

**SOUTH BAYLO UNIVERSITY**

**The Effectiveness of Acupuncture for the Treatment of Tension-Type Headaches**

**by**

**Christine Connor**

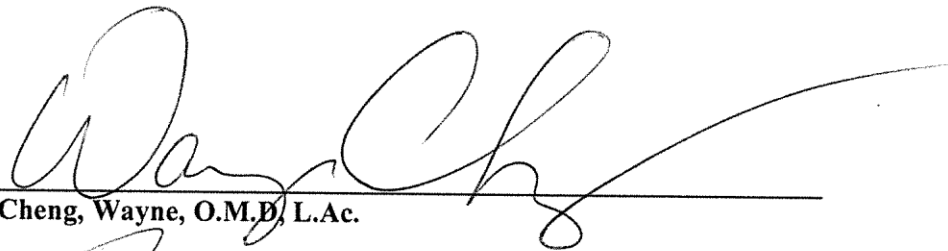
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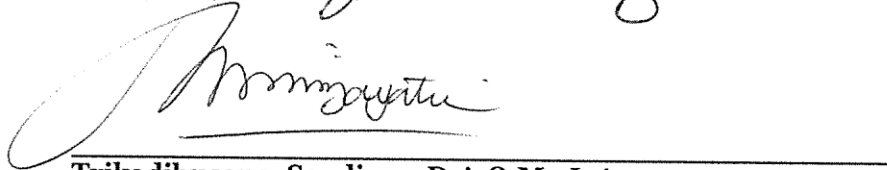
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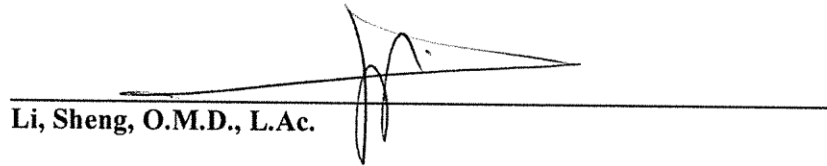
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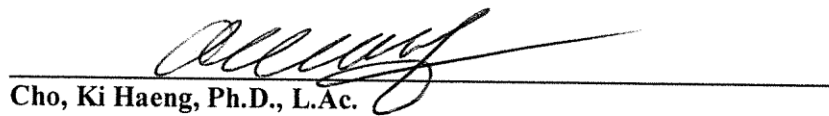
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# **The Effectiveness of Acupuncture for the Treatment of Tension-Type Headaches**

**Christine Connor**

**SOUTH BAYLO UNIVERISTY AT ANAHEIM, 2018**

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## **ABSTRACT**

Tension-type headaches are a common problem treated with acupuncture today, though effectiveness of the treatment is controversial. The purpose of this literature review is to evaluate the effectiveness of acupuncture in comparison to sham acupuncture, and no acupuncture in the treatment of tension type headaches. Three databases were searched, Central, Medline and Embase, from January 1992 to January 2018 using keywords; Acupuncture And Tension type Headache And RCT. Six trials with 1631 participants, mean age 44, met inclusion criteria. Only one study [Melchart 20005] compared acupuncture intervention to no acupuncture (waiting list) in treatment of TTH. The other five studies were used to compare acupuncture to sham interventions. For acupuncture vs waiting list we found that acupuncture had significantly less days with headache, lower intensity scores and less analgesic use than waiting list group (no acupuncture) at 8 weeks after treatment, 3-4 months after treatment and 6 months after treatment. Acupuncture vs. sham intervention we found that acupuncture was significantly more effective than sham for days with headache at 8 weeks after treatment

and at 3-4 month and 5-6 months after treatment. Headache intensity results show no significant differences at 8 weeks or 3-4 months, only at 5-6 months is acupuncture shown to be significantly more effective than sham in treatment of TTH. Analgesic use could only be measured for 3-4 weeks and 5-6 months and outcomes show that acupuncture is significantly more effective than sham for lowering analgesic use in the treatment of tension-type headaches. The headache scores (sum of intensity scores) did not show a significant difference between acupuncture and sham. These findings of this review show that acupuncture is significantly more effective than no acupuncture and acupuncture is significantly more effective than sham acupuncture in the treatment of tension-type headaches.

