

Treating Neuroinflammation, the Cause of Neurological Diseases, by Treating Leaky Gut Syndrome and Neurofeedback Training (NFT)

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Introduction

In recent years, it has become clear that neuroinflammatory processes are involved in the etiopathogenesis of many neurological diseases, such as schizophrenia [1,2], depression [3,4], Alzheimer's Disease (AD) [5-7]. In addition, mechanisms that cause neuroinflammation in each disease are gradually being elucidated. According to Nihon Alzheimer Dementia Association [8], dementia is found to be caused by the accumulation of two abnormal proteins, amyloid- β and tau. Amyloid- β is a substance produced during information transmission. In a healthy brain, unneeded amyloid- β is broken down as a waste product and excreted from the body through the blood vessels of the brain. However, if excretion fails or becomes excessive for some reason, amyloid- β binds to other amyloid- β and begins to accumulate on the surface of the brain. At the same time, the protein tau begins to increase inside the neurons to which amyloid- β has attached. After several years of amyloid- β accumulation, tau also accumulates due to its toxicity. At the same time, the protein tau begins to increase inside the neurons to which amyloid- β has attached. When the accumulation of amyloid- β continues for several years, tau also accumulates due to its toxicity. This inhibits signal transduction in neurons, and tau also becomes more toxic, resulting in the death of normal neurons one after another. In fact, autopsies of the brains of deceased Alzheimer's patients reveal a variety of pathogens that should not normally be present. Bacteria in the mouth, herpes on the face and lips, mold entering through the nose, and boron disease brought on by mites. But if the foreign invaders are not stopped, the inflammation in the brain will not stop, and the chronic secretion of amyloid- β will continue, and the poison will eventually destroy its own neurons and synapses. Therefore, many preventive methods are recommended to reinforce synapse to resist amyloid beta toxicity by providing ample nutrition to synapses and by continuing moderate exercise and intellectual activity.

But, if that was the case, why not find out why the foreign body enters and stop it?

Among the several causes of neuroinflammation [9], this paper presents a treatment method of various neurological disorders with neuroinflammation caused by leaky gut syndrome. According to Obrenovich (2018) [10] leaky gut is often caused by gluten allergy and leads to the opening of the Blood-Brain Barrier (BBB). This syndrome is also known as leaky brain. The interaction between blood and brain is generally regulated by the BBB, but once the BBB opens, viruses, bacteria, molds, and mites can enter the brain and cause a strong inflammatory response.

This approach was inspired by a client with dementia whose brain wave amplitude was abnormally high and who confirmed that her brain waves improved after gut treatment. The patient ate a lot of ramen noodles and had a poor intestinal environment, and around that time I happened to read an article about wheat zonulin causing intestinal inflammation in 2011 [11], which led me to speculate that wheat allergy might be the cause of the neuroinflammation. Then later, "brain-gut correlation" [12] became a hot topic in 2015. Since then, whenever we encountered similar clients, instead of starting NFT immediately, we first referred them to an integrative medicine doctor who would treat them for leaky gut and check their brain waves after treatment. Eventually, together with integrative medicine doctors, developers of NTA (Neurotransmission Adjustment), which regulates the autonomic nervous system and cerebrospinal fluid circulation, and specialist in meridians, qi, and acupuncture, I formed a loose network of specialists, referring clients to each other as needed to address their physical and mental problems.

In this approach, 1) First confirming neuroinflammation with neurofeedback EEG measurements, **Figure 1** shows three cases of spectrums of EEGs that I would judge as possible neuroinflammation. The pattern of abnormal spectrum is not consistent. 2) Second, an integrative medical doctor who can treat leaky gut syndrome after identifying and eliminating chemical and heavy metal deposits, opportunistic infections caused by viruses, bacteria, and parasites, and electromagnetic radiation by prescriptions. Sometimes, due to lack of metabolic abnormalities, if clients have problems of blood circulation, we refer to the developer of NTA or other specialists. **Figure 2** shows the spectrum after the treatment is over. Based on this EEG waveform, the amplitude of the delta wave is still large enough to be in the normal range by applying the arousal protocol and NFT. 3) Third, bringing the EEG back to normal with neurofeedback training. So far it has been quite successful in returning clients to a healthy state. We learned once the leaky gut syndrome is cured, the EEG returns to the normal range, and once the EEG is in the normal range, the client's behavioral problems and symptoms disappear. This approach has helped clients with diagnoses of ADHD, ASD, anxiety, depression, schizophrenia, and dementia to improve. While neurofeedback by itself has been shown to be helpful in improving each of these disorders, this method can significantly reduce the number of therapy sessions.

