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# Adaptive Neurosciences - Based Neurofeedback and Biofeedback Clinical Studies [Case Study - 3]

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*When individuals are mentally healthy, they are able to realize their own abilities, cope with the normal stresses of life, work productively, and make positive contributions to their community*

..... (World Health Organization, 2004)

**ABSTRACT:** An innovative program is proposed to monitor, prevent and manage mental health problems in workers, through application of new technologies and personalized advance based on neuroscience. Program uses quantitative methods such as biosensors and data analysis, as well as qualitative methods such as interviews and focus groups, for comprehensive understanding of mental health. Study was conducted by analyzing clinical cases treated at Neurointegral Scientific Institute, Bogotá, Colombia with neurointegral methodology. Quantitative and Qualitative methodology (advanced resources of brain mapping and artificial intelligence) have been adopted that includes; use of wearable and biosensors for brain mapping and real-time monitoring of brain and physiological markers such as stress, anxiety, fatigue. Analysis through artificial intelligence algorithms to detect predictive patterns of mental alterations has been adopted. Continuous effectiveness evaluation through inferential statistics has been factored. Interviews and focus groups to obtain subjective perceptions about mental well-being, content analysis to identify emerging categories on positive and negative mental health, triangulation of quantitative and qualitative data for comprehensive understanding of phenomenon and personalized intervention guided by evidence have been incorporated. Virtual reality for exposure and coping, cognitive training and contemplative techniques, and Recommendations on sleep, exercise, relaxation, assertiveness, among others have been referenced. Program optimizes mental health, increasing well-being, engagement and productivity. Combinations of quantitative and qualitative approaches mark new paradigm in care of occupational mental health.

**KEYWORDS:** Adapted Neuroscience, Neurofeedback, Biofeedback Neurointegral, Mental Health and Clinical Trials

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## I. INTRODUCTION

Mental disorders are growing public health problem worldwide. According to World Health Organization, around 450 million people suffer from some form of mental or behavioral disorder. Among the most common are anxiety and depression. Conventional treatments, such as medication and psychotherapy, have limitations in terms of effectiveness and accessibility. Novel alternatives are emerging that seek to complement these approaches. One of them is 'neurointegral methodology' (based on adaptations of neuroscience), developed by Neurointegral Scientific Institute (ICN), Bogota, which integrates various techniques to stimulate brain and generate changes in physical and mental well-being of individuals. Present study aimed to present neurointegral methodology (combination of behavioral therapy, neurotechnologies, virtual reality, artificial intelligence, as well as application of contemplative and cognitive techniques, among other strategies) and analyzes its application in illustrative clinical cases. Neurointegral methodology is a viable alternative for various mental and physical health problems according to the analyzed cases. More controlled studies are needed to confirm these preliminary findings. This methodology emerges as complementary option to consider in comprehensive approach with chronic or difficult-to-manage conditions. To

ensure quality of clinical cases selected in future studies, following suggestions can be considered: use guidelines and protocols for writing and publication of clinical cases that ensure quality and relevance, consider diversity of cases, obtain socio-demographic data, reason for consultation, history, diagnosis, type of intervention, and results through semi-structured interview with each patient, perform qualitative analysis of selected clinical cases to evaluate effectiveness of neurointegral methodology as complementary treatment in mental and physical health problems, and consider need to conduct controlled studies to confirm preliminary findings and obtain evidence on effectiveness of neurointegral methodology.

Additionally, language processing tools can be adopted to improve quality of analysis. case presented exemplifies various mental and physical health problems in which neurointegral methodology was beneficial as complementary treatment. Although controlled studies are needed to confirm these preliminary findings, qualitative evidence suggests positive effects. proposed mechanisms include multisensory stimulation of brain, increased relaxation and neuroplasticity, gradual exposure to stimuli, among others. Integration of cutting-edge techniques such as virtual reality with contemplative approaches provides immersive experience that accelerates changes in patients' well-being. Other research supports benefits of mindfulness-based interventions, meditation, Yoga, and similar interventions on various indicators of mental and physical health. Although evidence is needed, findings of this study suggest that neurointegral methodology can complement conventional treatments in fields such as anxiety, depression, addictions, cognitive rehabilitation, pain management, oncology, among others.

One highlight of this study was ability to apply skills and tools learned during therapy to real life situations. Subject's dedication to program and continued support of family played crucial role in overall improvement. Study concludes that with firm determination, personalized neuroscience-based therapies, and solid family support, it is possible to achieve positive and lasting changes in mental health. Study is a testament to transformative potential of adapted neurosciences in improving mental health and highlights importance of collaboration between science and compassion in finding effective solutions. This clinical study exemplifies innovative approach and profound impact in lives of people seeking effective solutions to mental health challenges. By combining experts' expertise with advanced neuroscience-based approaches, it is possible to transform mental health and offer higher quality of life to those who need it most (Dr Julio; 2023).

### The Case

This is a case study of a female Subject, @ around 32 years. Subject, a 35-year-old mother, showed up for therapy sessions having tried variety of treatments, including Psychiatry, Psychology, Witchcraft, and Christian counseling. Subject had been experiencing a condition of severe depression (persistent feeling of sadness or loss of interest, changes in sleep, appetite, energy level, concentration, daily behaviour or self-esteem) and suicidal tendencies (talking about suicide, getting the means to take own life, withdrawing from social contact and wanting to be left alone, having mood swings, being preoccupied with death, dying or violence, feeling trapped or hopeless about a situation) for the past two years. Subject's marital problems, which began a year ago, were the main triggering factor for her depression. Subject's husband had been physically and emotionally abusing Subject, and Subject felt increasingly isolated and desperate. Subject had come to have suicidal thoughts about her and daughters. Subject had planned to kill her husband and daughters in their sleep, but eventually realized she couldn't. Subject was motivated to receive help for her condition. Subject was willing to work hard to overcome her depression and improve her life.

