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Scalp Acupuncture and Mental Disorders

Chuen Heung Yau and Cheuk Long Ip

Abstract

While conventional treatments for many mental problems remain problematic and unsatisfactory in therapeutic outcomes, there is great demand for an effective yet economical treatment method that can alleviate the suffering of psychiatric patients. In traditional Chinese medicine, acupuncture on the scalp has been used for centuries. Not until recent decades did acupuncturists and clinicians develop new understandings and theories on the effect of scalp acupuncture. Upon elaboration on the therapeutic value of scalp acupuncture, it shows great potential in treating mental health disorders including depression, anxiety disorders, schizophrenia, and insomnia. Its profound treatment outcome in clinical use has caught clinicians' attention in recent years. However, controlled studies and investigations on its effect on psychiatric problems remain relatively small in number, and determinative evidence has yet to be found. In order to provide conclusive evidence on the use of scalp acupuncture to these disorders, more data from high-quality controlled trials are urgently needed. Since scalp acupuncture has advantages over the use of traditional acupuncture or body acupuncture in clinical and investigation settings, we are expecting a shift of attention from individualized acupuncture to a standardized universal scalp acupuncture treatment in clinical practice and academia.

Keywords: scalp acupuncture, treatment, mental disorder

1. Introduction

Mental disorders have been one of the leading contributors to the global disease burden in the twenty-first century. It has been accounted for one-third of the global disability [1]. Owing to the absence of cost-effective interventions and preventive measures, the prevalence of mental disorders shows no sign of declination. Surveys have shown that the increase in rates of treatments and therefore an even larger demand for mental health services has become an evitable problem for the society [2]. A proportion of patients with mental health problems shift from conventional health service to complementary and alternative medicine (CAM) [3]. Various studies showed the 12-month prevalence of CAM ranging from 10 to 75%, depending on populations and research methods [4]. Among all CAM applicable to patients, acupuncture, as one of the components in traditional Chinese medicine (TCM), has been commonly used in East Asian countries including China and Taiwan [5, 6]. In contrast to traditional body acupuncture, treatments for mental illness are more focused on acupuncture on the scalp. The sole use of acupoints or lines on the scalp in acupuncture deviates from the concept of traditional acupuncture and named

scalp acupuncture. The development of scalp acupuncture has been rapid in the recent decades, and there is emerging evidence in supporting its use in patients with mental illnesses.

2. History of scalp acupuncture

The earliest medical record for the application of acupuncture on scalps can be traced back to around 5 BC [7]. Since then, experiences accumulated with the utilization of acupuncture on the scalp in treating various illnesses. Along with the establishment of TCM theories, it had been a component in traditional acupuncture system. Until the 1950s, acupuncture experts started to observe and recognize the relationship between illnesses and subscalp spots. Inspired by micropuncture systems concepts and influenced by anatomical and physiological knowledge from modern medicine, new theories and new needling techniques had been established [8]. In the 1970s, acupuncturists from different areas of China developed their own schools of theory, and several scalp acupuncture systems have been suggested. Despite variations present in theoretical concepts, sites of acupuncture (acupoints), and nomenclature among different schools, many areas such as the clinical indication and treatment procedures share common ground. Most recognized theories include the adaptation of knowledge in cerebral anatomy, physiology, neurology, and reflexology. Owing to the impressive therapeutic effect of scalp acupuncture in treating brain diseases as well as other illnesses, there was a strong urge to facilitate academic exchange and promote scalp acupuncture to wider communities. Intensive efforts had been made in standardizing the names of the scalp acupoints. By the time the World Health Organization (WHO) set up an international standard scalp acupuncture nomenclature systems in 1989, scalp acupuncture had been already extensively applied by therapists and acupuncturists around the globe [9]. Some places like the USA and Japan had even developed their own understandings in the field of scalp acupuncture [10, 11]. In short, scalp acupuncture is a technique derived from TCM, yet its theory and application involves multiplicity of systems that have been rapidly developing in the recent decades.

