

The Treatment of Frontal Lobe Injury With Acupuncture and Traditional East Asian Medicine

Douglas S. Wingate, MAcOM, L.Ac.

The Frontal Lobes – Functional Overview

The frontal lobes are the senior executive of the brain and personality. Over the course of evolution, the frontal lobes have greatly expanded in size, and are largely responsible for the many achievements in art, culture, music, science, and math which are uniquely human. Although the frontal lobes are not the seat of actual intelligence, it is this area of the brain which enables humans to effectively utilize our intelligence and to anticipate and plan for future possibilities. Individuals who have had even a significant frontal lobe injury may still score normal on an IQ test as the cognitive ability remains but are unable to effectively put to use the intelligence they demonstrate.

There are varying theories as far as the precise essence of frontal lobe function which include regulating “cortical tone” with an emphasis on attentional processes; regulating a type of “autonomy” without which the individual becomes dependent on the external environment for cues that are then imitated; providing temporal structuring of behavior which integrates past experience with future plans; and the mediation of self-consciousness which bridges the gap between brain and mind. The frontal lobes act like an intermediary between stimulus and response, allowing for flexible, autonomous, and goal-directed behavior which in other animals is much more instinctual and governed by the limbic system and brain stem.

The frontal lobes act to process, integrate, inhibit, assimilate, and remember perceptions and impulses received from the limbic system, striatum, temporal lobe, & neocortical sensory receiving areas. Functions of the frontal lobes broadly include:

<ul style="list-style-type: none">-Engages in decision making and goal formation,-Modulates and shapes character and personality-Directs attention-Maintains concentration-Participates in information storage and memory retrieval	<p>At the neocortical level they are also responsible for the vocalization of language including:</p> <ul style="list-style-type: none">-Organizing and monitoring the processes involved in preparing to speak-The retrieval of semantic information-Insertion of syllables-Temporal sequences into auditory output-Programming and activating the primary motor areas subserving the oral-laryngeal musculature
---	---

The right and left frontal lobes appear to differ in their influences over arousal, attention, sexual, emotional, and memory functioning including even humor appreciation.

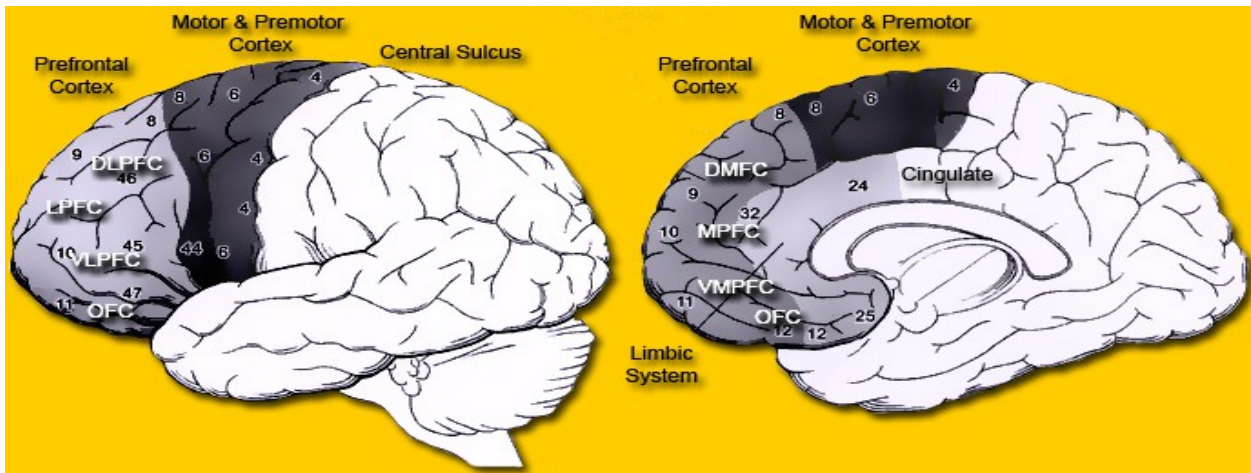
When adults who have been traumatized recall traumatic imagery or when they view combat-related photographs, the right frontal lobe displays increased activity, and the left inferior-orbital region displays reduced activity. The right frontal area mediates emotional and melodic speech; is dominant for arousal and appears to exert bilateral inhibitory influences over arousal whereas the influences of the left frontal lobe are more unilateral and excitatory

Left frontal area mediates the syntactical, lexical, semantic, and temporal sequential aspects of speech and is dominant. If the left frontal lobe is injured, cognitive and expressive functions tend to become suppressed and inhibited--a function not only of the injury but of right frontal suppressive influences.

By contrast, right frontal injuries are more likely to give rise to disinhibitory states, including the so called "frontal lobe personality". Due to the bilateral influence of the right frontal lobe and unilateral influence of the left lobe, if the either the left lobe alone of bilateral damage occurs the individual will express more of a depressed or apathetic affect, whereas only damage to the right lobe will more often result in an excited state. Sadness can reduce right and bi-frontal activity, though in most instances depression is directly attributed to left frontal dysfunction and reduced left frontal activity. Bilateral damage may show fluctuations between these state and thus resemble something like a bipolar personality trait

Adults with PTSD have displayed reduced left frontal lobe activity¹. Major brain areas involved in the pathology of PTSD are the medial frontal prefrontal cortex, anterior cingulate cortex, hippocampus and the amygdala. The amygdala controls conditioned fear responses while the medial prefrontal cortex involves the inhibition of such reactions. Thus injury the medial prefrontal cortex would lessen one's ability to inhibit fear and it has been theorized that the presence of frontal dysexecutive impairment due to brain injury may increase the perseverative nature of the re-experiencing of trauma.² In schizophrenia, lateral frontal gray matter reductions and decreased brain volume and activity have been repeatedly noted.¹