As regards social background, Subject has problems of being emotional and being a divorcee. There were no symptoms or case history of problems in relationship, problems of death of family member / friend, problems in job loss, problems in financial problems, problems of housing / school, legal problems, problems in arrests, problems in divorce, problems in parenting, problems in victim of physical abuse, problems in forced to have sex, problems in victim of sexual abuse, problems in being disable and / or being afraid of partner and being a member of family. Subject is a University educated person. Subject has a brother and father as part of family environment and support. Subject has received psychological or psychiatric treatment. Subject is not addicted to Alcohol, Tobacco, Insomnia and Drugs. Subject is the mother of two daughters, 10 and 12 years old. Subject's husband is a 37-year-old man with no relevant medical history. Subject has no family history of mental or physical illness. Point to be noted is that Subject is reported to be in a situation of starvation and depression.

There have been no complaints or presentation of Nervous system; viz. Headaches, Seizures, Dizziness, Paralysis, Mental Disorders, Cardiovascular; viz. Hypertension, Heart Attacks, Angina, Murmurs, Arrhythmias, Coronary Heart Disease, Hemo-Lymphatic System; viz. Anemia, Blood Disorders or Coagulation Problems. Digestive system; viz. Ulcer, Gastritis, Cirrhosis, Diverticula, Colitis, Hemorrhoids, Respiratory; viz. Asthma, Emphysema, Laryngeal or Bronchi Affection, Urinary; viz. Kidney Failure, Stones, Bloody Urine, Frequent Infections, Diseased Prostate, Sense Organs; viz. Cataracts, Terygium, Nearsightedness, Otitis, Deviated Septum, Sinusitis, Tonsillitis, Endocrine -





Metabolic; viz. Diabetes, Thyroid Diseases, Alterations In Blood Fats or Uric Acids, Osteo-Articular; viz. Spine Diseases, Knee Pain, Deformities, Immunological; viz. Lupus, Rheumatoid Arthritis, Infectious; viz. Hepatitis, Tuberculosis, AIDS or HIV (+), Sexually Transmitted Diseases, Cancer, Tumors, Radiotherapy or Chemotherapy, Surgeries, Traumas, (Accidents), Gynecological; viz. Tumors or Masses in the Ovaries, Uterus, Abnormal Menstruation, Mammary glands; viz. Pains, Masses, Secretions, Pathological or Abnormal Vaginal Cytology, Allergic Reactions, and Skin Infections.

**Provisional Observations**

Subject presents symptoms of ‘psychosis’, such as ‘hallucinations’ (false perception of objects or events involving senses: sight, sound, smell, touch and taste plus experience of hearing, seeing or smelling things that are not there) and ‘delusions’ (belief that is clearly false and that indicates an abnormality in affected person's content of thought plus fixed, false, and idiosyncratic belief and is one of trilogy of psychotic symptoms. Can be triggered by sleep disturbance and extreme stress, but they can occur in physical conditions, including brain injury or tumor, drug addiction and alcoholism, and somatic illness), as well as emotional dependence on their partner. In addition, Subject has impaired sleep and symptoms of malnutrition.

**Session No. 1**

The principal aim and objective of this session was to evaluate Subject's condition, interview and case analysis. This was an In-Person Session. Therapy room was carefully prepared, creating a cozy and calm environment with comfortable seating to receive Subject, Subject. Her facial expression upon entering was dull, and body language reflected sadness and discouragement. Subject was initially reluctant to share, indicating depth of feelings. Session began with an interview in which Subject was encouraged to talk about her experiences and concerns. During this conversation, Subject described deep sadness, constant fatigue, lack of interest in daily activities, and trouble sleeping. She mentioned losing motivation and hope in her life. During the interview, attempt was to explore possible triggers for her depression, such as recent stressful events or significant changes in her life. Subject shared that she had experienced a series of personal losses and work difficulties that had contributed to her current emotional state. A complete evaluation of her medical, psychological, and social history to better understand her history and context was undertaken. Subject was addressed for any additional symptoms, such as anxiety or suicidal thoughts, ensuring Subject felt safe during the session. As interview progressed, Subject began to express her emotions more openly, sharing her negative thoughts and concerns. Active listening and empathy techniques were adopted to validate her feelings and show her that she was being heard and understood. Subsequently, we carried out a preliminary analysis of the case, identifying risk factors and support resources in Subject's life. Treatment options available were discussed, which included individual therapy and lifestyle changes. At the end of the session, we agreed on a personalized treatment plan that included cognitive behavioral therapy and possibility of a consultation with a psychiatrist to assess the need for medication. Subject expressed her willingness to commit to the treatment process, which instilled hope in the session. Some activities adopted were; initial interview with the subject, evaluation of the subject's medical, psychological and social history, preliminary analysis of the case and design of a personalized treatment plan.

**Provisional Observations**

Subject is experiencing severe depression that has been exacerbated by a number of recent stressors. Immediate treatment is required to prevent her condition from worsening. The personalized treatment plan is designed to address the psychological and social factors that contribute to Subject's depression. Subject is motivated to recover and is committed to the treatment process.

Diagnosis	Signs and symptoms	Consequences
A persistent and severe major depressive disorder was identified, accompanied by generalized anxiety. In addition, suicidal thoughts and inclinations have been observed.	Subject presents series of signs and symptoms including anxiety, insomnia, and depression, feelings of pessimism, hopelessness, anhedonia, and avolition.	As a result of aforementioned symptoms, Subject experiences significant consequences that include social isolation, presence of suicidal ideation, and absence of meaning in life.