3. Modern adaptation of scalp acupuncture in mental disorders

In TCM concepts, all patients can be categorized into different syndrome types despite the diagnosis of disease. Patients will then be prescribed with a unique treatment regimen, i.e., two patients suffering from the same disease might receive prescription of different acupoints since they may vary in syndrome type [12]. This individualized medicine concept has been a feature of TCM since the early establishment of the philosophy of TCM. However, there are few shortcomings for this manipulation. Firstly, the differentiation of syndrome types may not be accurate or definite as the diagnosis procedures are highly dependent to the therapists' clinical experience. Besides, since most patients with mental problems have complicated somatic problems or being masked by the side effects of psychiatric medication, diagnosis of syndrome type according to TCM theories may become exceptionally difficult. Moreover, individualized acupuncture treatment may provide inconsistent therapeutic outcomes. Objective observation and comparisons of the treatment results become impossible as the testing subjects are using different acupoints. As a result, we suggest the use of standardized, identical acupoint regimen for acupuncture treatment on psychiatric patients.

Instead of body acupuncture, scalp acupuncture has been widely used in diseases originated from the brain. The invention of scalp acupuncture has been with accordance to the neurology and reflexology knowledge of the brain and scalp structures. It is perceived that acupuncture stimulation on the subscalpular tissue may exert influences to the respective lesion in the brain [7]. A large proportion of preceding clinical trials of acupuncture on various mental illnesses such as anxiety, depression, and insomnia adopted the essential use of scalp acupuncture, while the collateral use of body acupuncture remains elective [13–15]. The sole use of scalp acupuncture in treating insomnia or other diseases such as intracerebral hemorrhage and Parkinson's disease has been endorsed in literatures [15–17]. Therefore, we are convinced that the use of scalp acupuncture will be sufficient to bring about therapeutic value to the psychiatric patients.

Besides, scalp acupuncture shows superiority over body acupuncture in clinical situations. Unlike body acupuncture, patients receiving scalp acupuncture are not required to retain on bed. They can sit on chairs or carry out static activities during treatment sessions. Another advantage of scalp acupuncture is that since textile sensitivity of the scalp is relatively low, scalp acupuncture would cause less pain and discomfort when compared with body acupuncture. Apart from diminished unpleasant sensation during needle insertion, the manipulation of scalp acupuncture cannot be easily seen by the treatment recipients. This is important especially to those patients who easily feel anxious upon seeing needles.

4. Procedures of scalp acupuncture

In practice of scalp acupuncture, sterile disposable acupuncture needles of the standard size of 0.20 × 25 mm or 0.22 × 25 mm are usually used. Acupuncture needles are obliquely inserted onto the selected acupoints with an angle of 15–30° after standard sterilization procedures. The needles should be inserted at a depth of 10 mm lying between aponeurosis layer and loose areolar connective tissue. Needles rest too deep or too shallow at the scalp structure will cause pain and diminished effect. After the insertion, mild stimulation to the needles is recommended. Needles can be swirled at time intervals. A standard session of scalp acupuncture treatment will last for at least an hour before the needles are carefully removed after the treatment.

5. Selection of acupoints in treating mental disorders

According to TCM theories, acupoints are explicit points located at the surface of our bodies. Each acupoint serves its own function and can be joined together to form meridian lines. The selection and combination of acupoints is the most crucial component in acupuncture therapy. For example, it is understandable that the use of acupoints in treating brain diseases is definitely distinct from those for alleviating pain problems such as back pains. In the treatment of mental problems or brain organic problems, acupoints and scalp lines on the scalp including Baihui, Sishencong, midline of the forehead, lateral line 2 of the forehead and posterior lateral Line of the Vertex are commonly used.

Baihui is located at the vertex of the midline of the head, which is the meeting point from apexes of ears. It is one of the acupoints on the governor vessel (GV). The governor vessel is known to have its passage running from the coccyx upward along the spine into the brain. Under the TCM theory, it is the convergence of all Yang meridians and thus stimulation at Baihui can boost the flow of Qi in all the

Yang meridians, benefits brain development, and enhances intelligence. In modern studies, Baihui has been comprehensively studied and applied in treating a variety of brain diseases and mood disorders such as intracerebral hemorrhage, dementia, depression, anxiety, insomnia, etc. [13, 18–20].

