DIRECT NEURAL FEEDBACK AND DEPRESSION / TBI / CHRONIC PAIN

Depression

1. Symptoms

The word “depression” can be used in the strong, clinical sense, or in a milder, casual sense to refer to feeling blue or discouraged. Even patients with a clinical diagnosis, though, exhibit symptoms that vary in severity and presentation. At one end of the spectrum, a person may suffer from discrete episodes of severe clinical depression, interspersed by periods of normal functioning. A person with “mild” depression or dysthymia will instead experience a low-level, chronic condition of disturbed mood and symptoms.

SYMPTOMS OF DEPRESSION INCLUDE:	
• Profound despair • Hopelessness • Inability to take pleasure in anything (anhedonia) • Cognitive confusion • Memory loss • The inability to make simple decisions	• Forgetting tasks in the middle of completing them • Feeling uninspired and unfulfilled • Feeling like they are not living up to their potential • Persistent negative thinking • Endless recrimination • Repetitive rumination

When these symptoms of depression alternate with periods of abnormal energy, euphoria, talkativeness, and impulsivity, then it is possible that this is bipolar depression.

2. Assessing Improvement

An important consideration when working with depression is that the client may not be aware of improvements, even when they are happening. Behavioral changes (*e.g.* getting out of the house, calling loved ones, cleaning more) may happen before the client “feels better”. From outside, progress may be obvious - track it carefully and make the client aware of any change you observe.

What are the signs of improvement?

Since monitoring progress for depression or PTSD can be tricky for both practitioner and client, more frequent assessment may be needed. An effective way to do this is to check in with the client on a daily basis in a way that you both agree to. This does not have to be particularly detailed or time-consuming. For example, you can ask the client to rate 1-10 how they felt during the day. A simple text message to the client asking "what's your number today?" might be enough. Of course, you can be more specific about their particular issues.

a. Scaling questions - determining the initial level of depression

- How hopeless do you feel about (subject patient relates to their depression)?
- On a scale 1-10 how easy is it to get out of bed?
- How happy do you feel? Do you experience sudden shifts in mood??
- How open do you feel toward other people?

b. Results driven questions

- What changes do you want to see in your thought patterns?
- How much easier would you like to get out of bed?
- What would your target happiness level be?
- How would you like to open up to people?

c. Other open-ended questions that will help the client acknowledge progress

- How many hours a night are you sleeping?
- Do you find your sleep restful?
- Are you reaching out to friends or family, even though you're not feeling great?
- Have you taken up any new hobbies or done anything new recently?
- Are you open to trying meditation? How is it going?

3. How does CDN help with these symptoms?

The precise biological model of how depression affects the brain is still an area of active research. One well-known theory involves the hypothalamic-pituitary-adrenal (HPA) axis, a part of the nervous system which works closely with the sympathetic nervous system to create the stress response. Prolonged overactivation of the stress response is found in a significant portion of depressed patients.[1]

[1] Pariante, C. M., & Lightman, S. L. (2008). The HPA axis in major depression: classical theories and new developments. *Trends in Neurosciences*, 31(9), 464–468.

Why DNF is a promising treatment for depression

The old belief that negative thinking is the cause of depression is giving way to the belief that the opposite is true: the physical brain, not the mind, suffers from measurable electrochemical differences which are the origin of negative thoughts. Traditional help for depression may require years of treatment, with mixed efficacy. Medications can help provide some patients relief, but may have severe side effects that negatively affect quality of life. Therapy can help clients on their journey to "re-wire" their brain through conscious effort, but this process is by necessity slow. By working directly with the nervous system, neurofeedback[2] — and specifically direct neurofeedback[3] — can help provide a fresh approach to treatment for depression.

CDN involves minimal risk of side effects or adverse reactions compared to antidepressants, and unlike electro-convulsive therapy or trans-cranial magnetic stimulation it involves very weak signals and thus is minimally invasive. Practitioners can see results quickly with DNF, in one to two sessions, particularly with milder forms of depression. Adding CDN to a client's depression treatment plan is one possible method to interrupt the neurocircuitry which has been implicated in this mood disorder.

---

[2] Hammond, D. C. (2005). Neurofeedback with anxiety and affective disorders. *Psychiatric Clinics of North America*. 14(1):105-23, vii.