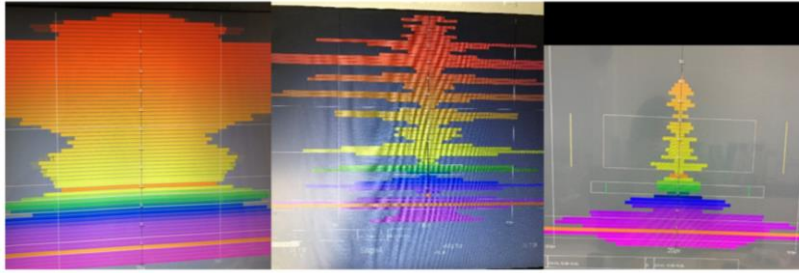


Figure 1: Three cases of EEG spectrum with abnormally high EEG amplitude. The spectrum indicates the amplitude of each frequency from 0 to 70 Hz from the bottom to top.

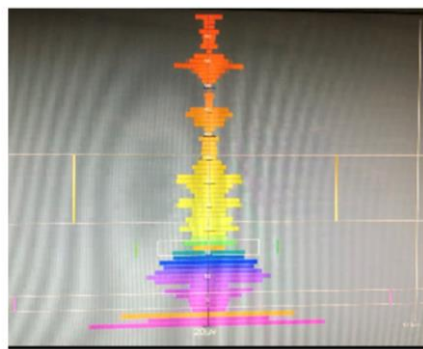


Figure 2: After the treatment o leaky gut syndrome.

Training Procedures

Client interview

At first, conduct interview asking a client about symptoms, chief complaint, when and why symptoms started, birth problems, developmental problems, accidents, past illnesses, history of hospitalization, history of illness, diet, sleep, exercise etc.

Measurement of brain waves

Then measure brain waves at site of Fz, Cz, and Pz according to International 10-20 methods for 60 seconds with open eyes and closed eyes: in EEGer software. We use EXP protocol to use and see the mutuality of brain to decide a proper protocol of the NFT. This measurement offers information to judge brain mutuality of the client to decide protocol of SMR training. If the amplitudes of brain waves of a client exceed too high or too low compared to a normal range, we do not start NFT soon, instead I refer the client to the physician.

These are the factors we found to influence on brain waves;

Wheat allergy

A blood test can be used to determine what allergies are present.

We found that the most clients with neurological disorders had leaky gut syndrome caused by wheat allergy. With the allergy, it is strongly recommended to stop eating any wheat products. In Japan, rice consumption has declined dramatically, and wheat is now used in all meals. Miso, soy sauce, ramen, udon, okonomiyaki, tempura, and above all, bread have been introduced into school lunches, and Japanese people have been eating wheat as their main food since World War II. In addition, ninety percent of Japan's wheat is imported from overseas and is made with a pesticide called Roundup, which contains glyphosate, the same defoliant that is banned in other countries, and glyphosate has been detected in bread sold at convenience stores, so we may have the highest incidence of dementia in the world.

Bacteria, fungi, parasite, and others

Parasites can be detected by fecal and immunological tests, while mites can be detected by mite allergy tests.

Some of schizophrenia clients had one or some of pathogenic bacteria, fungi, borrelia, molds, parasite, and viruses in ticks in the brain. For them, instead of psychotropic drugs, our physician prescribes antimicrobials, antibiotics and herbal medicines. Due to high temperature and humidity of Japanese weather, the incidence of mites is high, so thorough cleaning and anti-mite measures are also recommended. Clients diagnosed with schizophrenia often live in a poorly ventilated room that has not been cleaned for a long period of time and is full of stuff, with no place to step, where such creatures above can easily live. In this case, I usually ask a psychiatric social worker to help cleaning up the room as a part of treatment.

Heavy metals; mercury, lead, others

Toxic metals can be tested by urine displacement method with chelating agents.