Around the site Baihui locates the acupoints Sishencong. Sishencong is the four points located at 1 cun anterior, posterior, and lateral to Baihui. They are excluded from the 12 main meridians. Sishencong is known for its calming effect as well as tranquilizing excitement in mood. Different directions of needle insertion at Sishencong, such as pointing toward or away from Baihui or toward the side of brain lesion, can bring about different therapeutic effects. In general, it facilitates the harmony of Yin and Yang.

The location of the midline of forehead, also known as Shenting is 0.5 cun above the hairline and within the midline. Similar to Sishencong, it has been used to calm emotions and improve poor memory in theory. Lateral line 2 of the forehead are two acupoints located 0.5 cun above the hairline and directly above the pupils. In reference to anatomy, the midline and lateral line 2 of the forehead are the site of the prefrontal cortex (PFC). There are mainly five functions of PFC, which are executive functions, memory, intelligence, language, and gaze control. Because of the rich cortical and subcortical connection, PFC can initiate and perform goal-directed patterns of behavior, short-term memory tasks, planning, problem solving, etc. [21].

Posterior lateral lines of vertex are two points that are 1 cun next to the posterior Sishencong. It is located at posterior parietal lobe, anterior to the occipital lobe, and posterior to primary somatosensory cortex. Together with the close interconnection with frontal premotor area, it serves as a sensory-motor interface [22]. It receives sensory input from somatosensory cortex, and other regions of the brain integrate the information to allow the executive functioning.

6. Mechanism of scalp acupuncture

Acupuncture for treating brain diseases is never mythical or ritual. It has originated from years of clinical experience and scientific proofs. Scalp acupuncture has proven to bring both functional and structural changes to the brain. Study has shown that scalp acupuncture at Sishencong can significantly decrease the heart rate and blood pressure of the test subjects. It is suggested that it exerts its effect through modulation of autonomic nervous system [23]. Another physiological change induced by scalp acupuncture is the regulation of perfusion in the brain. An alteration of perfusion among brain structures is detected under the inspection of single-photon emission computerized tomography (SPECT) [7, 24]. It is suggested to be the action of vasoconstrictor endothelin-1 (ET-1) [25]. The dysfunction of the brain structures in brain diseases and injuries can be detected and depicted by the probe of abnormal brainwaves [26]. Scalp acupuncture has shown its ability in restoring normal waveforms in healthy and depressed patients [27, 28]. In the long term, acupuncture provokes modulation at cortical structures including orbitofrontal cortex and prefrontal cortex and medial temporal lobes, together with limbic regions of hypothalamus, amygdala, cingulate, and hippocampus. The effects of acupuncture on these structures have been strongly supported by neuroimaging data obtained from electroencephalography (EEG), fMRI, magnetoencephalography (MEG), and positron emission tomography (PET) [29].

Altered catecholamine levels are commonly found in patients with mental illness. The use of scalp acupuncture has been suggest to bring about a surge of neurohormones and neurotransmitters in the central nervous system such as adrenocorticotrophic hormone (ACTH), beta-endorphins, γ -aminobutyric acid (GABA)

protein, noradrenaline, and serotonin [30, 31]. Other molecules such as brain-derived neurotrophic factor (BDNF), postsynaptic density-95 (PSD-95) protein, and nitric oxide synthase (NOS) also respond to scalp acupuncture, suggesting their possible participation to the mechanism of action [32, 33].

7. Indication for scalp acupuncture on mental disorders

There has been a long history of utilizing acupuncture in treating mental health problems and “mind-related” syndromes in ancient China. However, scientific literatures and clinical trials on acupuncture for mental problems had not been recorded until 1980s. Despite numerous clinical observations and controlled trials that have been made since then, evidences have remain insufficient to draw a definitive conclusion on the general use of acupuncture on psychiatric patients. More high-quality controlled trials with greater sample size and longer follow-up period are clearly needed in order to advocate the use of scalp acupuncture for treating mental illness.