The Frontal Lobes – Pathology & Symptoms



Left Frontal Lobe	Right Frontal Lobe
<ul style="list-style-type: none"> -Depression -"psycho-motor" retardation -Tearfulness -Apathy -Irritability -Blunted intellectual and conceptual capability -Confusion -Puerility (silliness, childishness) -Either total or partial unawareness of the environment. -Sometimes characterized as blunted form of schizophrenia 	<ul style="list-style-type: none"> -Disinhibition- speech release, confabulation, lability, and other impulsive disturbances which may wax and wane -Mania -Confabulation (unintentional lies, false memories) -Hypersexuality -Tangentiality -Impulsive, labile, disinhibited and inappropriate social and emotional behaviors

Motor Cortex	Orbital Lobe
<p>Supplementary Motor Area:</p> <ul style="list-style-type: none"> -Body may become stiff -Movements tend to be slow, clumsy and uncoordinated -Severe agraphia -Short steps and disturbances of posture, balance, and gait. -May become mute or appearing catatonic if severe <p>Premotor Cortex:</p> <ul style="list-style-type: none"> -Fine motor function & dexterity effected (e.g. finger tapping) -Possible grasp reflex (i.e. stimulating the hand it will involuntarily clasp shut) <p>Primary Motor Area:</p> <ul style="list-style-type: none"> -Paralysis:- Initially contralateral flaccid hemiplegia then over several days the muscles develop increased tone and there is resistance to passive movements. Spasticity and hyperreflexia. Fine movements are usually permanently lost. 	<ul style="list-style-type: none"> -Disinhibition -Hyperactive -Euphoric -Extroverted -Labile -Overtalkative -Perseveratory tendencies (repetition of word or phrase) -Proneness to criminal behavior -Promiscuity -Gradiosity -Paranoia have also been observed

Broca's Area (left Lobe)	Frontal Eye Fields
<ul style="list-style-type: none"> -Loses the capacity to produce fluent speech. -Output becomes labored, sparse, and difficult, and may be unable to say even single words, such as "yes" or "no". -Immediately following an injury may be almost completely mute and suffer a paralysis of the upper right extremity as well as right facial weakness, unable to write, read out loud or repeat simple words. 	<ul style="list-style-type: none"> -Abnormalities in fixation -Decreased sensitivity to stimuli throughout the visual field -Slowed visual scanning and searching -Inattention and Neglect -Mislocation of Sounds -Some subgroups of "schizophrenics" have been shown to suffer from smooth pursuit and saccadic abnormalities

The "Frontal Lobe Personality"

With unilateral, bilateral, or even seemingly mild frontal lobe dysfunction patients may display an initial waxing and waning abnormalities including what is referred to as the "frontal lobe personality". This may include these symptoms:

-Tangentiality, flightiness of ideas	-Hyperexcitability
-Silliness or Childishness	-Increased sexuality
-Impulsiveness	-Promiscuity
-Fatuous Jocularly	-Extravagant money spending
-Lability	-Disregard of consequences
-Personal untidiness and dirtiness	-Tactlessness
-Poor Judgment	-Changes in hunger and appetite (usually with weight gain)
-Grandiosity	-Manic excitement
-Irritability, Restlessness	-Reduction in ability to produce original and imaginative thinking
-Careless work habits	-Perservation (repetition of a particular word, phrase, or gesture)
-Irresponsibility	-Compulsive use of utensils and tools (writing an endless letter with mechanical repetition of a certain phrase or word)
-Laziness or easily tired	

With significant frontal lobe pathology

- Attentional functioning may be grossly comprised
- Behavior may become fragmented
- Initiative, goal seeking, concern for consequences, planning skills, fantasy and imagination, and the general attitude toward the future may be lost
- Range of interest may shrink
- May not be able to adapt to new situations or carry out complex, purposive, and goal-directed activities
- Lack insight, judgment and common sense
- Show little to no interest in self-care or the manner in which they dress, or even if their clothes are soiled or inappropriate

A curious mixture of obsessive-compulsiveness and passive-aggressiveness may be suggested by their behavior.

Damage to the frontal lobes, the right frontal and orbital frontal in particular, can create symptoms similar to a state of alcohol consumption.

"Medial Frontal Lobe Syndrome"

In medial frontal lobe injury apathy is the major characteristic. Anterior cingulate gyri is primarily implicated.

- Limited speech
- Akinetic mutism may appear - complete absence of motor activity and speech
- Transcortical motor aphasia (particularly with the left supplementary motor area)
- Lower extremity paresis and gait disturbance can be seen if damage extends to high precentral gyrus
- Sphincteric disturbance (frontal lobe incontinence). Individual tends to be indifferent to this
- Loss of spontaneity and initiative – may seem to lack "free will"

"Dorsolateral Frontal Lobe Syndrome"

This syndrome is characterized by difficulty planning novel cognitive activity and carrying out sequential tasks. Although cognitive abilities such as language, memory, and visuospatial skills are themselves intact, individuals with dorsolateral lesions lack executive control and therefore cannot properly use these skills. "Knowledge is divorced from action"

In this syndrome executive function deficits are paramount, implying the individual is deficient in:

