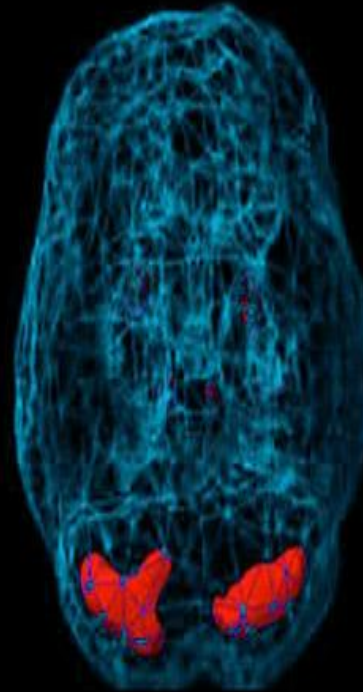
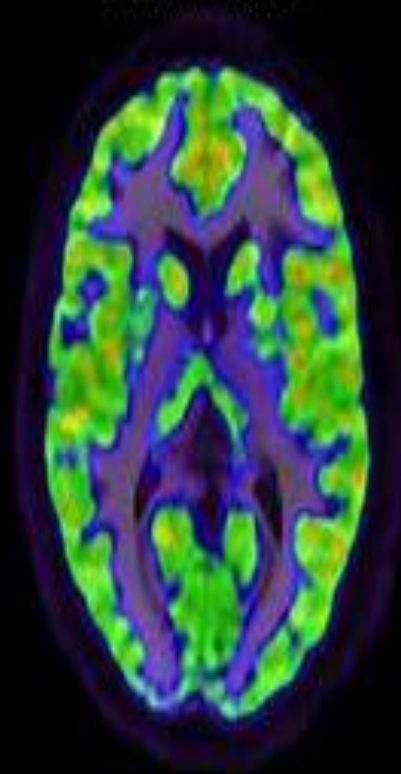
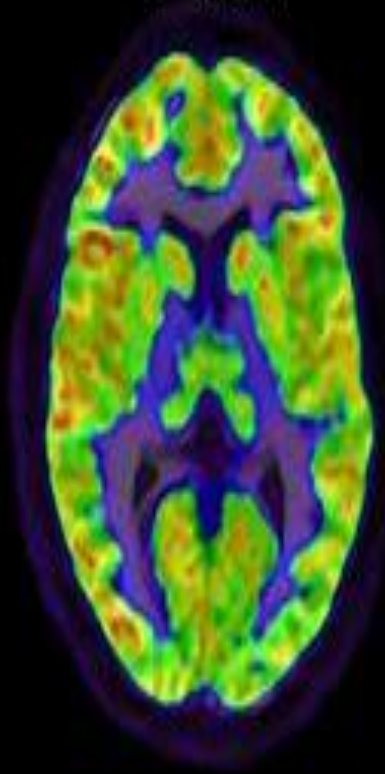


Over time executive functioning, problem solving, planning, mood regulation, empathy, attunement, attention, concentration, and activity all suffer.

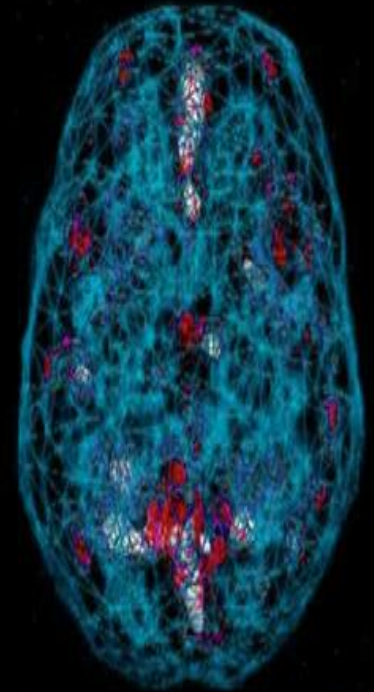
POSTTRAUMATIC STRESS IS ABOUT THE BRAIN TOO!

