

**Shaping the Future of Addiction Recovery_
Healing Trauma Through Mindful Movement in Group Settings**

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Abstract

Somatic experiences applied as clinical interventions to heal trauma have been widely studied in the field of neuroscience by scholars such as Dr. Bessel van der Kolk, Peter Levine, and Daniel Siegel. However, their perspectives have not adequately addressed the utilization of these interventions in group settings as a potential powerful healing tool to resolve underlying trauma issues. This paper addresses how utilization of mindful movement as a body-mind connection technique can change brain structures and create new pathways to healing traumatic memories which affect the addiction recovery process. This paper pays attention to the power of group work which allows for connections among group members through the mirror neuron process and interpersonal neurobiology. Specifically, in this guided project I will be looking at evidence from neuroscience, which indicates positive changes in the brain as a result of movement and body-mind connection in a group setting. This intervention allows formation of new neuropathways to heal and reduce recidivism. I will be focusing special attention on how traumatic experiences are stored in the body and show that it is through body experiences and sensations that the traumatic memories can be reached. This allows the individual to give meaning and heal from the bottom up (body to brain) and inside out (body to mind). I will juxtapose these concepts against more conservative approaches which utilize the prefrontal lobe and cortex of the brain. In conclusion, this guided project aims to explore an innovative way of healing trauma through mindful movement in a group setting, paying attention to deep breathing, mindful movements, and awareness among other forms of stress regulation techniques. This

process will be implemented through a 4-week structured workshop. I argue that there is power in healing through mindful movement group work; and that severed traumatic neurocognitions which resulted in a broken self can find its way to integration through movement.

Keywords: body-mind connection, somatic body interventions, group work, neurobiology in group clinical practice, health and mental health through the lifespan, addictions social work, and trauma.

Background

In the Eastern tradition the belief is that “we not only have a body, but we are our bodies” (Luke, 2009). The “Bottom-Up” / body-mind connection processes have been studied by several authors as a key component in healing trauma (van der Kolk, 2014, Siegel, 2012, Levine, 2017). The trauma process experienced early in life, leaves scars in our bodies, emotions, and memories, creating serious dissociation in the mind, mind-body connection, and the sense of self. Unresolved trauma remains stored in the body in the form of energy (van der Kolk, 2014). This phenomenon is directly related to future issues in life as addiction, mental health and other as well as serious behavioral and health problems such as diabetes, heart disease and cancer. In this study, a high correlation was found between ACE and early death in adults (Felitti et al., 1998), and the development of addiction and other health issues in later stages of development (Wahrer et al., 2020). This correlation was presented by the “Adverse Childhood Experience” ACE Kaiser Permanente study. It is therefore essential to study the body-mind connection as these are both intimately interrelated and interconnected entities that need to work in unison to achieve healing of the whole. This interconnectedness and dependency between mind and body indicates that the dissociated mind and self can be reached and healed through the body (Carleton & Gabay, 2012).

When somatic experiences are utilized as clinical interventions to heal trauma, the traumatic memories can be healed (Levine, 2017).

Substance use disorders (SUDS) co-occurring with mental health issues such as depression and other anxiety disorders are usually diagnosed as a presenting problem for individuals seeking addiction recovery treatment. While completing a psychosocial-spiritual assessment, frequently, serious underlying unresolved trauma, dysfunction in the family of origin, and adverse childhood experiences (ACE), are among other issues come to surface (Vitale, 2016). These negative experiences throughout the client's lifespan have caused a production of toxic stress which has affected brain development. The production of cortisol and hyperarousal, from the reptile brain (bottom up), has shaped the brain and body to remain in a hyper-aroused and hypervigilant state. This hyperarousal can drive the individual to lose the sense of safety and self, and engage in self-destructive behaviors such as compulsive drug and alcohol use to manage stress responses (van der Kolk, 1997). Therefore, teaching the individual stress regulations techniques is essential in the recovery process. SUD is a symptom of something deeper, the root cause. It is by identifying the root cause, that the treating professionals will be able to propose appropriate evidence-based interventions to avoid recidivism (Powers, 2017).