- Planning
- Monitoring
- Flexibility of behavior
- Difficulty solving problems involving foresight, goal selection, interference resistance, use of feedback & sustained effort
- Appears inattentive
- Unmotivated
- Perseveration
- Stimulus-bound behavior (e.g. incorrectly draws hands on clock at the 10 and 11 when asked to show 11:10)
- Echopraxia - involuntary imitation of others gestures (indicates inhibited personal monitoring)
- Working memory may be effected and overlap with inability for sustained attention

East Asian Medicine: A note on the “mystery” of the medicine

The foundations of East Asian medicine are quite different from those of Western biomedicine. While both are approaching the same physical body and the same occurrences therein, the lens through which disease is looked at varies significantly. Both The formation and development of East Asian medical theory was greatly influenced by ancient Chinese philosophy and much of the unique terminology that is still used is reliant on metaphor and what borders on poetic descriptions of systemic effects and functions rather than the compartmentalization of individual pieces and their actions. East Asian medicine is a functional, systems-based medical paradigm, which basically means it is looking at all parts of the body and how they are interacting, influencing each other and where normal function has gone awry. Due to the difference in phrasing and cultural perspectives there has developed an air of mystical components which may deter individuals from looking any farther into it despite a significant amount of literature supporting not only that it is effective, but also, how it is doing so.

Terms such as “Yin” and “Yang” which are still used in almost all texts were used from observation that objects or phenomena in nature, the human body included, as broad concepts consisted of two opposite yet interdependent relative properties. An example of this can be thought of in the body as the sympathetic (fight/flight response) and parasympathetic (rest/digest) nervous system which are opposite functions with which the dynamic of the two regulate the body. This sort of dynamic however is involved on multiple levels of scale from the cellular to organ systems and hormone secretions. Yin generally is referring to the more substantial or dense components of something, in the above example, the parasympathetic system, and Yang to the more motive and functional properties, the sympathetic nervous system. These phenomena being in a state of constant change between them based on external and internal stimuli.

East Asian medical practitioners held that the natural world was integrated into the human body and phenomena in the body reflected that which was found elsewhere in nature. Thus, diseases were viewed as and named after imbalances found elsewhere in nature - conditions were described as “dampness” or “heat” disorders. These can be brought into a modern Western context with a thorough understanding of the intended meaning, dampness loosely being correlated with things such as poor water metabolism and heat as febrile diseases and inflammation. The term “Qi” is one of the terms most shrouded in mystery within the medicine's lexicon and alone is likely the biggest hindrance to it's larger use and integration into the medical institutions. It is a sticky one, and multiple books have been dedicated to exploring this word alone. The foundational tenant that the body has an animating force which “flows” throughout and when it is obstructed one's health degrades is not built into biomedicine and yet there are still a number of functions within the body that sound much like the descriptions of “Qi” in traditional texts. I often use “intelligent metabolism” taken from Daniel Keown⁴, a western medical doctor and East Asian medicine practitioner, to try to keep it's broad meaning but use terms a little more palatable to the western lens. In it's essence it seems to correlate with most functional units of the body including ATP production (which is directly effected by acupuncture and cited later), action potential of the nerves, hormone secretions and means of intercellular communication among others.

The East Asian medical views of the body are in line with modern anatomy, however the terminology of the internal organs differ in meaning from conventional definition, conveying a generalization of the physiological functions. The channel or meridian doctrine is also heavily emphasized in East Asian medical theory and are essentially the pathways of information, energy, blood and fluid circulation which extend throughout the body, and have remarkable correlations to a component often given little emphasis in biomedicine – the fascia – which extends along trajectories from the tips of the fingers through the limbs and surrounding all internal organs much the way the meridian pathways are described. A thorough comparison between the fascia of the body and the meridian descriptions and organ system associations reveals a significant overlap and would likely change many minds the use of acupuncture. Acupuncture is a means of stimulating and eliciting a bioelectrical and biochemical response along these trajectories to restore proper functioning throughout the body.

Acupuncture Actions on the Brain Following Injury:

East Asian medicine practitioners differentiate and classify aspects of brain injury into different syndromes or patterns according to their clinical symptoms. Traumatic brain injury is said to risk rupture of the integrity of the body's natural protection system, permitting the invasion of external disease, leaking of essential intelligent metabolism, energy, blood and fluids and introducing blood extravasation. All of these will directly disturb normal intelligent metabolism, blood circulation and induce pain. It is not hard to extrapolate these descriptions into relating to the blood-brain barrier, inflammation, and tissue and nerve damage. Traditionally the brain performs thinking and memorization functions, however physicians attributed the heart as the organ which regulates the whole system, superseding the mental activity of the brain. This may simply metaphorically reflect the large emphasis that was placed on emotional states and health, however, modern research in the field of neurocardiology has shown some interesting developments that lend some credence to this idea. The brain also is considered to be the "cleanest" organ within the body. Should it become polluted by trauma, the rest of the body becomes more prone to disease. After severe head trauma, these factors may affect the organ systems, blocking the "aperture of the Heart" - our emotional well-being and clarity- and hurting the body's primary force for life activities.

More and more evidence is supporting acupuncture's ability to stimulate and regulate the central nervous system and the brain. The release of endorphins within the system and produce an analgesic effect has been well documented. Acupuncture can also create the release of other chemicals and hormones, which influence the body's self-regulating systems and promote natural healing abilities. A 2010 study demonstrated acupuncture to effectively trigger a local increase in the extracellular concentration of ATP, ADP, AMP and adenosine, a key component in energy exchange in metabolic processes. By increasing ATP the body is better able to create not only a well-recognized analgesic effect but also contribute more usable energy and innate healing potential within the body. A recent study also demonstrated acupuncture's ability to increase glucose metabolism and improve cerebral blood flow in the brain areas related to cognition and memory by increasing the expression of glucose transporter 1 (GLUT1) which is involved in cellular respiration, regulation of glucose levels and vitamin C uptake. The laboratory results indicated that upregulation of GLUT1 by acupuncture alleviates ischemia and anoxia related cognitive impairment.