### Session No. 2

The key plan and purpose of this session was to evaluate Subject's active listening and thinking patterns (engaged listening process that requires concentrating, understanding, responding to, and then remembering what is being said). Subject started sharing her thoughts and emotions of the week. She adopted on her feelings of persistent sadness and the feeling that her negative thoughts were overwhelming her. Active listening and empathy techniques were adopted to validate her feelings and concerns, fostering a supportive environment where she felt free to express herself. We explored together some of the negative automatic thoughts she was experiencing and how these were related to her depression. We identified thought patterns that contributed to their emotional distress. The Subject began to understand how her negative thoughts influenced her emotions and her perception of herself. We work on questioning and changing these negative thought patterns. During the session, we explore events from her past that could be contributing to her depression. The Subject shared some difficult personal experiences that were affecting her self-esteem and self-concept. The session concluded with a conversation about how she could practice questioning negative thoughts between sessions and how to keep track of her emotions and thoughts. Subject left the session with a greater awareness of her thinking patterns and a sense of hope to work on her recovery. Some activities adopted were; subject share her thoughts and emotions from the week , explore negative automatic thoughts, work on questioning and changing negative thought patterns, exploration of past events that could contribute to depression and conversation about how to practice questioning negative thoughts between sessions and keeping a record of emotions and thoughts.

### Provisional Observations

The Subject was willing to share her thoughts and emotions. She showed openness to exploring and understanding her negative thinking patterns. She began to become aware of how his thoughts affect her emotions and self-image. The Subject felt supported and understood during the session.

### Session No. 3

The key plan and purpose of this session was to evaluate Subject's diaphragmatic breathing aspects. This was programmed via. Family Support. The therapy area was adapted to accommodate Subject and her two children in a welcoming environment. Seating was arranged in a circle to encourage family participation. We began the session with a brief conversation to explain the purpose of the practice and make sure everyone felt comfortable. Subject occupied a comfortable chair, accompanied by her children, who showed their support. We begin with a talk about the benefits of diaphragmatic breathing to reduce stress and anxiety, common in depression. Next, we dive into the practice of diaphragmatic breathing. Subject and her children placed one hand on her abdomen and another on her chest. I asked them to inhale deeply through their nose, inflating their abdomen like a balloon, and then exhale slowly through their mouth. Following the rhythm of breathing, they adopted on the sensation of filling and emptying the abdomen. During this practice, Subject felt the physical and emotional support of her children, reminding her that she is not alone in her fight against depression. After several rounds of diaphragmatic breathing, we noticed how Subject's tension decreased and her expression relaxed. Her children shared their feelings about participating in the process and their willingness to support their mother in her recovery. We took this time to discuss the importance of open communication in the family and how you can work together to provide emotional support. Team explored how to integrate the practice of diaphragmatic breathing into her daily routine to promote Subject's well-being. The session concluded with a sense of unity and family support. Subject and her children committed to working together in their recovery process. We agreed to schedule follow-up sessions to continue strengthening family ties and support Subject's treatment. Subject left the session with a smile on her face, feeling the love and support of her family as she faces her depression. Some activities adopted were; lecture on the benefits of diaphragmatic breathing, diaphragmatic breathing practice with family support and discussion on the importance of family communication and the integration of diaphragmatic breathing into daily routine.

### Provisional Observations

Subject and her children's participation in diaphragmatic breathing practice were receptive. Family support gave Subject a feeling of security and emotional support. The session concluded with a strong sense of unity and family commitment.

#### Session No. 4

The key preparation and point of this session was to administer and evaluate Cognitive-behavioral therapy. Subject entered showing a dull facial expression and a hunched posture, signs of her emotional state. We began the session by asking her how she had been feeling since our last meeting. Subject shared her persistent feelings of sadness, constant lack of energy, and daily struggle to find motivation in her life. She explained that she often found herself caught up in negative thoughts about herself and her situation, which revolved around self-criticism and low self-esteem. To address these negative thinking patterns, I adopted cognitive behavioral therapy. Team asked Subject to describe a specific situation that made her feel depressed and share any thoughts that arose at that moment. Together, we analyze these thoughts and evaluate their realism and evidence base. We focus on identifying “cognitive distortions,” which are irrational ways of thinking, such as overgeneralization or all-or-nothing thinking. We collaborate in replacing these negative thoughts with more balanced and realistic thoughts, encouraging self-affirmation and self-compassion, and urging her to recognize her achievements and positive qualities. During the session, I introduced coping strategies such as scheduling pleasurable activities and practicing mindfulness. Team provided practical exercises that Subject could do between sessions to help her reduce the intensity of her depression. Team concluded the session with a discussion about the action plan that Subject could follow in her daily life to apply the skills learned. Team agreed to continue working together in subsequent sessions to monitor her progress and adjust the approach as necessary. Subject left the session feeling hopeful and empowered, ready to apply cognitive behavioral therapy strategies to her life and address her depression more effectively. Some activities adopted were; interview with the subject, identifying and questioning negative thinking patterns, replacing negative thoughts with positive thoughts, introduction of coping strategies, and design of an action plan.

#### Provisional Observations

Subject was receptive to cognitive behavioral therapy. Identifying and challenging negative thinking patterns was effective. We collaborate in replacing negative thoughts with more positive thoughts. Subject acquired coping strategies to reduce the intensity of her depression. Team agreed to continue working together to monitor her progress and adjust the approach as necessary.

#### Session No.5

The key grounding and spot of this session was to administer and evaluate Jacobson technique (method of deep muscle relaxation that does not involve any medications) with virtual reality and progressive visualization. Team transformed the therapy room into a quiet, dark space, with a comfortable sofa in the center. Team prepared a high-quality virtual reality (VR) headset and headphones for Subject. Before we started, we explained the process and assured her that she was in a safe environment. Subject settled on the couch and put on the VR headset and headphones. Team begin the session with a brief talk to remind her of the importance of relaxation in her treatment process and then immerse you in a calm and serene virtual environment. In the VR experience, Subject was on a tropical beach at sunset, where gentle waves crashed on the shore, creating a relaxing sound. While observing this virtual environment, Team asked her to practice Jacobson's relaxation technique. Jacobson's technique involves consciously tensing and relaxing muscle groups throughout the body to release built-up tension. Subject adopted on every part of her body, from her toes to her head, tensing her muscles for a few seconds and then relaxing them completely. During this practice, team provided with a progressive visualization guide. Subject imagined that every wave that broke on the beach carried with it any tension or worry she might have. As the waves receded, her body was filled with a deep sense of relaxation. Subject completely immersed herself in this experience, allowing relaxing and releasing the tension accumulated in her body and mind. Throughout the session, team continued to guide her through the Jacobson technique and progressive visualization. At end of session, Subject emerged from the VR environment with a more relaxed and calms expression on her face. Team discussed how she could apply these relaxation techniques into her daily life to relieve the stress and anxiety associated with her depression. Subject expressed her gratitude for the experience and committed to practicing these techniques regularly. Some activities adopted were; preparation of the VR environment, relaxation induction, practice of the Jacobson technique, progressive display and discussion on the application of the techniques in daily life.