Neurobiology of the brain is usually understood to refer mainly to the study of the brain itself. However, the brain and the nervous system is interconnected throughout the whole body. The nervous system, managed by the brain, communicates to the body through the brain stem, down through the spine, reaching through the body's electrical wiring to every single cell in our

organism. Therefore, I refer to the brain-body connection as an integrated nervous system capable of influencing and changing each other.

Neurobiology of Trauma

The structure of the brain is such that the higher executive functioning/decision making frontal lobe and cortex sit on top of the most primitive reptile brain. The reptile brain is deeply interconnected to the higher functioning as well as the spine and ready to register fearful experience for survival, shaping the higher functioning brain (Siegel, 2012). When a child experiences ACEs, the reptile brain becomes activated in a fear response for survival shaping the belief of ourselves, the world, the future, and inhibiting learning (Cozolino, 2016). Traumatic experiences as a child, affect and distort the sense of safety, trust, control over life, self-esteem, and a relationship to others (Saakvitne & Pearlman, 1996). In addition, when a child is being abused by an adult, there is great differential of the size, strengths and power which intensifies the perception of threat. The fear response to the abuse, will generate such fear that the child may believe the world is a scary place, making it difficult to trust adults, and the child might internalize the abuse attaching meaning about themselves such as: “I am bad, I don’t matter, It is my fault”, among other negative assumptions. In this case, self-esteem and the ability to establish positive relationships in life will be affected. This belief will remain stored and sitting at the core of the mind and body for years until resolved (Finkelhor, 1990). The witnessing and being a part of the traumatic event, is therefore, a threat to survival itself. The brain survival mechanisms take control of the survival response. The amygdala, which is the emotional center of the brain

becomes highly active and responds instantly to the threat engaging body systems to respond in a fight or flight mode. Heart rate rises, muscles tense, there is a rush of adrenaline among other immediate survival responses. The frontal lobe or decision-making part of the brain is inhibited along with the left frontal side of the brain that control narrative and language. This fight / flight response mechanism drives the mind, body and the emotions. The social brain systems, the ones which allow us to establish healthy secure relationships are inhibited generating serious problems with connecting and trusting others (Bogar, & Hulse-Killacky, 2006). When the traumatic events are experienced repeatedly, physical changes in the brain occur, creating distorted neuropathways and the individual may become “stuck” in the threat response distorting future meanings attached to threats. The brain’s sympathetic-parasympathetic balance will become disrupted and the individual will struggle with emotional and physical issues until the balance is restored (Carleton & Gabay, 2012). The disruption of balance is such that the individual is likely to engage in coping mechanisms to alleviate the traumatic pain, negative beliefs of self, and difficulty with being able to connect and fit in (Lotzin et.at, 2019). Because of the powerful effect they have on the brain, an extremely effective coping skill to numb negative feelings and energies left by traumatic experiences and memories, is the use of mood-altering substances such as drugs and alcohol.

Neurobiology of Addiction

When substances as alcohol, heroin, cocaine, amphetamines, or other alkaloids are utilized as a coping skill to manage emotional pain left from traumatic experiences, the individual feels an immediate release of pain. There is, in response, a release of endorphins such as dopamine, producing a feeling good sensation which overrides the negative emotions left from

trauma. Substance use becomes an extraordinarily effective way to cope, therefore, the individual will engage in repeated use creating a feedback loop of negative feeling - drug use - positive **reinforcement**. Due to the phenomenon of tolerance in the body, the individual will need more of the substance to achieve the desired effect and will continue to use substances despite negative consequences. Therefore, substance dependence is inevitable for individuals who have experienced trauma and subconsciously have engaged in substance use to cope with the remaining emotional and mental damage (Wang, et. al., 2020).

Among the causes of SUD, Morse (2006) discusses the genetic component transferred down through generations versus the moral stigma of addiction. Morse attributes 50% of SUD in affected individuals as being caused by genetic predisposition (Bujarski, et. al., 2018). However, there are both protective and risk factors for the development of drug dependencies.