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## I. INTRODUCTION

### I.1. Research Background

Tension-type headaches (TTH) are the most common form of headache, occurring in about three-quarters of the general population according to the American Migraine foundation. TTH are recurrent episodes of headache lasting minutes to weeks. The pain is typically pressing or tightening in quality, of mild to moderate intensity, bilateral in location often described as a band around the head [Cephalgia 2005] Pain does not get worse with physical activity ,nausea and vomiting are usually absent, but photophobia may be present. Tension-type headaches are categorized as not occurring more than 15 days out of the month [Cephalgia 2005].

The diagnostic difficulty most often encountered in Western medicine for the primary headache disorders is in discriminating between tension-type headache and migraine without aura [Zhao 2011]. Many frequent headache sufferers usually suffer from both disorders [IHS 3rd edition]. Pharmacotherapy remains the mainstay of management strategy in primary headache disorders, though many patients still experience pain and social disruption. Adverse side effects such as medication overuse headaches (MOH) and medication dependency may also limit the benefits of pharmacotherapy for tension-type headaches [Zhang 2009].

In traditional Chinese medicine (TCM) there are 2 diagnostic frameworks for headache: meridian diagnosis, based on the location of the pain, and syndrome diagnosis, dependent



on external and internal factors and the characteristics of the pain. The syndromes may be due to excess or deficiency. Very generally, the excess syndromes correspond to migraine and deficiency syndromes correspond to tension-type headaches [Schiapparelli 2011]. TCM offers another dimension of diagnostics and differentiation of tension-type headache. Over the last two decades, several studies have investigated the efficacy of acupuncture in relieving headache. Some of them suggested acupuncture may be useful, while others show no superiority over sham acupuncture [Karst 2001]. Thousands of patients treated by general practitioners, hospitals, headache clinics and a profusion of drug regimes attribute to the fact that current headache treatment is unsatisfactory [Loh 1885]. Acupuncture may be a cost effective alternative treatment worthy of further investigation. This review analyzed the results of current studies comparing acupuncture to sham acupuncture and no acupuncture for the treatment of tension-type headache.

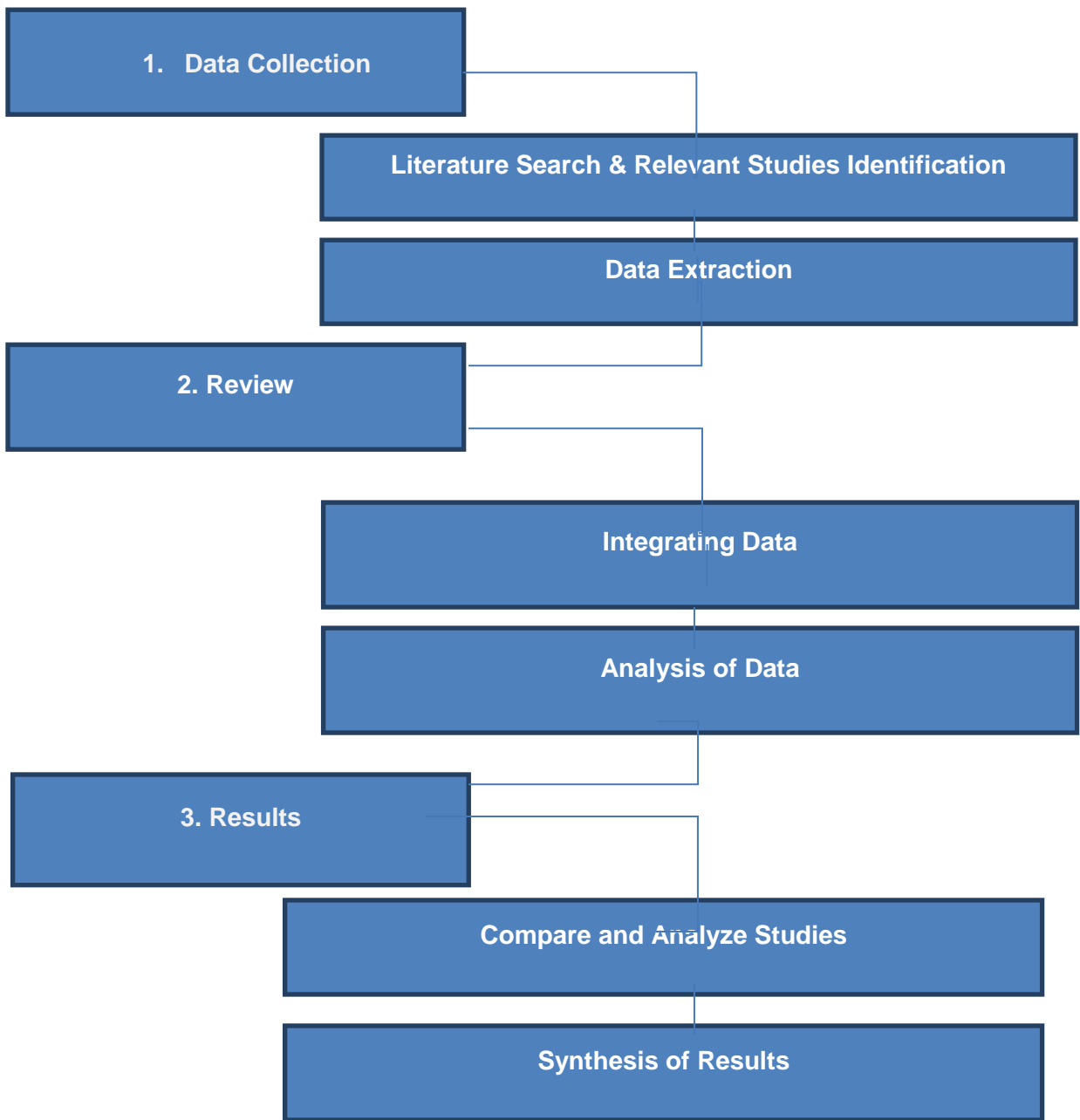
## **I.2 Research scope and significances**