Specific brain regions have also been shown by using fMRI techniques to be influenced by acupuncture points. Points were either activating, deactivating or regulating of different brain regions and specific points having influence in specific areas of the brain.^{7,9} In a meta-analysis of fMRI studies done mapping areas of the brain influenced by acupuncture it concluded "Two third (64%) of 25 studies showed that acupuncture treatments were associated with more activation, mainly in the somatosensory areas, motor areas, basal ganglia, cerebellum, limbic system and higher cognitive areas (e.g. prefrontal cortex). Three studies showed also more deactivations in the limbic system in response to acupuncture."¹⁰ The limbic system is associated with most of the body's emotional processing and acupuncture's regulatory effect on this region is likely the reason it can be helpful in mental-emotional conditions or concerns following a brain injury. An example of these brain region activations being point dependent was shown in a study that found the point KI-3, located posterior to the medial malleolus was shown to enhance connectivity between the superior temporal gyrus and postcentral gyrus, while GB-40, located anterior to the lateral malleolus, enhanced connectivity between the superior temporal gyrus and anterior insula.¹¹ These studies are limited however, and further research seems essential to create a thorough map of these influences.

A number of points have demonstrated by fMRI studies a correlation to brain activity in the frontal lobes,

Activating:

Motor Cortex: GB-34+GB-39 (electrical acupuncture), ST-36+GB-34 (electrical acupuncture)

SMA: ST-36 left side

Middle Frontal Gyrus: KI-3

Inferior Frontal Gyrus: KI-3

Deactivating:

Medial Frontal Gyrus: ST-36 left side, LI-4

Dorsolateral Pre-frontal Gyrus: LI-4

Inferior frontal Gyrus – LR-3 left side

Middle Frontal Gyrus: LR-3 left side, [BL-60, 65, 66, 67 right side]

George Soulie De Morant,¹² notes indications for brain regions according to his extensive studies of the medicine in China prior to the communist revolution when much of the information was either politically streamlined or lost. According to his studies these are the primary points indicated for the frontal lobe.

Points for the anterior frontal lobe:

Insufficiency: tonify SP-2, SP-3, LR-13, HT-9, GV-24, ST-40, PC-4

Excess: disperse SP-5, SP-3, GV-24

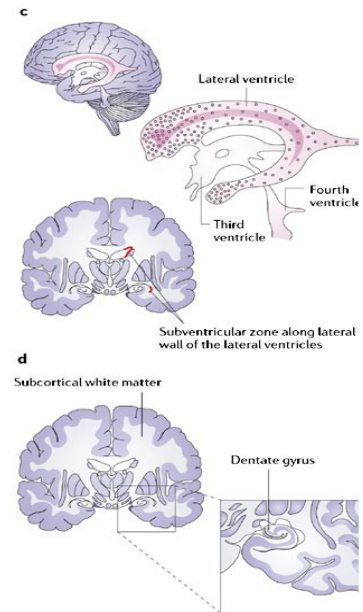
Points for the posterior frontal lobe:

GB-34, GB-27, BL-10, GB-20, PC-6

Role of Acupuncture in Neuroplasticity and Neurogenesis:

Acupuncture has been shown to have a direct influence on neuroplasticity and neurogenesis within the brain. This is the ability to create new neural connections and even generate new nerve cells. Until recently it was thought that any neuron loss due to injury or aging in adults was permanent. It is now known that neural stem cells are still active in certain parts of the adult brain, the dentate gyrus of the hippocampus and the subventricular zones. In neurogenesis stem cells are capable of developing into all major types of neural cells: Neurons, astrocytes, and oligodendrocytes. While we now know this ability exists in adults it is at a significantly slower rate than in children.

A recent study showed that acupuncture induces cell and neuroblast differentiation in the hippocampus, providing evidence that it may be useful as a neurogenesis-stimulating therapy. There has also been a demonstrated effect on cAMP signaling, a transcription factor important in proliferation, differentiation, and survival of neural precursor cells, as well as regulating neurotrophic factor that supports the growth, differentiation and survival of neurons. The following acupuncture points have been shown to influence neuronal proliferation:



-ST36	-CV12	-GV8
-GV20	-CV6	-LI11
-PC6	-SP10	-SJ5
-HT7	-GV16	-GB30
-CV17		

One of the most studied and clinically used points among these is ST36, located on the superior tibialis anterior muscle. Simulation of ST36 is used for a wide range of conditions affecting digestive system, cardiovascular system, the immune system, the nervous system, and has been widely used for brain disorders. In addition to the above listed actions, ST36 upregulated the expression of neuropeptide Y, which promotes the proliferation of neuronal precursor cells and appeared to lessen the neuropathologic effects of stress in rats.¹³

A recent study examined the role of acupuncture on brain tissue after cerebral ischemia (loss of blood supply to an area of the brain). This study showed a greater proliferation and differentiation of neural stem cells in the brain and an ability to increase blood flow and decrease cell death. Two points on the head, GV-20 and GV-26, regulate cells which “increase the release of nerve growth factors (NGFs) to make nerve cells survive and axons grow, synthesize neurotransmitters, (and) metabolize toxic substances.” While the use of GV-20 and GV-14 increased neural repair after ischemic damage. These points also activate bodily self-protection and reduction of nerve cell death in and near the site of injury. Needling points along the midline of the torso, often referred to as the conception vessel, also showed to increase growth factors [basic fibroblast growth factor, epidermal growth factor and NGF messenger RNA] in the subventricular zones and dentate gyrus.¹⁴