[3] Kavirajan, H.C., Lueck, K., Chuang, K. (2014). Alternating current cranial electrotherapy stimulation (CES) for depression. *Cochrane Systematic Reviews.* Issue 7. Art. No.: CD010521.

TRAUMATIC BRAIN INJURY (TBI)

A Traumatic Brain Injury (TBI) is a high-velocity or high-impact event that causes damage to the brain. A concussion is the most common type of TBI: a jolt to the head or body that causes the brain to move rapidly in the skull. Primary damage is sustained from the mechanical forces of impact and twisting, which damage blood vessels and neural connections, even if there is no skull fracture. Brain swelling, disruption of blood flow, or other effects on support systems can cause secondary damage hours or days after the initial impact. By some estimates, a concussion is suffered by someone in the U.S. *every 21 seconds*. One does not need to be knocked unconscious to have a concussion, nor does the blow that causes it need to be particularly severe. All that has to happen is that the brain moves rapidly in the skull.

1. Symptoms associated with TBI

1. **Physical** — headache, nausea, vomiting, balance issues, fatigue
2. **Cognitive** — slow thinking, foggy-headedness, trouble concentrating, remembering
3. **Emotional** — irritability, anger, impatience, frustration, anxiety, depression

2. Assessing Improvement

a. Scaling questions

- On a scale of 1-10, how are you today?
- What would you rate your level of (symptom) lately?

b. Results driven questions

- Do you feel better than you did before the prior session?
- Have your headache/nausea disappeared? Diminished?
- Are you finding your sense of balance improving?
- Are you feeling more energetic?
- Do you feel more alert? More focused?
- How are you doing emotionally? Have your feelings of anger/impatience /frustration /anxiety lessened?

c. Other open ended questions to help assess progress?

- How do you feel when you wake up? Do you feel brain fog - if so, for how long?
- How does this affect you at your job or school?

- Have any friends/family ever asked you if you were feeling ok? What happened to cue them to ask this?
- Have you ever been in a car accident where you hit your head? Other incidents?
- Are you aware of any head injuries you may have suffered at any point in your life?

3. How does CDN help with these symptoms?

TBI causes chemical changes in the brain. However, as we discussed earlier, the brain's chemistry exists to facilitate the movement of electrical impulses through the brain and body. CDN helps with the symptoms of TBI by giving the brain a chance to move out of the pattern it is stuck in and to re-balance the nervous system, thus helping restore its resilience and flexibility.

A study done by the Dubin Clinic on 10 former National Football League (NFL) players demonstrated that DNF offers definite, reliable relief from the symptoms of post-concussive syndrome.[4]

[4] Dubin, D. NFL Post-Concussive Syndrome. Results not yet published: http://thedubinclinic.com/nfl-post-concussive-syndrome-study/

PAIN

Pain, however unpleasant, is a necessary part of life, which makes us aware of injury or illness so that we can modify our behavior. Some pain, however, is not part of an immediate (acute) response that signals damage, but is an ongoing or sporadic recurrence of a symptom that remains after the original cause is gone. These types of chronic pain make day-to-day life difficult for sufferers, without communicating any essential information about bodily injury.

1. Types of pain for which DNF can help:

- Fibromyalgia
- Chronic pain
- Migraine
- Stress-related muscle pain

2. Assessing improvement

a. Scaling questions

- On a scale of 1-10 how bad is the pain?
- Is the pain worse at certain times of day?
- How long have you felt this?
- Are there times of day where you don't feel it at all?
- Are there things that you can do on your own that help with the pain?
- What specifically helps?
- Does anything make it worse?
- Have you tried meditation? Does it provide any relief?

b. Result-oriented questions

- Have episodes of pain decreased in intensity, on a scale of 1-10?
- Has the frequency of pain episodes decreased since treatment started?
- How long do the episodes of pain last? Has the duration changed during treatment?
- What is your recovery time after a migraine / other bout of pain?
- Have you noticed a decrease in side effects?

3. How does CDN help with these symptoms?

As overall anxiety decreases with CDN and the nervous system is able to get out of the "fight or flight" response, clients may notice that pain decreases by a point or two. This can make a big difference in day-to-day living and the ability to cope with chronic pain.

****__To the practitioner__: Many people have chronic aches and pains that they have learned to cope with over time; they may no longer be really aware of them. On the initial assessment, the patient should be asked about such aches and pains, even if they are seeking DNF for an unrelated issue. ****