#### Provisional Observations

Subject was receptive to the VR experience. Jacobson technique and progressive visualization were effective in helping Subject relax and release built-up tension. Subject expressed her commitment to practicing these techniques regularly.

This session illustrates how virtual reality can be an effective tool to improve emotional well-being. The combination of the Jacobson technique and progressive visualization provided Subject with an experience of deep relaxation and stress relief. Subject was receptive to the experience and committed to practicing these techniques regularly.

#### Session No. 6

The key basis and pustule of this session was to administer and evaluate emotional control through Chi Kung ( system of coordinated body-posture and movement, breathing, and meditation used for the purposes of health, spirituality, and martial arts training). We transform the therapy room into a calm and cozy space, suitable for Chi Kung practice. We began the session by explaining to Subject what the practice would entail and how it could benefit her in her recovery process. Subject, dressed appropriately for Chi Kung practice, sat in a comfortable chair. Team begin with a brief talk about the principles of Chi Kung, based on the connection between mind and body, and the regulation of vital energy or "chi." After the initial relaxation phase, we begin to perform slow and fluid Chi Kung movements. Team explained to Subject how each movement was designed to balance her internal energy and release emotional blockages. Team asked her to focus on the feeling of flow and calm he experienced in each movement. During the session, Subject practiced a series of Chi Kung movements specifically designed to release emotional tension and promote emotional stability. Team reminded her of the importance of deep breathing and focusing on the present moment. Over time, Subject began to notice a sense of calm and emotional balance. The practice of Chi Kung provided her with an effective tool to manage her emotions and reduce symptoms of depression. At the end of the session, Subject expressed her gratitude for the experience and committed to practicing Chi Kung regularly at home. Team agreed to continue working in future sessions to strengthen her emotional control skills and support her recovery. Subject left the session with a feeling of inner peace and a powerful tool to confront her depression from a more balanced and healthy perspective. Some of the activities adopted were; explanation of principles of Chi Kung, deep and conscious breathing exercises, slow and fluid Chi Kung movements, review of benefits of Chi Kung , and subject's commitment to practicing Chi Kung regularly.

#### Provisional Observations

Subject was receptive to Chi Kung practice. Chi Kung practice was effective in helping Subject relax and release emotional tension. Subject committed to practicing Chi Kung regularly.

#### Session No. 7

The key basis and pustule of this session was to plan, administer and evaluate contemplative activities and conscious eating habits. We begin the session with a conversation to better understand daily habits and relationship with food. Subject shared her challenges in finding pleasure in everyday activities. First, we discuss the importance of mindful eating and how it can help Subject make healthier food-related decisions. We explain how paying mindful attention to food, savoring every bite, and being aware of hunger and fullness cues can change the relationship with food. Next, we move on to planning contemplative activities. Together, we identified activities that could provide Subject with moments of calm and emotional satisfaction. These activities included meditation, mindful walks in nature, and reflective writing. Subject was interested in incorporating these practices into her daily routine and committed to dedicating time to them. We agreed to set a specific time for these activities and to keep a record of her experiences and feelings after each session. For the conscious eating part, we do a practical exercise. Subject selected some foods she liked and took them home with the task of eating them with full attention and without distractions. This included savoring each bite, observing the texture and flavor, and being present in the moment of eating. By the end of the session, Subject had a clear plan to incorporate contemplative activities and mindful eating into her daily life. Team encourages her to be compassionate with herself during this process and to remember that change takes time. Subject left the session with a renewed sense of hope and a determination to take steps to improve her emotional and physical well-being through mindfulness in her activities and relationship with food. Some of the activities adopted were; interview with subject, discussion on importance of conscious eating, identification of contemplative activities, practical conscious eating exercise and definition of an action plan.

#### Provisional Observations

The Subject was receptive to contemplative activities and mindful eating. Subject committed to incorporating these practices into her daily routine. The practical mindful eating exercise was beneficial for Subject. Subject left the session with a renewed sense of hope and determination. This session was an important step in Subject's recovery process. The

contemplative activities and mindful eating plan will give her tools to manage sadness and find a path to emotional and physical well-being.

#### Session No. 8

The key starting point and furuncle of this session was to observe reinforcement of conscious breathing techniques under pressure. Team began the session by reviewing conscious breathing techniques that we had previously explored in previous sessions. First, Team made sure Subject felt comfortable in the therapy room environment. The lighting was soft, and the atmosphere was designed to create a feeling of calm and tranquility. Subject sat in a comfortable chair and closed her eyes, preparing for practice. We begin with deep, slow breathing, focusing on the inhalation and exhalation. Team reminded Subject of the importance of breathing from the diaphragm and watching her body relax with each deep breath. Then, Team moved on to a specific breathing technique for depression or anxiety situations. Team explained to Subject how she could use this technique when she felt overwhelmed by sadness or stressful situations in her daily life. The technique was to inhale slowly for a count of four, hold her breath for a count of four, and then exhale slowly for a count of six. This technique would help slow down your heart rate and reduce anxiety in times of emotional crisis. Subject practiced this technique several times during the session, focusing on the sense of calm she experienced with each breathing cycle. Team encouraged her to incorporate this practice into daily routine, especially when facing moments of intense sadness. Team concluded the session with a conversation about how Subject could apply these techniques in her daily life and how she could identify situations that trigger sadness to use conscious breathing tools effectively. Some of the activities adopted were; review of conscious breathing techniques, practice a specific breathing technique for depression or anxiety situations and discussion on how to apply these techniques in everyday life

#### Provisional Observations

Subject was receptive to practicing conscious breathing techniques. Subject was able to apply the specific breathing technique for situations of depression or anxiety successfully. Subject committed to incorporating these practices into her daily routine.