Pattern Differentiation: One Disease With Many Patterns and Treatments

In East Asian medicine theory a single disease can have multiple means by which it came to be or ways in which it occurs. In order to effectively treat, a thorough history of the person to determine exactly what symptoms are present and their inter-relation as well as verification of these by diagnostic tools should be done and treatment is based on the findings. Each pattern has a different recommended set of acupuncture points and/or herbal medicinals, for instance. Points or medicinals used based on pattern differentiation may be complimented by points that have an effect on the effected area of trauma. You may also note that the same “pattern” can relate to multiple “diseases”. In this case the pattern treatment points would be similar but symptomatic points would vary. In this article examples are given of common “patterns” found for the conditions of Mania (Traditionally called “Kuang”), Depression (“Dian”) and Impaired memory (“Jian Wang”) as they provide relevant examples and may correlate to broader elements of right, left and overall frontal lobe injury respectfully.

Impaired Memory (Jian Wang)

Heart-Spleen/Pancreas Dual Vacuity Pattern

-Impaired memory -Sallow yellow complexion -Lassitude of the spirit -Heart palpitations -Reduced sleep -Profuse dreams	-Shortness of breath -Fatigue -Poor appetite -Loose stools -Menstrual irregularities in females
---	---

One would typically find the person's tongue to be pale and enlarged with a white coat. Their pulse may be fine and weak. The treatment approach would be to fortify the Spleen/Pancreas, boost the Qi, supplement the Heart and nourish the Blood. Using this pattern as an example, common points used for this pattern would be BL-20, GV-20, HT-7 and ST-36 with a base herbal formula of Gui Pi Tang.

Kidney Essence Insufficiency Pattern

-Impaired memory -Absentmindedness -Lassitude of the spirit -A tendency to let the head fall forward,	-Possibly loose teeth -Loss and/or early graying of the hair -Low back and knee soreness and limpness -Weak bones
--	--

The tongue would likely be pale with a white coat. Their pulse may be vacuous or choppy. The treatment principles would be to supplement the Kidneys/Adrenals and boost the Essence.

Heart and Kidney not Communicating Pattern

-Impaired memory -Dizziness -Tinnitus -Heart palpitations -Absent-mindedness,	-Low back and knee soreness and limpness -Heat felt in the palms of hands and feet -Afternoon tidal heat -Night sweats -Insomnia
---	--

The tongue would likely be red with a scanty coat. Their pulse may be fine and rapid. The treatment principles would be to supplement the Kidneys/Adrenals, nourish the Heart and promote the interaction between the heart and kidneys

Phlegm Qi Depression & Binding Pattern

-Impaired memory -Somnolence -Dizziness or vertigo -Chest oppression -Nausea	-Reduced food intake -Profuse phlegm -Sound of phlegm in the throat -Spitting or hacking of phlegm -Sensation of something being stuck in the throat
--	--

The tongue would likely have a slimy white coat. Their pulse may be wiry and slippery. The treatment principles would be to transform phlegm and quiet the spirit, rectify the Qi and resolve depression

Blood Stasis Internally Obstructing Pattern

-Sudden onset of impaired memory that endures -Dry mouth w/ desire for fluids but no desire to swallow -Chest oppression	-Abdominal fullness and pain exasperated by pressure -Black stools
--	---

The tongue would likely be dark and purplish with possible static macules, possibly engorged sublingual veins. Their pulse may be wiry and choppy. The treatment principles would be to quicken the blood, transform stasis, and fortify memory.

Mania (Kuang)

Mania traditionally refers to an agitated, excited affect accompanied by inappropriate anger and/or laughing, mental, physical, and emotional restlessness, etc.

Liver Depression Transforming Fire Pattern

-Emotional tension -Agitation or irritability -Easy to anger with bouts of possibly explosive violence -Chest, breast, rib-side, & abdominal distention and pain	-Menstrual irregularity and PMS, -Bitter taste in mouth, -Possible constipation, headache
---	---

One would expect the person's tongue to be red, with red or swollen tongue edges and a thin yellow possibly slightly dry coat. Their pulse may be wiry and rapid. The treatment approach would be to course the liver and resolve depression, downbear fire and quiet the mind.

Phlegm Fire Harassing Above Pattern

-Impetuosity -Rashness and impatience -Breaking things and injuring other people -Cursing and foul speech,	-An angry look in the eyes -Red facial complexion -Red eyes -Bound constipated stools
---	--

The tongue would likely be red with a slippery yellow coat. Their pulse may be wiry, large, slippery and rapid. The treatment principles would be to settle the heart (emotions), resolve phlegm, clear the liver and drain fire

Stomach/Large Intestine Heat Binding Pattern

-Mania & agitation -Improper emotional expression -Non-stop laughing -Excess self-esteem with boasting or talking big -"Deranged speech" -Singing aloud -Climbing to high places -Very creative at making songs or ideas -Busy schedule and changing ideas frequently	-Possible illusions or hallucinations -Red facial complexion -Body feels very hot like fire burning -Tendency to strip off one's clothes -Running around -No eating for days -Thirsty and drinking cold water -Recalcitrant constipation w/ dry bound stools -Scanty reddish urine
---	--

The tongue would likely be red or purple with a thick dry yellow or grey coat. Their pulse may be deep, rapid and forceful. The treatment principles would be to clear and drain the Stomach and Large Intestine and quiet agitation

Yin Vacuity-Fire Effulgence (Heart and Kidney Not Communicating) Pattern

-Enduring, long-standing mania which is not too severe -Laughing but less power than previously -Irritability -Hoarse voice -Lack of strength but keeps going at the same pace -Vexation and agitation -Insomnia -Excessive speech	-Susceptibility to fear -Heat felt in palms of hands and feet -Afternoon tidal fever -Dry mouth -Constipation -Scanty and dark urination -Possible malar flushing -Possible night sweats
---	---

The tongue would likely be red with a scanty possible yellow or mirror-like coat. Their pulse may be fine, wiry and rapid or deep, thready and rapid. The treatment principles would be to supplement the kidneys and adrenals, nourish the liver, downbear fire and quiet the mind.