There have been many studies done on acupuncture for migraines and tension type headaches in the past, and they generally support acupuncture as being a beneficial treatment. There are also many conflicting reports that state that acupuncture is not better than sham acupuncture in treatment of acupuncture. By pooling the results from 6 different studies we are able to gain a larger scale and longer term view of the effectiveness of acupuncture for TTH.

This study began with data collection as shown in Figure 1.1 literature search was conducted on 3 databases and relevant studies were identified. The selected studies were reviewed thoroughly, and key information was extracted for further analysis. The data was has been organized and systematically integrated to compare treatments and analyze the data.

### **I.3 Research Objectives**

In this literature review 5 randomized controlled trials were compared, analyzed and synthesized to determine the effectiveness of acupuncture for tension -type headaches.. We used studies that compared acupuncture to minimal acupuncture, sham acupuncture and no acupuncture to determine the effectiveness of these treatments for TTH. Information on patients, methods, interventions, outcomes and results, were extracted. Outcome criteria included (at least 50 % reduction in headache frequency) , days with headache per month, headache intensity scores (VAS pain scale 1-10), analgesic use (days with medication use) and headache scores (sum of intensity scores). The objective of this study is to evaluate the effectiveness of acupuncture in the treatment of tension -type headaches by comparing these outcomes from 6 included trials Results have been extracted, pooled and analyzed. Figure 1 below shows research procedures.



**Figure 1. Flow Diagram of Research Procedures**

## II. LITERATURE REVIEW

### II.1 Western Medicine Overview

The International Headache Society (IHS) classification of tension type headache is divided into two forms; episodic (ETTH) and chronic (CTTH). The episodic tension type headache is further divided into frequent or infrequent. All three categories of headache share common characteristics except for frequency; pressing or tightening quality of pain, mild to moderate intensity, bilateral, feels like a band around the head, no nausea and pain does not increase with activity [Cephalgia 2018]. The [IHS 2018] also suggests that on examination, the clinician should check for pericranial tenderness in patients to further distinguish the tension type headache as associated or not associated with pericranial tenderness. [IHS 2018]

The current recommendations for tension-type headache treatment from the EFNS taskforce are: simple analgesics and non-steroidal anti-inflammatory drugs. The second choice of treatment is a combination of analgesics containing caffeine. Triptans, muscle relaxants and opioids should not be used [Bendtsen 2010] A warning is added; It is crucial to avoid frequent and excessive use of analgesics to prevent the development of medication overuse headache. The tricyclic antidepressant Amitriptyline is a drug of first choice for prophylactic treatment of chronic TTH. Mirtazapine and Venlafaxine are drugs of second choice. Along with these recommendations the EFNS taskforce also states; The efficacy of prophylactic drugs is often limited, and treatment may be hampered by side effects. Treatment of frequent TTH is often difficult, Non-drug management should always be considered first although the scientific basis is limited [Bendtsen 2010].