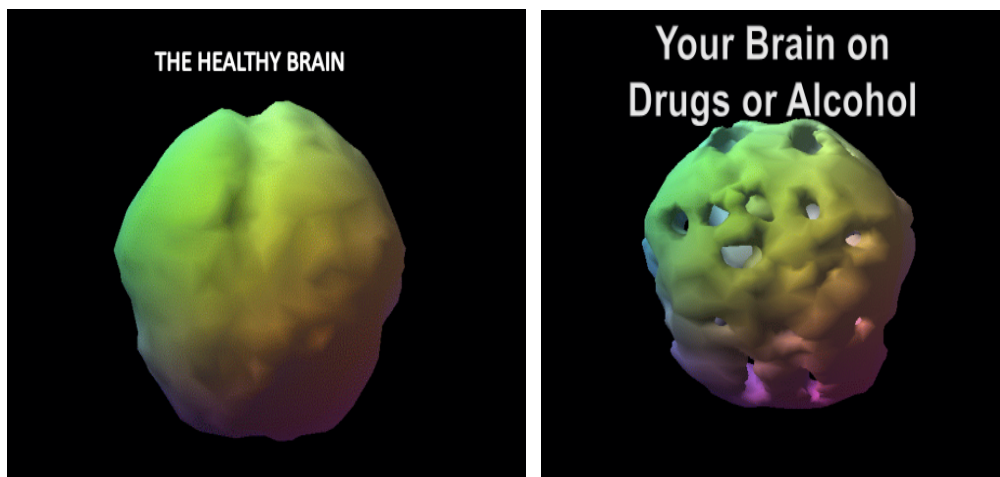
Relationships and attachments are fundamental in the developing brain. If the individual has genetic predisposition for substance abuse but also has an array of protective factors such as healthy relationships and secure attachments as a child, the individual is less likely to become dependent. However, if the individual is exposed to significant trauma in the form of ACEs, lacks secure attachments, and healthy relationships in life, there is a high probability that they will develop a SUD.

It is the nature of mood-altering addictive substances to cause a biological dependence because of the direct effects they have on the brain. Once introduced into the body, these substances, act directly on the nucleus accumbens, hippocampus, and amygdala, parts of the brain also known as the pleasure centers, stimulating the release of the dopamine and glutamate

neurotransmitters creating a sensation of pleasure (Pontieri, et al. 1995). There is an excessive release of these chemicals in the synaptic cleft. This produces an immediate extreme stimulation of neural responses in the brain and therefore ecstatic feelings in the body. At the same time, the hippocampus which oversees the coding for and access to memories becomes stimulated creating a response from the amygdala to remember the positive response. The “good feeling” of the substance is reinforced and “remembered” (Powers, 2017). The individual is drawn to recreate this process repeatedly until the neuropathway is strongly formed in the brain and the compulsive using behaviors become automatic. Once the brain has become dependent on substances it will be challenging for the brain to obtain similar sensations of pleasure from normal life activities (Wang et. al., 2020). This lack is attributed to the repeated overstimulation of the neural subsystems causing a depletion in the neurotransmitters creating a feeling of depression and other emotional maladies once the drug abuse stops. The individual’s behavior struggling with SUD, is characterized by a compulsion to use substances and withdrawal symptoms when the use subsides. Depending on the amount of substances used, the class and potency of the substance, resiliency of the individual and physical and emotional resiliency, the withdrawal symptoms can be severe. At times, withdrawal can be so emotionally and physically devastating that it can cause severe elevated heart rate, vomiting, swelling of brain and organs, stomach pain, liver failure, seizures, and death. (Roberts & Koob, 1997).

At times pictures can express more than a million words. Following are SPECT SCAN pictures of a healthy brain and a brain on drugs and alcohol. These images were facilitated by Dr. Daniel Amen at the Hanley Center while performing a training on the SPECT Scans. This equipment was utilized to perform brain scans of clients upon admission and end of treatment.

