

# Physiology of Emotions

- In the short time we have together today, I want to give an overview of how we can use physiological interventions to effect changes in emotional health and balance.
- While psychological stressors, relationships, behavior, life-choices etc. all have huge impacts on emotional health and well-being, so too do physiological factors such as blood sugar balance, nutritional status, inflammation, and sleep habits.

# Factors in Brain Health

- By being aware of, and assessing whether or not these factors are effecting your clients, gives you a potential area of intervention in treating your clients.
- A brain that is performing optimally on a physiological level is far more likely to successfully integrate psychotherapeutic therapies than one that is struggling just to function.
- Before delving into this topic, I want to give you a brief introduction to what I do, my training, and my approach.

# Short Biography

- I am licensed in, and have been practicing Acupuncture for 20 years.
- Acupuncture is however only one modality in the field of Oriental Medicine.
- Oriental Medicine teaches a brand of Functional Medicine. It describes the human body as a group of highly interactive and interdependent functional units or organ systems where the dysfunction in one system inevitably affects another. An example would be the digestive system affecting the Liver.

# Short Biography

- So, through my training in Oriental Medicine I have been trained to evaluate the body as a functional whole where dysfunction in one system can effect function in another.
- We are trained to look for causes, sometimes multiple causes beyond the presenting symptoms.

# Short Biography

- So to use the prior example, let's say someone has chronic constipation that doesn't respond to laxative therapy. And that over time this constipation leads to chronic imbalances in gut flora. These together may cause a more toxic load in the blood stream which over time puts stress on Liver function.....and as Liver stress persists.....it may start to cause a rash, or it may contribute to fatigue and irritability....it goes on, one system affecting the other.

# Short Biography

- Then there is the brain. By far our most complex organ. The command and control center for the rest of the body and perhaps the organ most susceptible to functional imbalances within the human system as a whole.
- The main point I want to make here today is as follows. If, the health of the brain, as an organ is responsible for not only our emotional ebbs and flows, but the very experience of our reality, then it is of upmost importance that we pay attention to those factors effecting brain health because they will directly impact our emotional and cognitive health.
- The most obvious example would be dementia.

# Short Biography

- Over the past 20 years I have more and more learned about and addressed the various factors that impact brain health and function and by so doing have helped people with problems ranging from fertility to emotional imbalances.
- I would like to briefly visit some of these today so you can start to think about physiological mechanisms that may be impacting your clients mental health.

# Factors in Brain Health

- A healthy brain needs the following:
- 1) A continuous and sufficient supply of Glucose
- 2) A continuous and sufficient supply of oxygen
- 3) Sufficient Hydration
- 4) Stimulation
- 5) Deep restorative sleep

# Factors in Brain Health

- 6) Proper Thyroid Stimulation
- 7) Proper Sex Hormone Stimulation
- 8) Proper Nutritional Status
- 9) Neurotransmitter Balance and Function
- 10) Absence of Neuro-inflammation caused by:  
Auto-immunity, Chronic Infections, Food Sensitivities, Toxic exposures including drugs and alcohol, auto-intoxification from gut permeability
- I would like to touch on some of these.

# Factors in Brain Health

- GLUCOSE
- Each and every brain cell (Neuron) needs a continuous supply of glucose to maintain proper function. Cut off the glucose and the neuron falters and eventually dies. This neuronal faltering and or death is called Neurodegeneration. It is something that effects each of us from the time we are born until death. The question is how fast and to what degree does neurodegeneration progress.

# Factors in Brain Health

- By far, and I can't emphasize this enough, the most common cause of Brain based symptoms in my clinic are due to Reactive Hypoglycemia.
- Reactive Hypoglycemia is the periodic dropping of blood sugar that triggers an Adrenal response and thereby effects brain function and mood. Glucose is the brain's fuel source, making stable blood sugar crucial to balanced brain chemistry. In susceptible individuals when blood glucose reaches a certain threshold the body switches to a Stress Response that can dramatically effect mood and cognitive function.