Stasis and Heat Mutually Binding Pattern

-Emotional lability -Agitation -Speaking to oneself -Delusional thinking,	-Auditory and visual hallucinations -Dark stagnant facial complexion -Piercing lancinating headache
--	---

The tongue would likely be dark red with static macules or spots and possibly engorged sublingual veins and a dry yellow coat. Their pulse may be wiry and rapid, possibly skipping. The primary treatment principles would be to quicken the blood and transform stasis.

Depression (Dian)

Stagnation of Liver Qi Pattern

-Depression -Mood swings -Restlessness -Chest, abdominal, and hypochondriac distention and pain	-Sighing -Pain & distention relieved by belching and/or passing gas, -Reduced appetite -Menstrual irregularities
--	---

One would expect the person's tongue to have a thin white or greasy coating. Their pulse may be wiry and slippery. The treatment approach would be to soothe the Liver, regulate Qi, and relieve depression

Qi Stagnation turning into Fire Pattern

-Easily agitated and irritable -Hypochondriac distention and pain -Chest oppression -Headache -Red eyes	-Tinnitus -Acid regurgitation -Dry mouth with bitter taste -Constipation -Stomach upset
---	---

The tongue would likely be red with a thin yellow coat. Their pulse may be wiry and rapid. The primary treatment principles would be to clear the Liver, drain fire, calm the Stomach, regulate Qi and relieve depression.

Vacuity of Yin and Blood (“Restless Organ Disorder”) Pattern

-Depression -Hysteria -Abnormal and unregulated emotional responses -Mood swings -Suspiciousness -Trance-like mental state	-Restlessness -Disorientation -Deafness -Aphonia -Convulsions -Chest oppression
---	--

The tongue would likely be pale with a thin white coat. Their pulse may be wiry and thready. The primary treatment principles would be to nourish the Heart, quiet the spirit, and relieve depression.

Heart and Spleen/Pancreas Dual Vacuity (Qi & Blood)

-Pensiveness -Palpitations -Poor memory -Insomnia	-Epigastric fullness and discomfort -Loss of appetite -Pale complexion -Fatigue
--	--

The tongue would likely be pale. Their pulse may be weak and thready. The primary treatment principles would be to tonify the Spleen/Pancreas, nourish the Heart, and relieve depression.

Schizophrenia₁₅

Traditionally in East Asian medicine schizophrenia was not a term used so its symptoms usually fell under those of “Kuang” or “Dian”. Due to correlations between left frontal lobe injury and symptoms akin to, if not diagnosed as, schizophrenia there are two other patterns in the literature specifically relating to schizophrenia that may relate to frontal lobe injury

Phlegm-Damp Obstructing Internally Pattern

-Lack of thought -Emotional Indifference -Laziness and Passivity	-Lack of Motivation -Impaired social skills
--	--

The tongue would likely be puffy with possible toothmarks and a white slimy coat. Their pulse may be slippery or sunken with a moderate rate. The primary treatment principles would be to dry dampness and transform phlegm.

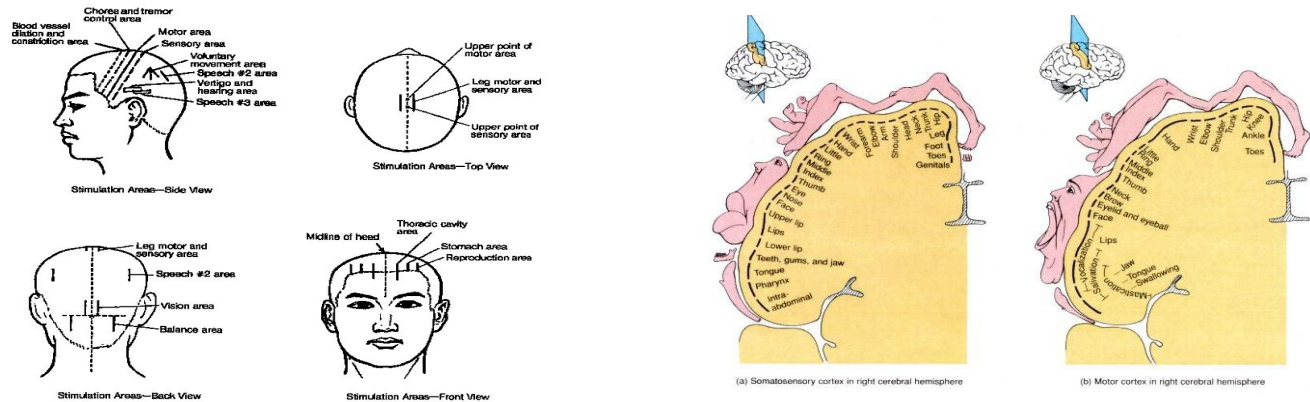
Yang Vacuity Damage Pattern

-Lack of Thought; or Significant Thought Content -Flat Affect -Lack of motivation	-Withdrawn behavior -Taciturn (disinclination to talk)
---	---

The tongue would likely be pale with a thin white coat. Their pulse may be sunken, fine and weak. The primary treatment principles would be to supplement vacuity and support the Yang.