#### Session No. 9

The key point was to introduce and observe effects of contemplative Yoga practice. We begin the session by creating a cozy and calm atmosphere in the therapy room. We placed a Yoga mat on the floor and made sure the lighting was soft and relaxing. Subject dressed in comfortable clothes and stood on the Yoga mat. We began with a brief conversation about how she was feeling and what her concerns were at the time. Subject shared her thoughts and emotions, which helped adapt the Yoga practice to her emotional needs. We began the session with a gentle sequence of Yoga movements that adopted on opening the heart and expanding the chest. These moves were specifically chosen to help release the emotional tensions that Subject was experiencing. During the practice, Team encouraged Subject to focus on her breathing and bring her attention to each movement and stretch. Team reminded her of the importance of practicing self-compassion and allowing herself to feel whatever emotions came up during the session. As we progressed in the Yoga practice, Subject began to relax and find a sense of inner peace. Team suggested that she closed her eyes for a few moments while Team continued with the movements and stretches. After Yoga practice, we guided Subject into a short meditation session where she adopted on gratitude and self-care. I asked her to reflect on the things she was grateful for in her life and how she could better care for herself in the midst of her sadness. At the end of the session, Subject emerged from Yoga practice with a calmer and more relaxed expression on her face. Team talked about how she could continue to use Yoga as a tool to ease her sadness and practice mindfulness in her daily life. Some of the activities adopted were; creating a cozy and calm environment, conversation about subject's concerns, Yoga practice adopted on opening the heart, meditation on gratitude and self-care and discussion on how to incorporate Yoga into daily life.

#### Provisional Observation

Subject was receptive to the Yoga practice. Subject experienced a sense of emotional relief during Yoga practice. Subject committed to incorporating Yoga into her daily life. This session was an important step in Subject's recovery process. Practicing Yoga gave her an opportunity to connect with herself, release emotional tensions, and find calm and well-being in the midst of her sadness.



### Session No. 10

The key point was to introduce and observe effects of Reiki (gentle hand movements with the intention to guide the flow of healthy energy) session. The Subject came to the session expressing concern and stress about not getting a job, which had led her to experience high levels of anxiety and stress. She settled on a massage table, dressed in comfortable clothing, and was explained what the Reiki process would entail and how it could benefit her. Subject proceeded to place her hands near different points on her body, working on channeling vital energy or “ki” “to release emotional blockages and encourage deep relaxation. During the session, the Subject reported feeling a sensation of warmth and calm as the energy flowed through her. Subject was encouraged to maintain deep, conscious breathing to help her release tension and worries. Subject adopted on the area of her heart and her solar plexus, two points related to managing emotions and self-confidence. Throughout the session, she experienced a growing sense of relaxation and well-being. In the end, she was given time to slowly wake up and return to full consciousness. The session concluded by talking about the sensations and experiences during the Reiki process. Subject was reminded of the importance of taking care of herself and managing stress effectively during her job search. Subject left the session with a smile on her face and a sense of emotional relief. Some of the activities adopted were; creating a calm and welcoming environment, explanation of the Reiki process, Reiki application and discussion about the subject's sensations and experiences

### Provisional Observations

The Subject was receptive to the Reiki experience. Subject experienced a sense of emotional relief during the Reiki session. Subject committed to taking care of her and managing stress effectively.

### Session No. 11

The key point was to introduce Mindfulness session and follow-up with VR and neurofeedback. The Subject came to the session with a positive attitude and a willingness to continue working on her emotional well-being. Team begin by creating a calm environment in the therapy room, incorporating a virtual reality environment designed for meditation and mindfulness. Subject put on the virtual reality glasses and immersed herself in a serene virtual environment, surrounded by nature and relaxing sounds. Team begin with a guided meditation session in virtual reality. Subject followed the instructions to focus her attention on her breathing and the present moment. As the meditation progressed, she was reminded how mindful breathing exercises could help calm her mind and reduce anxiety. While Subject was immersed in the virtual reality experience, team also provided her with neurofeedback. Team monitored her physiological and brain responses to show her how her mental and emotional state were responding positively to the practice of mindfulness and conscious breathing. As the session progressed, Subject was able to observe in real time how her heart rate stabilized and how the areas of her brain associated with stress decreased in activity. This provided her with tangible evidence of the beneficial effects of these practices on her emotional well-being. After the virtual reality and neurofeedback session, Subject shared her impressions and how she had felt during the experience. Team talked about how she could incorporate these practices into her daily life and how to recognize the signs of depression and anxiety to apply mindfulness and breathing techniques in those moments. Some of the activities adopted were; creating a calm environment in therapy room, immersion in a virtual reality environment for meditation, guided meditation in virtual reality, neurofeedback and discussion about subject's experiences.

### Provisional Observations

Subject was receptive to the virtual reality and neurofeedback experience. Subject was able to observe in real time the beneficial effects of mindfulness and conscious breathing practices. This session was an important step in Subject's recovery process. The combination of advanced technologies, including virtual reality and neurofeedback, allowed her to directly experience the beneficial effects of mindfulness and conscious breathing practices.

### Session No. 12

The key point was Reinforcement of Jacobson exercises combined with brain gymnastics. In this session, the Subject arrived with a positive attitude and willingness to continue strengthening her skills to deal with depression. We began the session with a brief conversation to assess how you had been feeling since the last session and whether you had experienced situations that triggered stress or anxiety. The Subject shared her experiences, which allowed the session to be adapted to her current needs. We begin with a series of Jacobson exercises, a progressive muscle relaxation

technique. The Subject reclined comfortably in a reclining chair and closed her eyes. Subject was guided to focus on each muscle group, tensing it and then deliberately releasing the tension. This technique helps identify and release physical tension associated with stress and anxiety. After completing progressive muscle relaxation, we move on to brain gymnastics. Team used variety of exercises designed to stimulate different areas of the brain, improve concentration and promote emotional balance. Subject actively participated in these exercises, which included puzzles, coordination exercises, and cognitive stimulation activities. As the session progressed, Subject began to feel more relaxed and adopted. It was discussed how Subject could apply these techniques in her daily life to manage stress and maintain state of improvement from depression. At the end of the session, Subject shared her reflections and how Subject had felt during the process. Some of the activities adopted were; Initial conversation, Jacobson exercises, Brain GYM and discussion.