The images would be utilized as a diagnostic tool to explain damage to the brain caused by SUD and cater the treatment towards those areas most affected.



Neurobiology of Recovery Utilizing Experiential Somatic Techniques

It is through relationships that our brains are shaped. Individual experiences happen in the environment and through relationships, they are introduced into the body through the senses, and given meaning by the mind. These experiences are stored in the body and the brain in the form of energies and memories. At times these memories are painful; therefore, as a defense mechanism, the brain tends to dissociate and “forget” in aid of the individual’s wellbeing. Seriously traumatic experiences change the brain, directly affecting the speech and storytelling part of the brain. Therefore, it is difficult to find meaning for these experiences and process and heal through conventional forms of talk-therapies. Mindfulness and self-regulatory techniques can be utilized to calm an aroused body and find meaning. Through movement and somatic techniques, the neuropathways of the brain can reach these severed stored memories and find new ways of moving that can release them without having to re-live the experience (Roberts, 2005).

A compounded traumatic experience or relational trauma can cause depersonalization, which is when the body and mind connection are severed (Loewenstein & Brand, 2014). Using gentle movement and mirroring with other members in a mindful movement group, can slowly allow the body to connect back with the mind. Through deep breathing and other mindful techniques this goal can be achieved.

Pendulation. A process where the natural life rhythms of contraction and expansion occurring in the body and the mind support flexibility and healing of trauma (Levine, 1999). This process can be utilized by a mindfully trained therapists to take clients in to the contraction states where the trauma resides, and slowly and skillfully go into the contraction, staying in the contraction for necessary time to instill awareness and meaning, then promoting subsequent expansion until healing occurs. An example is the natural constant psychical process of the breath which expands the lungs as we inhale and contracts as we exhale. Another is the heart that is in constant contraction and expansion allowing for blood flow through the body. This process of pendulation can be utilized in mindful movement to feel sensations that arise when the body is contracted and expanded. It can also be utilized in mind processes where the therapist goes into the uncomfortable feeling with the client (contraction) and allows for the un-comfortability to be felt, creating awareness of the emotions that arise to later retrieve (expansion) going back to that point at a later time. This flow creates flexibility and resiliency of mind and strengthening of the body. In the 76th verse, of the 81 verses of the Tao Te Ching, Lao Tzu writes about flexibility consorting with life and rigidity consorting with death. Flexibility of body and mind allows for systems to become calm and slow down so that new neuropathways can generate creating resiliency. This also may relate to the duality and natural flow between the sympathetic system

which stimulates us and the parasympathetic which calms us down. Utilizing these principles in addition to the circadian rhythm, mindful movement, relaxation and meditation, trauma healing can be achieved.

FEED. An acronym described by Arden (2010), which proposes a way to feed your brain and promote neuroplasticity by practicing the acronym of: Focus, Effort, Effortless, and Determination. Focusing by paying attention, concentrating, and being aware in the present moment, activates the frontal lobe of the brain and therefore other centers of the brain become activated. This process is necessary to engage the brain and create new neuropathways (neuroplasticity). This phenomenon of neuroplasticity does not occur when the brain is utilizing subconscious mechanisms in automatic mode. In mindful practices as meditation and other mindful movement practices such as yoga, the focus is essential. **Drishty** is a yoga term which is defined by the ability to visually focus on one spot while holding the body in an asana (posture) remaining calm and static in the position, breathing in and out, while feeling the inner body sensations and energies (“tuning in”). Some of these sensations are pleasant as well as some extremely uncomfortable or painful. The ability to remain focused will allow the practitioner to improve the pose over time, gain endurance, strength and flexibility. Feuerstein (2008), in the manual utilized for Ashtanga yoga teachers training, mentions that focusing the energies of the mind and body, will allow discovery of the true self. One of the teachings of the Upanishads talks about mantras being utilized to focus a spiritual empowered sound “OM” which has the power to focus away from the external and into the internal world allowing for transformation of the mind. In yogi terms, Dharana means concentration, described in the Yoga-Sūtra (3.1) as “the binding of the mind to a single place” (Fuerstein, 2008, pp. 95) This

concentration allows the mind to focus inwardly and drift away from distraction. Siegel (2012), describes how the focus of attention will create neuroplasticity in the brain, allowing the brain to change and create new neurons and pathways.