PTSD

No PTSD



Healthy Brain



PTSD

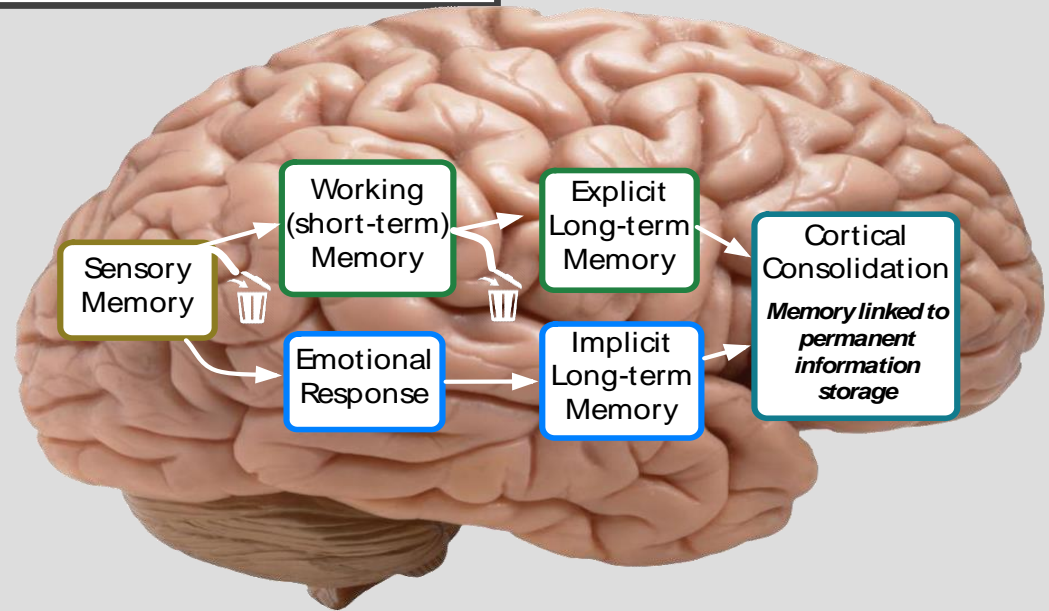
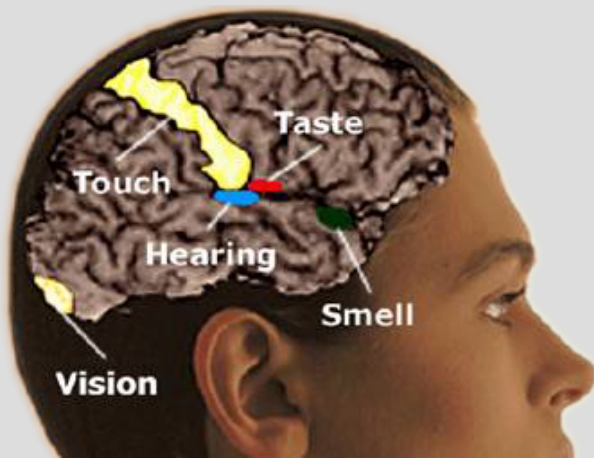
Trauma: Any experience that creates a stress response strong enough to have a lasting effect.

TWO TYPES OF TRAUMA(PTS)

- 1) Overwhelming, typically life threatening experience, “shock” trauma
- 2) Painful life experiences, often repeating, including vicarious trauma (witnessing of other people’s trauma and pain)



BRAIN'S JOB: PROCESS VAST INFLOW OF INFORMATION



Explicit: facts, general knowledge, autobiographical (*placing self in space & time*)

Implicit: emotional responses, body sensations, reflexive actions
(*lacking subjective internal recall of self, time and place*)

The processing of each of these layers follows different neurological pathways

REM sleep is needed to move information through series of stages

VIEWING PTSD AS A MEMORY ISSUE

Sometimes Processing Gets Stuck

Not about character

Not about psychological weakness

It's a BRAIN THING, resulting from:

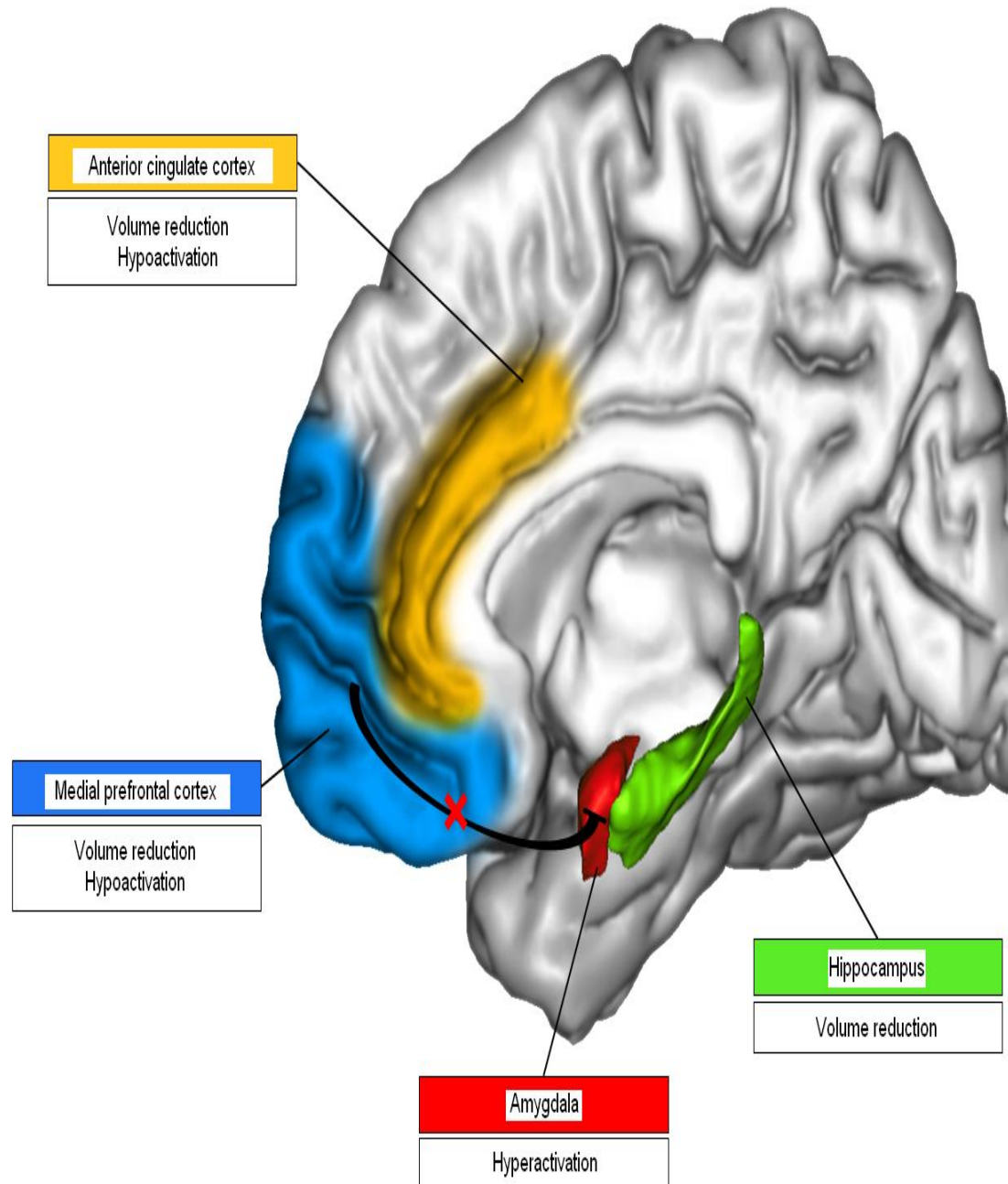
Escalation of stress

Multi-systemic threat response activation

Cascade of neuro-chemicals

Shutting down of the brain's information processing system

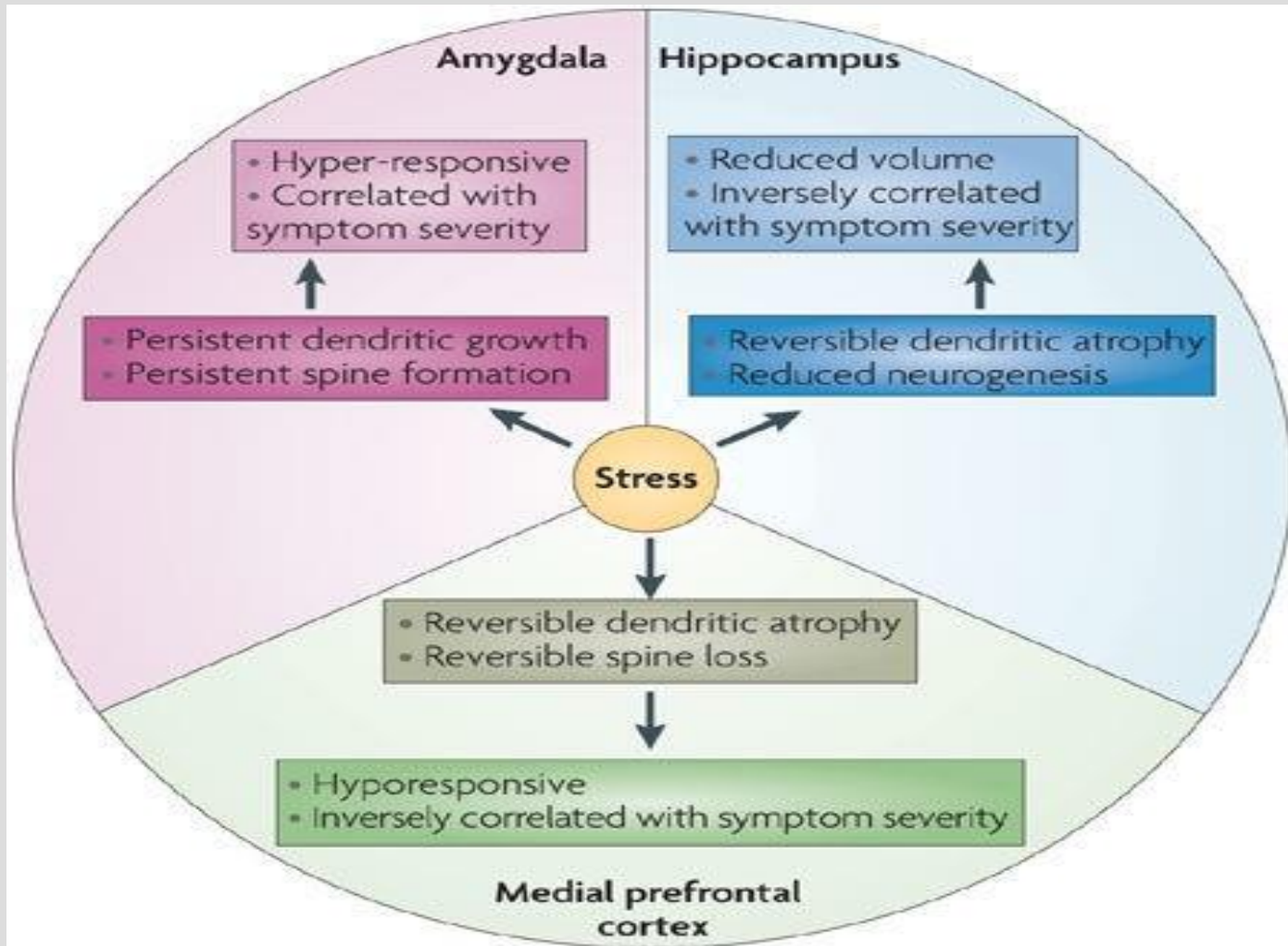
Leading to the experience not getting processed and adaptively linked



TRAUMA DISRUPTS INFORMATION PROCESSING

- Implicit memory gets stored as unprocessed raw sensory data in the form of emotions, body sensations and reflexive actions, separated from the related explicit (contextual) information
- Memory of the experience remains unlinked to the previously acquired information and knowledge
- Memory remains **frozen in time**, separated from related explicit information, *unaltered by later life experiences*
- **Time Doesn't Heal All Wounds**
- Frozen, unprocessed memories can get triggered and re-experienced by any stimulus perceived by brain as similar
- Implicit only layer that gets activated without explicit layer
- **Perception is that activation is about now**

TRAUMA CHANGES THE BRAIN



TRAUMA/PTSD IS ONE OF THE MOST TREATABLE OF HUMAN CONDITIONS

One of the most researched areas of treatment

Traditional talk therapy is not effective

Requires specialized treatment

2 forms of treatment found to be highly effective:

- **EMDR** (Eye Movement Desensitization and Reprocessing)
- **CBT** (cognitive behavioral therapy, cognitive processing therapy, prolonged exposure, trauma-focused)

EMDR EFFECTIVELY AND EFFICIENTLY RESOLVES PTSD

- Extensive body of research- most researched treatment method
- NIMH study: 75% resolution of adult onset PTSD in 6 sessions
- EMDR is listed as an **evidenced based** treatment for depression and anxiety in addition to PTSD by the *National Registry of Evidence-Based Programs and Practices by the United States Department of Health and Human Services*
- Client doesn't have to have skills needed in traditional talk therapy: identifying, talking about and expressing feelings; deep psychological insight