Various non-pharmacological treatments have been used for tension-type headache with some degrees of benefits. In particular, acupuncture has been widely used to treat headaches [Alias2003]. In a 1998 National Institute of Health consensus statement, acupuncture was accepted as a viable alternative for treating headaches [Alias 2003]. Current studies done on acupuncture for tension-type headache have shown contradictory results. Some studies show acupuncture is superior to sham, others show no significant difference [Endres 2007]. More research is needed to determine the effectiveness of acupuncture and tension-type headaches.

Little is known about the relationship between International Headache Society diagnostic criteria and traditional Chinese medicine (TCM) diagnosis in primary headache disorders. In a secondary analysis of the data of the prospective, controlled, blinded German acupuncture trials for migraine and tension-type headache. Data were collected from 1042 headache patients, of whom 633 were diagnosed with migraine and 409 with tension-type headache, it was found that the diagnoses of migraine and tension-type headache were mirrored by different patterns of TCM diagnoses. The patterns Liver Yang Rising, Liver Fire Rising, and Phlegm appearing to be best suited to differentiating between migraine and tension-type headache.[Bowling 2010] Although not unexpected, given that the diagnosis of primary headache disorders in both diagnostic systems is based largely on the nature and quality of patient-reported symptoms, this finding suggests that migraine and tension-type headache are associated with different patterns of TCM diagnosis [Bowling2010]. TCM offers additional insight into diagnosis and differentiation of tension-type headaches that can be used for specification of acupuncture treatment.

## **II.2 Chinese Medicine Overview**

In Traditional Chinese Medicine (TCM) health is seen as a balance between two opposing forces, Yin and Yang. When these two forces are in balance the person is said

to be in good health. When yin and yang are out of balance TCM diagnosis is used to determine the root cause of the imbalance. A treatment plan is designed to return the body to its natural state of balance and health [Schipparelli 2011].

Acupuncture has a long tradition of use for the treatment of many pain conditions, including headache. Headache is one of the most common symptoms seen in an acupuncture clinic as very few people have never experienced a headache before. The main aetiological factors contributing to tension-type headache are: Constitution, emotional stress, (anger in particular), overwork, excessive sexual activity, irregular diet, trauma, childbirth, and external pathogenic factors [Maciocia 2005]. Treatments are based on syndrome differentiation and different acupuncture points are used for each syndrome. Differentiation is done according to the eight principles of Chinese medicine; Interior/Exterior, Deficiency/Excess, Heat/Cold, and Yin/Yang [Cheng 2010]

Headaches can be due to Exterior conditions such as: Wind-Cold, Wind-Heat, Wind-Dampness. They may also be due to Interior conditions that are either empty or full. Interior full conditions consist of; Liver-yang rising, Liver-fire, Liver-wind, Liver-Qi stagnation, Stagnation of cold in liver channel, Dampness, Turbid phlegm, Turbid-phlegm-wind, Liver-yang rising with phlegm in the head, Retention of food, Stasis of blood, and Stomach -heat. Empty conditions consist of; Qi deficiency, Blood deficiency and Kidney deficiency [Maciocia 2005]. The differentiations of different types of headache are used extensively in herbal prescriptions. Acupuncture differentiations and point selection are chosen according to the following differentiations;

### II.3 Acupuncture Point Selection

Wind invasion is broken down to 3 categories with the following point prescriptions used

**Headache due to pathogenic invasion of wind into the meridians and collaterals: Wind Cold:**

LU 7, GB 20, Du 16, Bl 10, all with reducing method. **Wind Heat:** L I 4, GB 20, Du 16, Du 14, TB 5, all with reducing method. **Wind Dampness:** Lu 7, LI 6, SP 6, ST 8, Du 23, all with reducing method.