Arden (2010) proposes that focused attention turns on the nucleus basalis promoting the production of myelin, a fatty layer that coats the axon which is secreted when numerous hours of training are dedicated to the skill as in athletes and dancers, which improves the firing of the neurons and neurotransmission becomes 3000 times more efficient. This phenomenon acts on the stem cells in the hippocampus producing growth of new neurons. New strong and healthy neuropathways are being generated which translate into long-lasting physical, emotional, and mental positive change. In yoga practice, the yogi will spend countless hours dedicated to mastering the postures, forms of meditation, focusing of the mind, and mindful skills. In the yogi practitioners' brain, myelin will be produced with the same effect. In addition, the muscle fat will be trimmed creating new muscle fibers, strengthening and shaping old ones. Simultaneously in the brain we should see pruning of unneeded neurons while new strong neuro connections are being generated. All this will be achieved by being able to calm the mind, pay attention and focus. The act of focusing, is not so simple when having a racing brain, multitasking society, and the constant distraction of modern electronics. We must learn how to calm the racing brain before we can learn to focus. Something as simple as focusing on the breath, as the act of deep breathing can calm the racing brain and stimulate the parasympathetic nervous system. Therefore, yoga could be used as an excellent therapeutic tool to generate neuroplasticity, the development of new memories, new ways of moving, and therefore positive

lasting change. The other sections of the FEED acronym: effort, effortless and discipline are as important in the development of new neuropathways as is the focus. The effort speaks to the action needed to move the energies, which at the beginning are more uncomfortable and difficult until the behavior, movement or thought which have been repeated so many times that they become effortless. At that point progress has been made. It takes discipline to be able to achieve change. Motivation needs to be sustained in order to continue the process even if it is difficult or uncomfortable.

Neurobiology and Group Work

Group work has been one of the primary recommended and utilized current modalities in addiction recovery treatment. In good group work, there is development of mutual aid where group members connect with each other and help each other in the healing process (Gitterman & Shulman, 2005). Recovering from SUD's and MH in a mindful group setting is an innovative approach. The brain is a social organ, it develops and increases its power through the experiences with the social environment (Cozolino, 2014). In therapeutic groups, the experience of bonding, feeling that "I am not alone", the feedback from other group members, the sense of connection when "It happened to me too", generates a healing bond, a neuropathway of connection in the brain that will promote healing. The ability of the facilitator to create a safe space with empathy and compassion that can stimulate new emotional and mental growth. Movement incorporated in group would allow for group members to experience a different way of communicating through body language. Observing others move in space, mirroring of other movements, and witnessing feelings and sensations which arise in the self is a healing process. The individual is not in isolation but moving with other group members through the space, creating a sense of

connection and bonding. Group dynamics will develop and play an important role in the development of group process. This innovative approach needs further study to be able to prove effectiveness as an evidence based clinical intervention. Mindful movement in group is a way of meditation., where the mind is silenced as the practitioner's slowdown in the moment, going inside and feeling body sensations and abstaining from judgment. Meditation helps the wiring of neuro-connections and improves brain health as studies utilizing of FMRI and PET scans of brains in Tibetan monks who have practiced meditation for years show (Arden, 2010). Within the energetic exchange that happens in movement, activation of group members mirror neurons occurs. Through the mirror neuron process and shared neural circuits among group members, the mover and the observer will be able to feel what others are feeling and develop empathy and connectedness through the shared neural circuits. Connections among group members by sharing the movement experience will allow for the creation of meaning of the shared experience which strengthens neural circuits and human connections (Cozzolino, 2014).