CURRENT UNDERSTANDING- HOW EMDR WORKS

- Through a series of steps, a conscious link is created to the traumatic memory or painful life event to be addressed
- Eye movements, or an alternative form of *bilateral stimulation*, activate the information processing system, the reprocessing of the disturbing aspects of the memory begins, likely using the same mechanism as in REM sleep
- Continued sets of eye movements (BLS) move the unprocessed information along the appropriate neurological pathways at an accelerated rate

CURRENT UNDERSTANDING- HOW EMDR WORKS

Spontaneously accesses related information and clears out the disturbance

- Links data from this memory to previously stored related adaptive information.
- Fully reprocesses memory, resulting in
 - ☀ Elimination of disturbance tied to event
 - ☀ Positive shift in related self perception
 - ☀ Elimination of previously reactive behavioral patterns and triggers
 - ☀ Physiological return to homeostasis versus chronic multi-systemic threat response activation
- Gives the brain another opportunity to do what couldn't be done at the time of experience(s)

ENDORSEMENTS OF EMDR FOR PTSD

American Psychiatric Association

US Departments of Veterans Affairs and Defense

SAHMSA (Substance Abuse and Mental Health Services
Administration of the Dept. of HHS)

World Health Organization

International Society for Treatment of Traumatic Stress

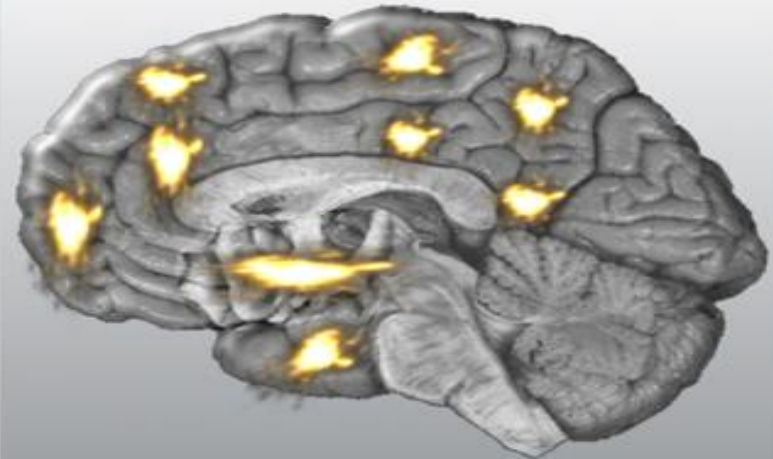
United Kingdom Department of Health

Israeli National Council for Mental Health

EMDR AND OTHER NERVOUS SYSTEM DRIVEN TREATMENTS CAN ALSO RESTORE THE BRAIN OF CHRONIC PAIN PATIENTS



**ACUTE PAIN
PERCEPTION**



**PERSISTENT PAIN
PERCEPTION**

IN PERSISTENT PAIN THE BRAIN PAIN MAP EXPANDS UP TO 5 TIMES

THE BRAIN LEARNS PAIN

WHAT IS NEEDED

- MULTIFACETED TREATMENT APPROACHES THAT ARE:
 - FLUID
 - DELIBERATE AND STRATEGIC
 - INCORPORATE THE UNDERSTANDING OF THE MECHANISMS OF DYSFUNCTION
 - INCORPORATE **ALL** THE NEEDED MECHANISMS OF INTERVENTION TO IMPACT RECOVERY AND HEALING.

MECHANISMS OF DYSFUNCTION

- **Chronic pain is a syndrome** where there are systems of dysfunction that are co-occurring and co-reinforcing.
- ***Unfortunate Neuroplastic Changes*** that have occurred due to constant firing of pain signals
- ***Chronic Multi-Systemic Threat Response Activation*** that results in a habituated nervous system of *Psychophysiological Incoherence*
 - ***Perpetuates pain amplification and systemic breakdown***
 - ***Perpetuates neurotransmitter and biochemical imbalances***
- ***Repetitious Pain Gate Facilitation***
- ***Long Term Potentiation and Unmediated Inflammation Issues***
- Exacerbation or initiation of other ***Co-occurring Psychophysiological Conditions*** (depression, PTSD, anxiety, SUD)