The liver is involved in headaches for the following diagnoses and point prescriptions:

**Headaches due to upsurge of liver-yang:** LV 3, LV 8, SP 6, TB 5, GB 20, and extra point Taiyang, using reducing method on LV 3 and GB 20, and reinforcing method on LV 8, SP 6, and KD 3. and even method on Taiyang. **Liver fire:** LV 2, SP 6, TB 5, GB 38, GB 20 and extra point Taiyang and on distal points use reducing method, on local points use even method. **Headache due to Liver-qi stagnation:** LV 3, GB 34, LI 4, ST 36, Du 4, Shenting, Taiyang, LV 3, LI 4 with reducing method, ST 36 with reinforcing method and local points with even method. A less common disorder is **Headache due to stagnation of cold in the liver channel:** LV 3, Du 20 Reducing method on LV 3, followed by application of moxa on needle, even method on Du 20.

Blood related issues are treated with the following point prescriptions: **Headache due to deficiency of blood:** ST 36, SP 6, BL 20, LV 8, Ren 4, Tonifying method on all points. **Headache due to blood stagnation:** LI 11, LI 4, SP 6, LV 3, also Ashi points (tender points) reducing method is used on all points.

Digestion can be involved in headaches in the following diagnoses and point prescriptions: **Headache due to retention of food:** Ren 10, ST 21, P 6, ST 34, ST 45, LI

4, ST 8, using even method on Ren 10, ST 21, and ST 8 and even method on all other points. **Headaches due to stomach-heat:** ST 44, LI 4, Yintang

Reducing method on ST 44, and LI 4, and even method on Yintang.

When dampness and phlegm are the causes we use the following point prescriptions:

**Headaches due to dampness:** SP 3, LI 4, LU 7, Ren 12, UB 20, ST 8, with reducing method on SP 3, and LI 4, even method on ST 8, and reinforcing method on LU 7, BL 20, and Ren 12. **Headaches due to turbid phlegm:** St 40, LI 4, LU 7, ST 8, Du 20, with reducing method on ST 40 and LI 4, reinforcing method on LU 7, even method on ST 8, Du 20.

Use the following prescription for **Headaches due to kidney deficiency:** KD 3, St 36, SP 6, Du 20, GB 19, for kidney yin deficiency use Ren 4, for kidney yang deficient use UB 23. All points should be reinforced. Moxa can be used on KD 3, unless there is pronounced symptoms of deficiency heat. In case of kidney yang deficiency moxa can be used directly on BL 23. Direct moxa can also be used directly on Du 20[Giovanni].

#### **II.4 Differentiation of Syndromes**

**Wind Pathogenic Invasion;** Attacks of endogenous or exogenous factors may cause headache due to derangement of qi and blood in the head and retardation of circulation of qi in the meridians that go to the head [Mariocia 2005]. Headache caused by exogenous pathogenic factors is mostly due to invasion of pathogenic wind. Wind is the primary exogenous pathogenic factor in causing disease, since cold, damp, dryness and heat all



depend on wind to invade the body. Wind is a yang pathogenic factor and is characterized by “upward and outward dispersion” and can easily invade the upper part of the body.

Wind can interfere with the opening and closing of pores with clinical manifestation of headaches [Cheng 2010]. The main manifestations of wind headache are pain extending to the nape of neck and back regions. This pain is violent boring and fixed pain accompanied by a thin tight pulse and usually a white tongue coating.[Cheng 2010].

**Liver Yang Rising;** This is probably the most common type of interior headache. The most frequent cause of liver yang rising headache is emotional, particularly frustration, anger and resentment [Mariocia 2005]. There are 4 situations that can precede **Liver-yang rising; Liver-Blood deficiency, Liver-yin deficiency, Liver-and Kidney yin deficiency and Liver/Kidney- Yin and Kidney -Yang deficiency**[Mariocia 2005]. The main manifestations of headache due to upsurge of **Liver-yang rising are headache,** blurred vision, severe pain on bilateral sides of the head, irritability, hot temper, flushed face, bitter taste in the mouth, wiry rapid pulse, red tongue with yellow coat [Cheng 2010 ]. Liver-fire symptoms are similar to liver-Yang symptoms with the main difference being that the Liver- fire is an excess pathogenic factor[Mariocia 2005].