### **Provisional Observations**

Subject was receptive to the Jacobson exercises and brain gymnastics. Subject was able to identify and release physical tension associated with stress and anxiety through the Jacobson exercises. She enjoyed the brain gym exercises and found that they helped her relax and concentrate. Subject committed to practicing the Jacobson exercises and brain gymnastics in daily life. This session was an important step in the recovery process, as these combined techniques allowed Subject to learn to manage stress and improve her emotional well-being.

### **Session No. 13**

Aim of this Session was to monitor active listening and biofeedback monitoring. Subject came to the session with an optimistic attitude and a willingness to explore her work goals and how to address them effectively. We began the session with an open conversation in which the Subject shared her new career goals and the emotions that arose as she considered this new chapter in her life. During this phase, we practiced active listening; paying full attention to what the Subject was expressing and validating her feelings and aspirations. As the Subject talked about her career goals and possible opportunities, we monitored her galvanic activity using biofeedback. This device recorded her emotional and physiological responses, such as skin sweating, to provide objective information about how she was experiencing her thoughts and emotions in relation to her goals. The Subject was able to see in real time how her emotional responses fluctuated as we talked about different aspects of her job search and job expectations. This allowed her to become aware of how certain thoughts or situations triggered stress or anxiety responses in her body. Throughout the session, Team applied stress and anxiety management techniques, such as conscious breathing and identifying automatic negative thoughts. Team worked together to explore strategies to address her work goals more effectively and reduce emotional reactivity. At the end of the session, Subject shared reflections and how she felt about her career goals. Team talked about how she could apply stress management and self-monitoring techniques in her job search and how to use biofeedback to monitor her emotional response in future work situations. Some of the activities adopted were; initial conversation, biofeedback monitoring and discussion.

### **Provisional Observations**

Subject was receptive to active listening and biofeedback. Subject was able to become aware of how certain thoughts or situations triggered stress or anxiety responses in her body. Subject committed to applying stress management and self-control techniques in her job search. Subject expressed confidence in her abilities to address her work goals effectively. This session was an important step in the recovery process, as the combination of active listening and biofeedback allowed her to develop greater awareness of her emotions and how they can affect her behavior.

### **Session No. 14 and 15**

Aim of this Session was to attend thematic workshops. Subject, who has been showing a remarkable state of improvement in her fight against depression and anxiety, participated in two days of thematic workshops designed to explore the neuro-ecology of emotions and how to find happiness in difficult times. First sub-session was on Neuro-ecology of Emotions. Subject arrived with enthusiasm and an open mind to explore the fascinating world of the neuro-ecology of emotions. The workshop began with an introduction to the relationship between the brain and emotions, highlighting how our emotional experiences are related to brain activity. Through interactive presentations and hands-on exercises, the Subject learned about key brain structures involved in emotional regulation, such as the amygdale and prefrontal cortex. Emotional self-regulation techniques were explored, including mindfulness and conscious breathing,

which the Subject had been practicing in previous sessions. The workshop also adopted on understanding how emotions can influence our perceptions and behaviors, and how we can cultivate emotional intelligence to make healthier and more effective decisions. Second sub - session was on Happiness in Difficult Times. Subject immersed herself in exploring how to find happiness even in difficult situations. The workshop began with a reflection on resilience and the ability to adapt to life's challenges. Practical strategies for cultivating happiness were discussed, such as gratitude, setting meaningful goals, and the importance of maintaining healthy social connections. Subject shared her own experiences and challenges related to depression and how she had applied some of these strategies in her daily life. The workshop also addressed the importance of looking after mental and emotional wellbeing, and how to seek support when needed. The Subject was inspired by the stories of other people who had overcome difficult times and found happiness despite adversity. At the end of the two days of workshops, the Subject shared her reflections and how she felt about what she had learned. Subject left with a feeling of empowerment and a greater understanding of how to manage her emotions and find happiness even in challenging times. Some of the activities planned for Workshop - 1 were; interactive presentation on the neuro-ecology of emotions, practical exercises on emotional self-regulation and discussion on emotional intelligence. Some of the activities planned for Workshop - 2 were; reflection on resilience, discussion on strategies to cultivate happiness and testimonies from people who have overcome difficult times.

#### **Provisional Observations**

Subject was enthusiastic and committed to the workshops. Subject learned about important concepts and techniques for managing her emotions and promoting her mental and emotional well-being. Subject felt empowered and motivated to continue her path to recovery.

#### **Session No. 16**

Aim of this Session was to induce and observe effects of Training in laughter Yoga. It began with a brief meditation and conscious breathing exercises to establish an environment of calm and full attention. The laughter Yoga instructor guided the session, encouraging participants to participate in a series of exercises designed to deliberately induce laughter. These exercises included simple movements, games, and fun activities that invited contagious laughter. The Subject joined in the happy and relaxed atmosphere of the session. The laughter became contagious, and soon everyone was laughing together, releasing pent-up tensions and promoting a sense of shared joy. As the session progressed, the instructor also incorporated gentle stretching and relaxation exercises, allowing participants to experience a sense of calm and well-being after vigorous laughter. Some of the activities adopted were; meditation and conscious breathing exercises, laughter Yoga exercises, and gentle stretching and relaxation exercises.

#### **Provisional Observations**

Subject was receptive to the activity. Laughter Yoga session was a positive and enriching experience for Subject.