Scalp Acupuncture

Most acupuncture points are located on the trunk and limbs. However, the points over the head play an important place in brain injury management with acupuncture. Specific scalp acupuncture systems and protocols are a relatively newly development yet promising method to treat brain injury and its related symptoms¹⁶⁻¹⁸. Several scalp “systems” exist, including needling over the sensory-motor homunculi along the parietal and frontal lobes to increase both movement and sensory feedback. Often some immediate benefit can be found from this method. Future research may be aimed at scalp acupuncture and its effects on the release of neurotransmitters and neurohormones.



Acupuncture Points located over the frontal lobes:

Points physically located over the frontal lobes have a range of indications. Many are beneficial for disorders of the eyes, ears and nose as well as other indications more relevant to this article. For the sake of brevity I have excluded eye, ear and nose indications of these points which can easily be found in the source texts.^{12,19}

ST-8: Headache, splitting headache with chills & fever, dizziness, vomiting, dyspnea with agitation & oppression, hemiplegia

GV-22: chronic headaches, deficiency and cold of the brain, bursting headache due to excessive consumption of alcohol, dizziness, visual dizziness, chronic and acute childhood fright wind, Blue-green complexion, red and swollen face, swelling of the skin of the head, dandruff, somnolence, fright palpitations. Awakens a response in ST-40, Anterior brain, true energy, vitality, Shen, association of ideas, of sensations, of images, concentration, imagination, psychological hearing: hears sounds, but comprehends the meaning poorly

Insufficiency: cerebral anemia, rapid fatigue of the brain, moments of weakness, foggy to the point of cerebral confusion, emotional agitation, deranged mind, bluish-white complexion, somnolence, weakness of the blood

Excess: cerebral congestion, heat and pain in the brain as if broken, congested face

GV-23: ceaseless bleeding from the nose and mouth, visual dizziness, redness and swelling of the face, swelling of the skin of the head, head wind, malaria, febrile disease with absence of sweating, mania-depression.

GV-24: mania-depression, ascends to high places and sings, discards clothing and runs around, mimics other people's speech, fright palpitations, insomnia, loss of consciousness, tongue thrusting, upward staring eyes, opisthotonos, wind epilepsy, wind dizziness accompanied by vomiting, vomiting with agitation and fullness, dizziness, head wind, headache with chills and fever, cold sensation of the head, nosebleed, Awakens a response in ST-40, psychological and cerebral hyperexcitation, excessive sadness, sobbing, pulls out hair, cannot sleep, apprehension, anxiety, jumps up on tables, sings, depression, migraines with photophobia

BL-2: frontal headache, head wind, dizziness, nosebleed, face pain, red face with cheek pain, infantile epilepsy with upward staring eyes, hemorrhoid pain, manic behavior, loss of consciousness, pain and stiffness of the neck, hyperexcited mind, nightmares, hallucinations, or serious depression to the point of loss of consciousness

BL-3: Headache, vertex headache, dizziness, dyspnea, epilepsy, agitation and fullness of the heart

BL-4: Headache, vertex headache, swelling of the vertex, nosebleed, agitation and fullness of the heart, dyspnea, absence of sweating, agitation and heat in the body

BL-5: Rigidity of the spine, opisthotonos, upward staring eyes, epilepsy, madness, tetany, clonic spasm, dizziness, headache, pain in the eye and head, heaviness of the head, does not recognize anybody

BL-6: Vertex headache, wind dizziness, deviation of the mouth, vomiting, agitation of the heart with vomiting, febrile disease with absence of sweating

GB-15: head wind, visual dizziness, pain of the occiput and forehead, pain of the supraorbital ridge, windstroke, epilepsy, loss of consciousness, malaria, pain of the supraclavicular fossa, swelling of the axilla, Easy fear, great emotiveness, violent sobbing, from shock; trembling, stiffness, pain stretching(particularly at night), depression

GB-16: headache, swelling of the head and face, toothache of the upper jaw, swelling of the gums, nasal congestion, epilepsy, aversion to cold, chills and fever with absence of sweating

Discussion

The treatment of frontal lobe injury with acupuncture and East Asian medicine is as individualized as the person who sustained the injury. Many factors are taken into account beyond site of injury, also taken into account are the primary symptoms and underlying states of the person's body and mind. All of these are considered and then prioritized and formed into a treatment plan that is always evolving based on any progress made. In this way acupuncture and East Asian medicine has much to offer in the treatment of frontal lobe injury and more broadly, traumatic brain injury. While there are points that have been indicated for, or demonstrated to influence the frontal lobes specifically and fMRI imaging is allowing these to be known with more specificity and precision, a significant amount of research still remains to be done in this capacity to realize the extent to which this approach can be used.

Only a small number of points have been tested and they should additionally be tested in both healthy individuals and those with a known brain injury to determine if there is significant differences as a recent study showed the effect on points for insomnia activated brain regions that were wider, larger and with greater intensity in those who were sleep-deprived versus those well rested.¹⁸ Additionally studies should be done over time to determine the extended effects on injured regions using these points. Until such time much of the treatment must be based off of physical and cognitive symptoms which is how East Asian has been used for thousands of years and thus able to work quite well under these circumstances.