**Liver Qi Stagnation;** This type of headache is usually brought about through stress, and is a common type of tension headache. Associated symptoms may include; hypochondriac pain or distension, nervous tension, poor digestion, belching, flatulence, abdominal distension, small bitty stools, sighing and a wiry pulse. Liver qi stagnation headaches are usually located on the forehead and temples and may have a characteristic of moving from side to side, and are associated with stomach disharmony, such as food

retention in the stomach. The pain is intense but not as throbbing as a liver-yang type headache[Mariocia 2005].

**Stagnation of Cold in the Liver Channel;** This is called a terminal yin headache and it is rare. It presents with an intense pain at the top of the head, a chilly icy sensation at the time of pain [Flaws 2007] a feeling of cold, cold limbs and vomiting with a wiry (liver) pulse [Mariocia 2005].

**Blood Deficiency;** The main symptoms are a one-sided headache most often occurring in females perimenstrally, blurred vision, tunnel vision, photophobia, numbness and tingling of the fingers or face, chest, rib-side and/or breast distention and fullness, sighing, may be aggravated by emotions such as anger or depression, fatigue, cold hands and feet, irregular periods. Often with lower abdominal bloating and pain, alternating diarrhea and constipation, or loose stools, a pale but dark tongue with white coat, and a thin fine pulse [Flaws 2007]

**Blood Stagnation;** This is an enduring headache that will not heal, immovable fixed pain, piercing, lancinating pain, possible history of traumatic injury to the head, a purple dark tongue or possible static macules or spots and a wiry pulse [Flaws 2007].

**Food Retention;** This type of headache is felt on the forehead and can be very intense. It is related to food intake , so it will be aggravated by eating. Can often be an acute headache after eating wrong foods or too much food. It is usually accompanied by bloating and fullness of the epigastrium, sour regurgitation, belching, foul breath and a sticky, tongue coating with a slippery pulse [Mariocia 2005].

**Stomach Heat;** The stomach related headaches are found on the forehead, this one can be acute or chronic. If it appears as a symptom of a febrile disease, it is related to the

Yang-ming of the six stages patterns and is caused by exterior cold. The Yang -Ming stage is characterized by heat in the stomach. In chronic cases this type of headache is due to a long standing condition of heat in the stomach. The causes of this headache are excessive consumption of hot energy foods, such as meats, spices, fried foods, and alcohol. It is felt as an intense pain across the forehead and is accompanied by a desire to drink cold drinks, dry stools, possible epigastric pain, a thick yellow tongue coating and a slippery overflowing pulse on the right middle position [Mariocia 2005 ].

**Dampness;** This is a dull headache that feels like the head is wrapped in a cloth or stuffed with wool with a sensation of heaviness that makes thinking difficult [Mariocia 2005]. This condition is known as “deep-source nasal congestion’ and usually appears after an unresolved case of the common cold where an external wind pathogen remains in the body and obstructs the protective qi [Cheng 2010]. Other symptoms include persistent catarrh, sometimes sinusitis, nausea, lack of appetite, and a feeling of fullness in the chest and epigastrium, a thick sticky tongue coating and a slippery pulse on right middle [Mariocia 2005].

**Turbid Phlegm;** The headache from phlegm is similar to that from dampness. Both are related to deficiency of spleen qi, however phlegm is more obstructive than dampness. Phlegm clouds the senses more than damp, adding blurred vision and dizziness to the symptoms [Mariocia 2005]. With phlegm you will find dizziness, vertigo, tinnitus with a low sound, decreased hearing, profuse phlegm, heavy-headedness, chest oppression, nausea, vomiting, decreased appetite, maybe palpitations, white slimy tongue coat and a moderate slow pulse [Flaws 2007].