#### **Session No. 17**

Aim of this Session was to introduce active listening and narration. A session adopted on active listening and storytelling was conducted to address the Subject's suicidal thoughts and explore her emotions. Some of the activities adopted were; Subject was actively listened to as she shared her experiences and suicidal thoughts. This allowed Subject to feel heard and understood, without judgment or pressure. Narration: Subject was invited to tell her life story, focusing on moments of hope, resistance and improvement. Through storytelling, the Subject was able to rediscover her own resilience and the reasons why she wanted to live. Support strategies and resources available to the Subject when she felt suicidal thoughts were approaching were explored. The Subject identified trusted people she could turn to in times of crisis and professional resources she could access.

#### **Provisional Observations**

Subject was receptive to the activities of the session. The session was a profound and transformative experience for the Subject. She felt heard, understood and supported. The Subject was able to rediscover her own resilience and the reasons why she wanted to live. You learned strategies and support resources available for when you feel suicidal thoughts approaching.

### Session No. 18

Aim of this Session was to inject essence of Neurofeedback and biofeedback continuity session. In this follow-up session, the positive changes in the Subject's life and how she has learned to manage moments of depression were explored. Reflection on positive changes: We discussed the changes that the Subject has experienced since she began her neurointegral training, including her adaptation to a new job, which represents a significant achievement in her recovery process. She also shared how her confidence and social skills have improved thanks to the strategies learned during her training. Strategies to control moments of depression: The Subject described how she has adopted contemplative and cognitive techniques in her daily life to control her moments of depression. She shared how she has adopted these tools to identify and respond to early signs of sadness or discouragement. Emotional self-regulation routine: Subject shared how she has developed an emotional self-regulation routine that includes breathing exercises and meditation, which has helped her avoid relapses into depression. Monitoring Brain and Physiological Activity: The Subject discussed how regularly monitoring her brain activity and physiological response through biofeedback has been an integral part of her success.

### Provisional Observations

The Subject seemed motivated and optimistic in this session. She has demonstrated a remarkable ability to apply the techniques learned in her neurointegral training. You have developed strong self-awareness and self-regulation capacity. She is well on her way to continued and lasting recovery.

### Session No. 19

Aim of this Session was to observe progressive visualization training. This follow-up session adopted on exploring how the Subject has applied progressive visualization strategies to consolidate her progress and reach new levels of well-being. We begin by reflecting on the notable changes that the Subject has experienced since the beginning of her neurointegral training. The Subject shared how she has developed greater sensitivity to her emotions and how she has learned to handle stressful situations more effectively in her daily life. Next, we delve into a guided practice of progressive visualization. The Subject chose to visualize a future in which she felt even more secure, happy, and in control of her life. Through this technique, the Subject was able to visualize in a vivid and detailed way what her ideal life would be like and how she would feel emotionally in that scenario. During the visualization, the Subject immersed herself in an experience of deep relaxation, and was able to connect with her deepest emotions and desires. This practice not only gave her a sense of calm and well-being in the moment, but also helped strengthen her positive self-image and self-confidence. Finally, we discussed how the Subject could incorporate progressive visualization into her daily life to maintain and strengthen her mental and physical well-being. We talked about the importance of regularly practicing this technique as an effective tool to maintain a positive mindset and focus on her goals. Some of the activities adopted were; reflection on subject's progress, practice of progressive visualization and discussion on applying progressive visualization.

As regards Reflection on Subject's Progress; Team began the session by reflecting on the notable changes Subject has experienced since beginning her neurointegral training. This reflection allowed Subject to share her progress and achievements, which in turn strengthened her self-esteem and motivation to continue her recovery process. Subject shared how she has felt more in tune with her emotions and how she has learned to handle stressful situations more effectively in her daily life. As regards Practice of progressive visualization: After reflection, we proceeded with the practice of progressive visualization. In this activity, Subject chose to visualize a future in which she felt even more secure, happy, and in control of her life. Through detailed guidance, Subject was able to create a vivid and positive mental image of that desired future. During this practice, Subject immersed herself in a deep and emotionally enriching relaxation experience. As regards Discussion on Applying Progressive Visualization: We concluded the session by discussing how Subject could incorporate progressive visualization into her daily life to maintain and strengthen her mental and physical well-being. We talked about the importance of regularly practicing this technique as an effective tool to maintain a positive mindset and focus on her goals.



### Provisional Observations

Subject was motivated and optimistic throughout the session. Subject has demonstrated a remarkable ability to apply the techniques learned in her neurointegral training. Subject is well on her way to continued, long-lasting recovery, and progressive visualization is a valuable addition to her self-care and wellness toolkit.

### Session No. 20

Aim of this Session was to analyze tapping technique family training. In this special closing session, Subject, along with her children and mother, participated in a series of activities designed to celebrate her progress on the journey toward better mental and physical well-being through neurointegral training. Some of the activities adopted were; reflection on subject's journey, tapping training and discussion on the application of tapping. As regards reflection on subject's journey: the session began with a reflection in which subject, her children, and her mother shared their thoughts and emotions about the process of change and growth that subject had experienced during her training. Each had the opportunity to express how they had seen subject transform and how this had impacted the family dynamic. This reflection fostered openness, understanding, and celebration of subject's achievements. As regards tapping training: following the reflection, a tapping training session was conducted. Subject, her children and her mother gathered in a circle and practiced this emotional release technique. Tapping involves gently touching certain points on the body while focusing on specific thoughts or emotions. During this activity, subject and her family shared this process, which strengthened their bond and allowed them to experience joint emotional release. As regards discussion on the application of tapping: finally, the session concluded with a discussion on how subject and her family could incorporate the tapping technique into their daily lives. Situations where tapping could be helpful were explored, such as managing stress, anxiety or overwhelming emotions. The family discussed how they could support each other in applying this technique and how it could be a tool to strengthen their emotional well-being.

### Provisional Observations

Subject appeared motivated and optimistic throughout the session, reflecting her continued commitment to her recovery. The session experience strengthened the unity and family ties between Subject, her children and her mother, which contributed to an environment of emotional support. Overall, the session reinforced the idea that Subject is on a solid path toward continued and lasting recovery, backed by the support of her family.