Aims

Utilization of Mindful Movement to Heal Trauma

Mindful movement is described by allowing the body to move, paying attention, and being in the moment of the feelings and sensations which arise. As 20 years of professional dancer, followed by 30 years of yoga practice, I have learned to move mindfully, fully engaging the body and the mind through the breath. Plasticity of the body turns into plasticity of mind (Pierce, 2013). Oxygenation of the body oxygenates the mind and neuron cells improving learning and performance. Movement will promote growing gray matter as shown in adults who juggled balls for 3 month and increased gray matter in the mid temporal area of the brain

(Draginski, et al., 2003). Yoga practice involving repetitious mindful movement will increase long term potentiation in the brain due to the excitation and activation of the brain cells. The prolonged holding the poses will strengthen neuron connection, rebalancing melatonin and enhancing the sleep cycle. In addition, it will promote tryptophan precursor to serotonin which enhance mood by the release of endorphins (endogenous opioids). Research shows that movement of the body increases production of new neurons in the dentate gyrus, therefore improving brain functions, memory and learning (Uda et al.,2006). Based on prevalent knowledge, a yoga practice is expected to enhance learning, improve executive function, prevent atrophy of the brain due to aging and slowing down neurodegenerative diseases as depression and Alzheimer's (Cotman C W. et al., 2007).

Methods

The mindful movement workshop will be structured and implemented for a 4-week period, offered to individuals who are in recovery for SUD and trauma, and who are currently residing in an inpatient setting. Selected participants will have experienced SUD and acknowledge underlying trauma issues; however, participation would be completely voluntary. Sessions will be 2 times per week and each session will be for a 2-hour period. Participants will fill out a pre and post questionnaire to be able to assess and measure the effectiveness of the mindful movement workshop intervention. Participants will have the choice to be active participants or observers for each of the sessions. Participants will be provided with information at the beginning of the workshop, releases will be signed, and questions answered. At the beginning of each mindful movement session, participants will discuss, and review agreed upon

group norms in order to keep safety among the group. Different movement activities will be utilized with each session providing for 30 minutes of processing at the end of each session. The workshop will be focused on movement-oriented activities based on the following known process of: 1) exploring different ways of moving, 2) mirroring, 3) witnessing, 4) assimilating, and 5) processing.

Results

Expected results are that group member participants can explore and experience healing of trauma through mindful movement in groups. Participants will have the opportunity to establish positive connections, improve awareness, gain insight regarding self-regulation techniques, improve the sense of self and self-esteem, and avoid recidivism. To prove these results, I propose a future research study or multiple case study evaluation of outcomes for the workshop. In addition, attendees will learn to transform their own intuitive senses into the active therapeutic skills so essential to recovery. These experiential body/mind activities from the workshop, will highlight how the facilitator can utilize their instinctive skills to attend mindfully and empathetically to the therapeutic process, responding genuinely, and translating non-verbal cues and experiences into cognitive insights.

Discussion/conclusion

The development of a mindful movement workshop as a healing approach to trauma, was based on the concept of interconnectedness and intimate interrelationship between mind and body. Neurobiological principals and processes were taken into consideration to explain how somatic experiencing and awareness of body-mind connection through movement can promote healing. Most of the referred authors and studies show how trauma disruption causes

fragmentation in brain connection and developing coherent meanings of the self, which in turn predict an array of behavioral, physical and mental health issues. Neurobiology and brain processes are therefore necessary to include in healing conversation, especially when trauma is a factor. A distorted belief or sense of self can be reached and changed through mindful movement. Inner focus, being in the present moment, able to experience sensations including the blood flowing through the veins, hearing the beat in the ear drum, the twitching and contracting of the muscles, all contribute to the development of regulatory and integrative neural circuits and help integrate the traumatized brain. In a group setting, members will be able to share their experiences with other group members by encouraging awareness of the mirror neuron processes that create empathy and a sense of mutual aid. Initial changes in the body as they are in the brain are usually temporary. Discipline and a perseverant practice of engaging the brain through mindful moving, is expected to have a positive effect on the improvement of brain connections. Therefore, the workshop is presented as an introduction to the infinite possibilities of healing the body and the mind among traumatized individuals.

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