**Kidney Deficiency;** This headache is due to deficient kidney essence failing to nourish the brain. It is felt inside the head, not in any specific place and can be described as a whole head pain accompanied by a feeling of emptiness inside the brain and dizziness. [Mariocia 2005]. The main symptoms are dizziness, continuous tinnitus which increases during headaches, impaired memory, insomnia, profuse dreams, low back and knee soreness and limpness and premature headaches. The headache can be from kidney yang deficiency or kidney yin deficiency; Kidney yang deficient signs are; a milder headache, accompanied by a feeling of coldness, sore lower back and knees [Mariocia 2005] kidney yin headache is characterized by; more severe pain deep inside the head, night sweating, scanty urination, dizziness, tinnitus, soreness of the low back and slight constipation, tongue is red with scanty coat and pulse will be floating and empty.

Recently, the distribution of TCM diagnosis was analyzed in a group of 1,042 patients suffering from migraine or TTH [Bowling 2010]. The authors found that the diagnosis of migraine and TTH were mirrored by different patterns of TCM diagnoses. The most common channel headaches in both migraine and TTH are Shaoyang and the least common was Jueyin. The largest difference in frequency of occurrence between TTH and migraine are found in the Taiyang headache, with tightness and pain found at the occiput. TTH is most frequently related to this area [Schiapparelli 2011].

## **III. MATERIALS AND METHODS**

### **III.1 Literature Search**

The following three databases were searched from January 1992 to January 2018: MEDLINE (EBSCO) EMBASE, the Cochrane Central Register of Controlled Trials (CENTRAL) PUBMED. MEDLINE Any randomized controlled trials, in English only, related to acupuncture for tension-type headaches were included. A comprehensive search of databases was done using keywords “tension-type headache” AND “acupuncture AND “Randomized controlled trial” Originally 151 published articles were identified through the databases searched. Only scholarly peer-reviewed full-text studies from the period of January 1992 to January 2018 were filtered out and the remaining studies totaled 34. After screening those 34 articles based on predetermined inclusion and exclusion criteria, 10 articles were evaluated for eligibility, and 6 randomized controlled trials were identified from full text articles for this study.

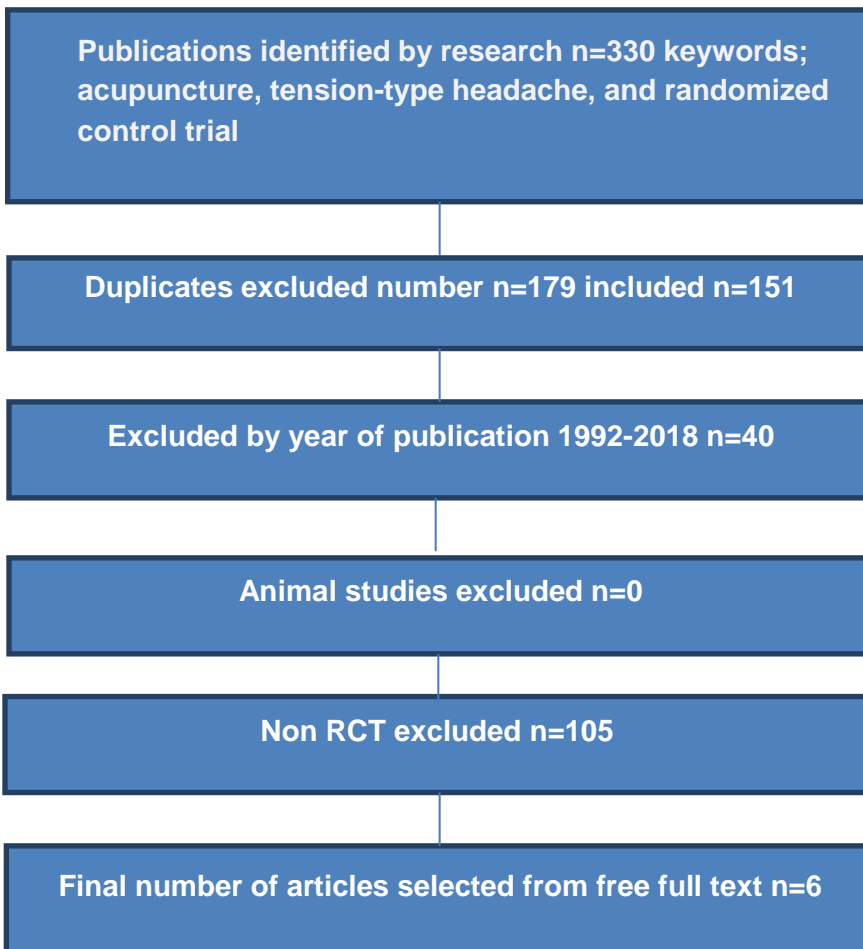
### **III.2 Inclusion/Exclusion Criteria**