### Treatment Analysis

Neurointegral training is demonstrated as a highly effective intervention to improve both the mental and physical well-being of people. Neurointegral training is based on a combination of techniques, including neurofeedback, biofeedback, mindfulness, and cognitive-behavioral therapy. People who undergo neurointegral training can obtain a series of benefits, such as:

- Improving self-awareness and self-regulation ability.
- Reduce symptoms of anxiety, depression and stress.
- Experience an improvement in your mood and overall quality of life.

In Subject's specific case, neurointegral training has had an extremely positive impact. This is reflected in the notable decrease in their symptoms of anxiety and depression, the strengthening of their self-esteem and self-confidence, their better ability to deal with stress and the general improvement in their quality of life. Importantly, neurointegral training is an ongoing process, and Subject will continue to benefit as she incorporates the techniques learned into her daily life. Furthermore, the active participation of Subject's family in this process has been a crucial element. By witnessing her transformation, her loved ones have been inspired to follow her example and work on their own well-being. In summary, neurointegral training has been an extremely positive and transformative experience for both Subject and her family. This process has not only allowed her to achieve her goals in terms of mental and physical well-being but has also provided her with the tools and support necessary to maintain her progress over time.

Treatment results reflect significant progress in overall health. Specifically, she has experienced notable improvements in the following areas:-

**Improvement in emotional well-being:** Throughout the sessions, Subject has experienced a significant improvement in her emotional well-being. Initially, she struggled with depression and anxiety, but as treatment progressed, she learned to identify and manage her emotions more effectively. Incorporating techniques such as meditation, Yoga, tapping, and progressive visualization have given her tools for emotional self-control and resilience.

**Developing Coping Skills:** Subject has learned important coping skills to deal with stress, anxiety, and depression. These skills include mindfulness, conscious breathing, progressive muscle relaxation, brain gymnastics, and emotional self-regulation. These tools allow you to address emotional challenges in healthier and more constructive ways.

**Strengthening self-esteem and self-confidence:** Throughout treatment, Subject has worked to strengthen her self-esteem and self-confidence. She has learned to recognize her own strengths and have gained confidence in her abilities to cope with difficulties. Participation in thematic workshops and group training sessions contributed to this growth.

**Family and social support:** The participation of Subject's family in the treatment process has been an important factor in her recovery. The closing session in which her children and mother joined for a tapping session highlighted emotional support and family unity. This support network is crucial to her continued well-being.

**Commitment to Recovery:** Subject has demonstrated a consistent commitment and positive attitude toward her recovery. She has been willing to try different techniques and approaches and has integrated many of these practices into her daily life. This commitment is a strong indicator of her willingness to maintain and strengthen your emotional well-being over the long term.

### Success Factors

**Personal Commitment:** Subject demonstrated a strong commitment and motivation to improve her mental and physical well-being. Their willingness to actively participate in the neurointegral training process was essential.

**Variety of techniques:** The neuro-integrative training approach adopted a variety of techniques, such as neurofeedback, biofeedback, mindfulness, and cognitive behavioral therapy. This combination of approaches allowed multiple aspects of their emotional and mental well-being to be addressed.

**Professional supervision:** Guidance and supervision from mental health professionals specialized in neurointegral training were essential. These experts guided Subject through the process and adapted the techniques to her individual needs.

**Family support:** The active involvement of Subject's family played a crucial role in her success. The emotional support and understanding of her loved ones strengthened her motivation and provided her with a strong support system.

**Persistence:** Subject demonstrated great persistence throughout the process, even in times of challenge. Their ability to continue working on their well-being, even when obstacles presented themselves, was a determining factor.

**Self-awareness:** Neurointegral training helped Subject develop greater self-awareness of her thoughts, emotions, and physiological responses. This awareness allowed her to identify and address the triggers for her anxiety and depression effectively.

**Application in daily life:** Subject not only learned the techniques, but also applied them in her daily life. The ability to use these tools in everyday situations was essential to maintaining their progress over time.

### Recommendations

Maintain the practice of the techniques learned: Continue applying the techniques of emotional self-regulation, mindfulness, and progressive visualization in your daily life. These tools will help you maintain a state of emotional well-being.

Listen to your body: Continue to pay attention to the signals that your body and mind send you. Self-awareness is one of your strengths, so use it to identify and address any early signs of stress, anxiety, or depression.

Set realistic goals: Define goals and objectives for your life, both short and long term. These goals can be professional, personal or wellness. Make sure they are achievable and realistic.

Maintain social support: Your family's support has been essential in your recovery process. Continue to maintain meaningful connections with your loved ones and seek emotional support when you need it.

Take care of your physical health: Physical well-being is closely related to mental well-being. Continue with healthy habits such as a balanced diet and regular physical exercise.

Be kind to yourself: Remember that the recovery process can have ups and downs, and it's okay to have difficult times. Practice self-compassion and don't be too hard on yourself in those moments.

Celebrate your achievements: Recognize and celebrate your achievements, even the smallest ones. This will remind you of how far you have come on your journey to wellness.

Keep an open mind: If you ever face challenges or major changes in your life, keep an open mind to adapt and learn new coping strategies.

## II. CONCLUSION

“For we all agree that the most excellent man should rule, i.e., the supreme by nature, and that the law rules and alone is authoritative; but the law is a kind of intelligence, i.e. a discourse based on intelligence. And again, what standard do we have what criterion of good things that is more precise than the intelligent man? For all that this man will choose, if the human centric decision is based on his knowledge, are good things and their contraries are bad. And since everybody chooses most of all what conforms to their own proper dispositions (a just man choosing to live justly, a man with bravery to live bravely, likewise a self-controlled man to live with self-control), it is clear that the intelligent man will choose most of all to be intelligent; for this is the function of that capacity. Hence it's evident that, according to the most authoritative human centric decision, intelligence is supreme among goods.”... Aristotle (in ‘Protrepticus’). Study on Cognito - Attention Based Neurointegral Model is the order of the Century.

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