Heavy metals are often detected in the brain of the client who suffers from depression or any motivation. Mercury in tuna, a favorite of the Japanese, lead used in water pipes, palladium in tooth fillings still used in Japan, although banned in other countries, and cadmium in brown rice, which is common in Japanese soil are the ones often found in the clients. In this case, detoxification is strongly recommended by taking oriental medicine or taking a bath or hot sauna to sweat. If heavy metal exists in the brain, any stimulation may damage brain tissue [5-8]. When heavy metals such as lead enter a synaptic receptor, it is predicted that brain cells will diminish without the outflow of potassium ions. In that case, any intervention of brain function (including neurofeedback training) may cause damage.

Electromagnetic wave

There are a variety of electromagnetic wave testers, ranging from simple ones to specialized tests by electromagnetic wave measurement specialists.

Negative effects of electromagnetic waves on the human body have been pointed out [12,13]. 5G cell phone signals are everywhere, and we are inevitably affected by electromagnetic waves when we work with PCs on a daily basis. For those who are affected by electromagnetic radiation, it is recommended that they do not place their cell phones next to their heads at night before going to bed and protect him using electromagnetic wave shielding sheets or other devices.

Psychological stress

Psychological stress itself causes neuroinflammation without directly relating with leaky gut. Because psychological stress act on astrocytes by increasing the concentration of glutamate, which releases ATP as a gliotransmitter, and ATP is recognized as a danger agent by NLRP3 in microglia and activation of NLRP3 leads to the formation of a cytoplasmic multiprotein signaling complex called the inflammasome, which is a complex of inflammatory cytokines IL-1 β , IL-18, and GSDMD, and serves as a platform for caspase-1 activation leading to the processing of cell death via GSDMD [14]. Such pyrokinetic cell death is a major pathway of inflammation, and over activation of the NLRP3 inflammasome may be implicated in a variety of inflammatory diseases [15]. Stress disturbs the autonomic nervous system, resulting in the same symptoms as leaky gut syndrome, and no matter how much one treats leaky gut syndrome, the symptoms will recur, so the focus of treatment should be on reducing or eliminating stress. For the clients under high stress, I give counseling sessions to teach how to cope with the problem emotionally and rationally, relaxation techniques, cognitive therapy, cognitive behavior therapy, meditation, and give Alpha/Theta training to relax, as needed.

Trauma

For clients with dissociative disorders, often initiated from early childhood abuse, and have severe trauma show abnormal high amplitudes of theta waves, hypnotherapy or Self-identity Unification Methods, invented by Suzuki Kataoka, which was a method of integrating dissociated personalities by asking the present self to imagine how he or she would deal with the trauma if he or she were present in the situation that caused the trauma, by asking the younger injured self to reassure himself or herself that if a third party was abusing him or her at the time, how the present self would deal with that third party and then, after the injured self is satisfied and agrees, encouraging the present self to integrate it, developed in Japan. This method is very effective, and one session is enough to go through a life. In addition, SMR protocol for trauma can be applied.

Educational guidance about nutrition, exercise, and sleep

ADHD and Asperger's syndrome patients, in particular, are often deficient in protein, zinc, vitamins, and minerals, so we tell them to eat a PFC-balanced diet, especially for anxiety and depression, and that 90% of serotonin production, which is essential for mental stability, is done in the intestines, and to improve the intestinal environment In order to improve the intestinal environment, they are advised to eat vegetables and fruits high in fiber, chew their food well, and eat slowly. He also tells them that it is important to lead a regular life, get a good night's sleep, and be physically active to stabilize their minds.

NFT

Neurofeedback is a kind of biofeedback, which teaches self-control of brain functions to subjects by measuring brain waves and providing a feedback signal. Neurofeedback usually provides the audio and or video feedback. Because of plasticity in the brain, once learned and repeated many times, the brain autonomously produces brain waves in the desired frequency band, and NFT has been shown to increase focus and attention with proper arousal. The efficacy of NFT for ADHD, epilepsy, and depression has been proved. Ordinarily, 20 sessions are required to train, but after treating neuroinflammation, it only takes 3 to 5 sessions.

In Japan, psychiatrists commonly use polytherapy, which involves the use of several different types of antipsychotic drugs with similar efficacy. Although the Ministry of Health, Labor, and Welfare has imposed restrictions such as reduced insurance points for polytherapy, Japanese psychiatric care is more than 50 years behind that of other developed countries. In developed countries, the average length of stay in psychiatric hospitals is around 18 days, while in Japan it is 284.7 days (2013). There are also outpatients who are prescribed more than 10 different medications. Most patients, once they see a psychiatrist, stay with him or her for a long time and are almost always on medication for a long period of time. Because of the effects of psychotropic medications on brain waves, it can take one to two years or more to initiate neurofeedback, starting with a reduction in medication, gradually decreasing the type and amount of medication, and finally abstinence. However, it is difficult to say, since a schizophrenic man in his 50s who had been hospitalized for a long period of time once started treatment and now asked for vocational training, but it can be said that the earlier the patient is diagnosed, the easier it is to see the effects of the treatment.