MECHANISMS OF INTERVENTION TO IMPACT RECOVERY AND HEALING

- Interventions for specific brain regions/substructures to ***Undo the Neuroplastic Pain Process of Chronic Pain*** and re-habituate back to a normal, healthy pain response system
- Interventions to ***Close the Pain Pathways***
- Interventions to ***Shift from Psychophysiological Incoherence to Coherence*** and to settle down the nervous system during and in between sessions
- Interventions to ***Create Pro-Health Neurotransmitters and Biochemicals*** through behavioral and lifestyle strategies
- Interventions to ***Disrupt Pain Networks***/nervous system pathway systems using short-term and long-term depression strategies (*EMDR*)
- Interventions to effectively and efficiently ***Address Co-Existing Psychophysiological Conditions*** (depression, PTSD, anxiety, SUD) (*EMDR*)

EMDR FOR PAIN: THEORIES ON HOW AND WHY IT WORKS

- Trauma and Pain Interface:
 - Chronic stress/threat response activation is at the center of or a primary player in many chronic health conditions and autoimmune disorders.
 - Developmental trauma and highly anxious and depressive states cause excessive release of Substance P. (MH Moshkowitz, MD, MD Golden, DO, 2013)
 - Hyperarousal causes up to 5 times the amount of Substance P to be released, activating 3-5 times the number of cells that receive it. (MH Moshkowitz, MD, MD Golden, DO, 2013)
 - Chronic pain states cause the release of up to 5 times the amount of Substance P which contribute to depressive and anxious states. (MH Moshkowitz, MD, MD Golden, DO, 2013)
 - Persistent pain locks in traumatic memory. (MH Moshkowitz, MD, MD Golden, DO, 2013)
 - 40 - 75% of people who suffer from PTSD also suffer from chronic pain. (JL Murphy, PhD, 2017)

EMDR FOR PAIN USING **EMDR PAIN PROTOCOL**: THEORIES ON HOW AND WHY IT WORKS

- **Short and Long-Term Potentiation:**
 - ***Short-term potentiation*** - one nerve cell fires and it turns on other targeted nerve cells, but when it stops so do the others.
 - ***Long-term potentiation*** - the first nerve cell fires with a number of bursts and then stops firing, but the other targeted nerve cells continue to stay turned on (*excited*) *without any further stimuli*. This can last from hours to years. This is often the case with chronic pain as synaptic connections between the neurons that are excited become strengthened and an information storage system (memory) is created.
- ***The brain and the body learn to develop a memory for the pain on a cellular level resulting in an amplified pain experience, or pain circuit.*** (MH Moskowitz, MD, MD Golden, DO, 2013)

EMDR FOR PAIN USING ***PAIN PROTOCOL***: THEORIES ON HOW AND WHY IT WORKS

- **Short and Long-term depression:**
 - **Short-term depression** is when one nerve cell fires it prevents a targeted nerve cell from firing by itself or by any other cell.
 - **Long-term depression** occurs when the inhibiting nerve cell fires in a slow rhythm, and causes the excited nerves to synchronize with it and stops the excitatory process. If you achieve this with enough nerve cells in the circuit, you can disrupt and dismantle the circuit, and the body can return to pre-injury function.
 - Long-term depression ***results in neuronal disconnection***, unlearning, and brain map shrinkage. (Doidge, 2007)
 - Even though both LTP and LTD are occurring at the neuronal level, patients' subjective experience of positive change is reflective of the parietal functions of higher-order assessment, remapping, and integration. (Pearson, 2009)

DELIBERATE, STRATEGIC AND FLUID

The effective pain therapist:

- **Knows this information** inside and out
- **Can teach it** in appropriate, digestible ways to patients
 - **Empowers and Engages** them in the necessary way to motivate them to become active in their recovery plan
 - **Creates a neural-template** that begins to shift affective and pain states in and of itself (shifts functioning of the associational cortices)
- Knows how **to order and build interventions** based on each patient's presentation to promote engagement and small successes to build upon larger ones.
- Knows how to deliberately and strategically **move in and out of pain**, posttraumatic stress, depressive, **and other nervous system states** to abate moments of suffering while facilitating the larger goal of and belief in healing.
- **Will learn about physiological health issues** and put forth efforts for coordinated care with other healthcare providers.

**“ONE OF THE KEY PRACTICAL LESSONS
OF MODERN NEUROSCIENCE IS THAT
THE POWER TO DIRECT OUR
ATTENTION HAS WITHIN IT THE
POWER TO SHAPE OUR BRAIN’S FIRING
PATTERNS, AS WELL AS THE POWER TO
SHAPE THE ARCHITECTURE OF THE
BRAIN ITSELF.”**

-Daniel J. Siegel

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