# Factors in Brain Health

- Following is a list of symptoms that constitute Reactive Hypoglycemia. These are questions you can ask your patients to determine if are susceptible to unstable blood sugar.
- Eating relieves fatigue
- Craving for sweets between meals
- Irritability if meals are missed....ie Hanger
- Dependency on coffee and sugar to keep going

# Factors in Brain Health

- Becoming light-headed if meals are missed
- Feeling dizzy, shaky or jittery if meals are missed.
- Feeling agitated or anxious if meals are missed.
- Poor Memory, forgetfulness that fluctuates
- Tendency to become easily upset
- Difficulty concentrating or learning
- Fasting glucose below 80 and/or LDH below 140
- All these symptoms are lessened by ingestion of regular meals

# Factors in Brain Health

- As you can see many of these symptoms relate to emotional balance and cognitive function. So for the person diagnosed with depression or anxiety blood sugar balance can be a real wildcard for determining their day to day emotional stability.

# Factors in Brain Health

- Lets take a quick overview of blood sugar metabolism, how food transforms to glucose.
- When we eat a meal the digestive process begins with mastication and depending on the Glycemic Load of that meal the body begins absorbing glucose from that digested carbohydrates at a certain rate.

# Factors in Brain Health

- As Glucose begins to rise the Pancreas secretes Insulin a hormone used to transport glucose to cells, and for the purpose of this discussion, neurons, to be converted to ATP used to fuel our metabolism.
- Some glucose will be transported to the Liver to be converted to Glycogen and stored for future use.

# Factors in Brain Health

- When the body burns through the glucose created by the most recent meal, and the food source is not replenished, it turns to convert these glycogen stores in the Liver back into glucose.
- With the aid of the Adrenal Glands this conversion takes place and in this way the body maintains a relatively stable blood-level of glucose.

# Factors on Brain Health

- For certain people, and for a variety of reasons, some people do not readily make this conversion. This is often do to “functionally weakened” cortisol production in the Adrenal glands.
- For these people they experience a variety of symptoms as the Adrenals initiate a stress response releasing Catecholamines to help aid the body in Glycogen conversion.

# Factors in Brain Health

- When this happens people will often experience the symptoms listed below as well as suppression in appetite which only exacerbates symptoms.
- The symptoms associated with the Hypo-glycemic pattern are symptoms associated with struggling brain performance. Such a physiologic pattern can strongly contribute to symptoms associated with depression and anxiety.
- How do we treat hypoglycemia?

# Factors in Brain Health

- In addition to nutritional supplementation these people have to eat 3 protein containing, low glycemic meals as well as snacks.
- Additionally, they have to avoid sugar-laden snacks as a sudden rise in blood sugar will be followed by precipitous drop creating these same symptoms.

# Factors in Brain Health

- Treatment in my clinic involves nutritional supplementation to support Cortisol regulation and Glycemic balance.
- Dietary recommendations of 3 meals daily that include animal protein, 2 low glycemic snacks and avoidance of high glycemic foods such as sweets and breads.

# Factors in Brain Health

- The next factor effecting brain health I would like to discuss is Oxygen.
- Like glucose, every neuron needs a constant supply of oxygen. Being some of the most metabolically active cells in the body it is crucial they receive a constant supply of both for proper function.

# Factors in Brain Health

- The disastrous effects of Oxygen depletion on neurons can clearly be seen in accidents such as drowning where massive neuronal death can often be seen in survivors.
- When the oxygen depletion is mild but chronic it effects the normal balance of brain function and accelerates the rate of neurodegeneration. Because of this, the person experiences fatigue, weakened cognitive function, and emotional lability.

# Factors in Brain Health

- Causes of oxygen depletion include: circulatory blockage, COPD, and anemia.
- In children and adolescents anemia is common and can often be overlooked unless it's severe.
- There are several types of anemia the most common of which is Iron deficient anemia.

# Factors in Brain Health

- The issue with anemia is oxygen deliverability. Iron is used by red blood cells to make hemoglobin. Hemoglobin is what the cell uses to carry oxygen to other cells such as neurons.
- Low iron equals low oxygen equals poor brain function.