Measurement of EEG

At the last session of the NFT, another EEG is taken again to see compared with that of the first session. And the amplitude of delta, theta, alpha, beta, high beta waves become within normal range, it is time to complete the sessions.

Case Reports

The below are the cases applying our approach. I received an agreement to report her from each case.

Client diagnosed as schizophrenia

The client was a 15-year-old female diagnosed with schizophrenia that had been unable to go to middle school for nearly three years due to impulsive outbursts caused by auditory hallucinations and violence against her mother and sister. When I first met her in 202X, she glared at me and did not open her mouth at all. She had about five earrings in her ears and dressed like a punk. I took a mini-map and found that her total amplitude was over 80m, so I determined that she had neuroinflammation and referred her to an integrative physician. As she was malnourished because she ate only sweets and pastries, and so recommended to take a supplement and eat balanced meal and get up in the morning and walk every morning to correct her day-night lifestyle. The doctor's diagnosis revealed that she had leaky gut syndrome and a tick on her brain. I asked mother to clean her room. After three months of medical treatment, she began NFT; by the fourth session, she stopped wearing his earrings and began talking to me; by the sixth session, her mother reported that as she wanted to go to high school and would take an examination for high school; by the tenth session, she talked me about what she would like for her future, and her brain waves became completely normal, so that the session was over.

Client diagnosed as depression

The client was a man in his 30s, a pilot. In 201X, he suddenly depressed and took a leave of absence for six months. He complained that he could not want to do anything but lying down at home because he just felt too tired. He however would like to recover very much, so he visited two psychiatrists for six months but showed no signs of

improvement, so he came to me through an acquaintance. When I asked his life event, there was no event relating to his depression, and he had lived quite healthy life with balanced diet and regular excises, so I suspected that he had been affected by electromagnetic radiation, as it is said that the cockpit of an airplane is like having two microwave ovens open and the pilot is exposed to their electromagnetic radiation for about 20 hours round trip. I found that hi EEG amplitudes ranged from 0 to 2 microvolts, with the screen characters barely moving, which indicated little electrical activity of neurons seemed to be occurring. Then I referred to the physician who also reached the same diagnosis. Then, I recommended him to go to the ocean near for a week to walk along the beach with barefoot. I also instructed him to stop using electronic devices and computers. After a week, I found that the amplitude of his brain waves was in the normal range. After a couple of NFT, the session was over.

Clients diagnosed as dementia

The subjects of this case study report were two men and three women, ages 68 to 75, all of whom received Level 2 long-term care insurance. They attended the same day service three times a week, had a balanced lunch and light exercise in 201X. Most had pre-existing medical conditions such as high blood pressure and diabetes. Some were disorientated, unable to speak, or had fuzzy memories. EEG measurements showed delta and theta waves with abnormal amplitudes of 60 microvolts in all of them. Since neuroinflammation was suspected, we referred them to an integrative medicine specialist. As a result, they were all diagnosed with leaky gut syndrome. After several months of treatment, they each received 10-20 NFTs. Two of them, two women, had past traumas, so they received Self-identity Unification Therapy. As a result, all the remaining patients, except one who refrained from taking medication during the treatment period, showed significant improvement in brain function, improved memory in daily life, and smoother conversations.

Conclusion

My proposal in this paper is an inductive conclusion based on seven years of clinical experience. This approach has helped many clients with psychiatric and neurological symptoms by first suspecting encephalitis for clients with abnormally high amplitudes, then treating them for leaky gut syndrome, and then performing NFT after further EEG measurements to bring the EEG into the normal range. Although not necessarily applicable to all patients, it may be worthwhile to treat patients with neurologic disorders with confirmed neuroinflammation to see if they are treated for leaky gut syndrome and subsequently relieved of symptoms. I use a device that simply attaches one flat electrode to the head for simplicity, but QEEG and FMRI neurofeedback can also be applied to detect brain abnormalities.

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