7.1 Depression

Depression is the most common mental problem [34]. The disappointing response rate and side effects of conventional medication discourage a proportion of patients from complying conventional treatments. Instead, they turn to CAM treatments, including scalp acupuncture. Meta-analysis has shown possible efficacy of scalp acupuncture on major depressive and bipolar disorders and antepartum and post-stroke depressions [14, 35]. Several studies suggested that the effect of scalp acupuncture is comparable to conventional medication, while a study concluded better outcome in somatization and cognitive process disturbances over antidepressant [36]. Despite various clinical investigations that have been carried out, additional high-quality randomized controlled trials are urgently needed to provide conclusive evidence [37].

7.2 Anxiety disorders

Controlled studies have obtained consistent positive results on the use of acupuncture in patients suffering from anxiety disorder. However, most investigations have been focused on preoperative anxiety, generalized anxiety disorder, or anxiety neurosis only, while there is a large vacancy of knowledge about the effect of acupuncture on specific anxiety disorders like panic disorder, phobias, or obsessive-compulsive disorders [13]. A recent meta-analysis advocates the use of acupuncture on patients having post-traumatic stress disorder (PTSD) [38]. It is worth mentioning that a large proportion of studies concerning anxiety have been utilizing auricular acupuncture and body acupuncture, whereas investigations on the use of scalp acupuncture are scarce. We can see a great demand for complementing our knowledge toward the use of scalp acupuncture on various anxiety disorders.

7.3 Schizophrenia and psychotic disorders

Relatively few studies have been made on the use of scalp acupuncture to psychotic patients. Most studies suggested limited evidence on the use of acupuncture as adjuvant treatment along with antipsychotic medication. However, a general significant improvement in sleep quality and extrapyramidal side effects has been observed in psychotic patients receiving acupuncture treatment [35, 39].

7.4 Insomnia

Insomnia and sleep disorders are common mental health problems that have been always overlooked. Poor sleep quality could adversely affect the quality of life and deteriorate mental status. The use of acupuncture and scalp acupuncture may benefit insomnia patients, according to recent systematic review literatures. Since the current results of the clinical studies are promising and consistent, the use of acupuncture may be encouraged as an adjunctive therapy in insomnia [15]. We are expecting more high-quality evidence supporting especially the use of scalp acupuncture in the treatment of insomnia in the near future.

8. Contraindication of scalp acupuncture

The contraindications of scalp acupuncture include infants with unclosed cranial fontanelles and sutures. Patients with cranial infection, ulcer, or scars on scalp are not advised to perform scalp acupuncture. Patients with past history of epilepsy or seizure should be comprehensively evaluated by the therapists before receiving treatment. Patients extremely anxious toward needles should be handled with care. Appropriate counseling and encouragement will be useful in building a good rapport between therapist and the parent. Possible side effect of scalp acupuncture includes discomfort or mild pain by the needle, emotional distress during the treatment sessions, bleeding, sleep disturbance, and increased hyperactivity.

9. Summary

Scalp acupuncture deserves greater concerns on its application on mental disorders. It has advantages over conventional individualized body acupuncture in clinical practice, and its effect could be objectively observed. Evidence from neuro-imaging, biochemical investigations, and clinical trial has been supporting the use of scalp acupuncture on patients with mental disorders. We see great potential in scalp acupuncture to play an important role in alleviating or even preventing mental health problems in the future. Nonetheless, there is an urgent need for quality trials to provide definitive evidence to support the use of scalp acupuncture for various mental disorders.

List of abbreviations

CAM	complementary and alternative medicine
ET-1	endothelin-1
EEG	electroencephalography
fMRI	functional magnetic resonance imaging
GABA	γ -aminobutyric acid
GV	governor vessel
MEG	magnetoencephalography
MRI	magnetic resonance imaging
NOS	nitric oxide synthase
PET	positron emission tomography
PTSD	post-traumatic stress disorder
PFC	prefrontal cortex

PSD-95 postsynaptic density-95 protein
SPECT single-photon emission computerized tomography
TCM traditional Chinese medicine
WHO World Health Organization

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