The development of East Asian Medicine is based on the empirical experience on clinical applications of natural products and acupuncture. Acupuncture has been used effectively for at least 3,000 years and has accumulated rich clinical application experience. Although there are increasing number of patients and physicians in the United States and other Western countries accepting acupuncture as a complementary form of medical treatment, there have been no large-scale, well-controlled studies done evaluating acupuncture's management of brain injury.

Acupuncture is a safe treatment modality which seems to have no obvious side effects; however, there are no large-scale controlled studies done yet on acupuncture management of brain injury related problems. It is additionally a very cost-effective treatment strategy that can easily be implemented into rehabilitative programs. Clearly, this is an area of research that can meld East Asian medicine and Western medicine in an attempt to best optimize patient outcome following a brain injury.

How ultimately East Asian medicine will be integrated into the rehabilitative management of persons with brain injury is yet to be seen. Though patients could undoubtedly benefit from such an integration. Practitioners should remain open to treatment strategies such as acupuncture and natural medicinals that potentially assist their patients' recovery and/or function and commensurately advocate for these areas of intervention to be more critically assessed through high quality controlled research studies.²¹

For More Research, Articles and Information or to Contact The Author Visit

www.healingbraininjurynaturally.com

References

1. Joseph, R. Neuroscience: Neuropsychology, Neuropsychiatry, Behavioral Neurology, Brain & Mind, University Press Science Publishers; 4th Edition edition, 2011. Print
2. Silver, J., McAllister, T, Yudofsky, S. Textbook of Traumatic Brain Injury. American Psychiatric Publishing, Inc.; 2 edition, 2011. Print.
3. Filley, Christopher M. *Neurobehavioral Anatomy*. Niwot, Colo: U of Colorado, 2011. Print.
4. Keown, Daniel. *The Spark in the Machine: How the Science of Acupuncture Explains the Mysteries of Western Medicine*. Singing Dragon Publishing, 2014. Print.
5. Goldman, N, et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. *Nature Neuroscience*. 2010 Jul. 13(7):883-8
6. Luo, Benhua. "Development in Study on 'Qi Tonifying, Blood Regulating, and Essence Nurturing' Acupuncture Technique Treating Vascular Dementia." *Chinese Journal of Gerontology*. 14.139 (2014): 4091-4092
7. Cho ZH. et al. fMRI neurophysiological evidence of acupuncture mechanism. *Medical Acupuncture*. 2005. 14(1):16-22
8. Xu FM. Xie P. LV F-J. Mou J. Zhao JN. Chen WJ., Gong QY. Study of the corresponding areas of the liver and lung meridians in the brain with fMRI. *International J of Clinical Acupuncture*. 2008 17(2):61-6
9. Zeng Y. Liang XC. Central mechanisms of acupuncture investigated by the functional brain imaging technique. *European Journal of Oriental Medicine*. 2005:16-9
10. Huang W, Pach D, Napadow V, Park K, Long X, et al. (2012) Characterizing Acupuncture Stimuli Using Brain Imaging with fMRI - A Systematic Review and Meta-Analysis of the Literature. *PLoS ONE* 7(4): e32960. doi:10.1371/journal.pone.0032960
11. Modular effects of acupuncture on resting-state networks: a functional MRI study combining independent component analysis and multivariate causal analysis. *Journal of Magnetic Resonance Imaging*, 2012
12. Morant, G. Soulié De, and Paul Zmiewski. *Chinese Acupuncture*. Brookline, MA, U.S.A.: Paradigm Publications, 1994. Print.
13. Nam, M-H, Yin, C., Soh, K.-S., Choi, S-H, Adult Neurogenesis and Acupuncture Stimulation at ST-36. *Journal of Acupuncture and Meridian Studies*. 2011; 4(3)
14. Zhou-xin Yang, Peng-dian Chen, Hai-bo Yu, Wen-shu Luo, Yong-Gang Wu, Min Pi, Jun-hua Peng, Yong-feng Liu, Shao-yun Zhang, Yan-hua Gou. Research advances in treatment of cerebral ischemic injury by acupuncture of conception and governor vessels to promote nerve regeneration. *Journal of Chinese Integrative Medicine*. Jan. 2012; 10(3)
15. Flaws, Bob, and James Lake. *Chinese Medical Psychiatry: A Textbook & Clinical Manual: Including Indications for Referral to Western Medical Services*. Boulder, CO: Blue Poppy, 2001. Print.
16. Tang W. Clinical observation on scalp acupuncture treatment in 50 cases of headache. *Chinese Medicine*. 2002;22(3):190-2.
17. Nakazawa H. Averil A. Scalp acupuncture. *Physical Medicine & Rehabilitation Clinics of North America*. 1999;10(3):555-62.
18. Li J. Xiao J. Clinical study on effects of scalp-acupuncture in treating acute cerebral hemorrhage. *Chinese Journal of Integrated Traditional & Western Medicine*. 1999;19(4):203-5.
19. Deadman, Peter, Mazin Al-Khafaji, and Kevin Baker. *A Manual of Acupuncture*. Hove, East Sussex, England: Journal of Chinese Medicine Publications, 2007. Print.
20. Wong, G. "Traditional Chinese Medicine Theory in the Mechanism and Treatment of TBI". 2006 Pp.1051-1060 (discussion adapted from)
21. Xi-Jian, D., L. Bi-Xia, M. You-Jiang, J. Jian, and Z. Xian-Jun. "Different Cerebellar Responding to Acupuncture at SP6 under Different Sleep States: an fMRI Study. *J Sleep Disor: Treat Care* 2: 2." of 5 (2013): 2.