# Factors in Brain Health

- Iron deficient anemia can be caused by: poor nutrition or eating disorders, heavy menstruation, a poorly designed vegetarian or vegan diets, celiac or Chron's disease, even severe IBS.
- Such patients will often realize marked improvements in cognitive function and emotional stability with Iron supplementation or dietary adjustments.
- Another common form of anemia is B12 deficient anemia which can be seen in blood work. It is very common in vegans and vegetarians and is easily remedied through B12 supplementation.

# Factors in Brain Health

- The next factor I would like to touch on is stimulation. All neurons need stimulation to remain healthy.
- There are two types of stimulation mental stimulation and physical stimulation. I would like to touch upon the importance of physical stimulation.
- One of the biggest impediments to long-term space travel is weightlessness. Without the constant stimulation of gravity neurons degenerate.

# Factors in Brain Health

- For us earthbound humans exercise and or body work such as acupuncture, massage, PT, etc. play a huge role in the stimulation of neurons.
- Multiple studies have shown the profound benefits of exercise in the treatment of depression.
- Studies using functional MRI's have shown increases in blood flow and electrical activity in brain tissue in subjects undergoing acupuncture. This has helped to explain some of the positive benefits noted in the treatment of depression and anxiety using acupuncture.

# Factors in Brain Health

- An often overlooked factor is brain health, and commonly under diagnosed condition is hypothyroidism.
- To remain healthy, neurons need sufficient stimulation by thyroid hormone. One of the most common symptoms of hypothyroidism is lack of mental endurance and acuity.
- The 2 most common causes of hypothyroidism are: Hashimoto's disease an auto-immune disease and Iodine Deficiency.

# Factors in Brain Health

- While not common in children it does occur.
- It is estimated that up to 12% or 20 million Americans are effected with Thyroid disease.
- Further, it is estimated that up to 60% don't know they have it.
- So basically there are a lot of people out there with under-functioning Thyroids that are not being diagnosed. Similarly, there are many people who are under medicated and effectively “hypo”.
- A common misdiagnosis for hypothyroidism is depression.

# Factors in Brain Health

- One commonly over looked factor in Brain health is sleep.
- In my practice interrupted sleep, lack of sleep, and various types of insomnia are very common.
- Many children, particularly adolescents under sleep or sleep at hours way out of synch with a normal circadian rhythm.

# Factors in Brain Health

- A brain lacking in sleep is not a brain that can effectively cope cognitively or emotionally.
- Often the problem can be resolved with review of sleep hygiene particularly around computers, cell phones and other media.
- If the problem is truly around the ability to fall or stay asleep then this needs to be addressed either medically or thru alternative means.
- My main point here is that sufficient sleep is essential for optimal brain function and needs to be assessed.

# Factors in Brain Health

- Overall nutritional status
- Nutritional status is a huge topic, but I just want to touch on it. In today's culture “diet” is more driven by taste and fads than by nutritional needs.
- Meals if they are not skipped are often comprised of bars or pre-prepared food.

# Factors in Brain Health

- Many people, particularly children and adolescents exclude nutrient dense foods from their diets.
- With all of my patients we visit the topic of diet over and over with the goal of diversifying their selections and adding more freshly prepared foods to their diets.
- For Brain health the most important nutrient is Fat.

# Factors in Brain Health

- The main issues surrounding dietary fats are not eating enough “good” fats and consumption of bad fats.
- With my patients I encourage adding fats such as coconut oil, pastured butter, Olive Oil, Nut oils, avocado, nuts, fish oils, and egg yolks.
- Conversely I encourage the avoidance of hydrogenated fats, processed polyunsaturated fats such as canola, safflower, and corn oils.

# Factors in Brain Health

- This is a huge topic, but the point I want to make is that proper nutrition is a major factor in maintaining the health of both the brain and body, and needs to be a consideration in achieving long-term brain health.

# Factors in Brain Health

- So we have just skimmed the surface in terms of covering some of the factors that effect brain health.
- There are other factors we look at in the clinic such as chronic infections, food allergies, and auto-immune reactions as well as neurotransmitter imbalances.
- The main point I hoped to communicate is that evaluating and addressing the physical health of the brain can be a valuable tool in the treatment of a wide variety of mental emotional imbalances.

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