This study includes 1) RCT randomized controlled trials from January 1992 to January 2018 that adopted a double-blind, single-blind or non-blind, 2) studies on acupuncture for tension-type headache. Exclusion criteria will include 1) duplicates 2) non randomized controlled trials

### **III.3 Data Extraction and Analysis**

One independent reviewer extracted information on: study design, subject characteristics, intervention/ treatment design, ,assessment parameters and outcome measures results/conclusions from the selected studies to evaluate the effectiveness of acupuncture treatment for Tension -type

headache. Outcome measurements included days with headache, headache intensity scores, analgesic use and headache scores. All data was extracted to make a comparative analysis. Figure 2 shows the selection process.



**Figure 2. Flow Diagram of Research Selection Process**

## **IV. RESULTS AND DISCUSSION**

### **IV.1 Acupuncture Protocols for Tension-Type Headaches**

All physicians used sterile, disposable needles with their choice of needle length and diameter. Each study used standard points for headache along with optional points according to symptoms. Headaches were differentiated according to Traditional Chinese Medicine theory diagnosis. The protocols for all 6 studies used very similar point selections for standard points and optional points.

The standard points for tension-type headaches include Gallbladder (GB) 20, GB 21, Liver (LIV) 3 and Large Intestine (LI 4). Optional points include: Du Mai (DU) 23, extra points Yintang and Taiyang, Stomach (ST) 44, and GB 2, for Frontal headaches (forehead pain). Headaches mainly in the Vertex of head include: DU 20, or 23, plus extra point Si Shen Cong. For pain mainly coming from the neck the use: Bladder (UB) 10, 60, or 62; DU 14 or 19, Small Intestine (SI) 3 or 6. For whole head pain with fatigue use: extra point Taiyang, Spleen (SP) 6 or 9, ST 36 or 40, Ren Mai (REN) 12. For headaches that are worse with wet or cold weather use: LI 4, DU 14, GB 3, Sanjiao (SJ) 6, and GB 39. And for modalities of wind, damp and cold use: LI 4, DU 14, SJ 6, GB 34. For modalities with cold and wind use: LI 4, Lung (LU) 7, SJ 5 and DU 14.

### **IV.2 Summary of Each Article**

In a study by Melchart (2012), 270 patients with chronic tension-type headaches were placed in 3 groups; acupuncture, minimal acupuncture and no acupuncture waiting list control group. The acupuncture and the minimal acupuncture group received 12 sessions ,

given over eight weeks, (two session in the first four weeks followed by one session a week for the following four weeks. The waiting list group started treatments after the 12 weeks. This un-blinded the study and long term results were limited to 3 months after randomization. The outcome was measured by the difference in number of days with headache between the four weeks before randomization and weeks 9-12 after randomization, as recorded by participants in headache diaries.

Acupuncture patients were treated with acupuncture points Gb20, Gb21, and Lv3, on all, and other points were used according to symptom, bilaterally with "de qi" sensation achieved. Needles were stimulated manually at least once during treatment, needles were limited to 25 per patient. In the minimal acupuncture group the number, length and frequency of treatments were the same as for the acupuncture group but the points used were 10, predefined non-acupuncture points needled superficially with fine needles and no "de qi" or stimulation was attempted. The results show that the number of days without headache decreased by 7.2 days in the acupuncture group compared with 6.6 days in the minimal group and 1.5 days in the waiting list group (difference: acupuncture vs minimal acupuncture, 0.6 days, 95% confidence interval -1.5 to 2.6 days,  $P= 0.58$ ; acupuncture waiting list, 5.7 days, 3.9 to 7.5 days,  $P< 0.001$ ). The proportion of responders (at least 50% reduction in days with headache) was 46% in the acupuncture group, 35% in the minimal acupuncture group, and 4% in the waiting list group. This study concluded that acupuncture intervention in this trial is more effective than no treatment but not significantly more effective than minimal acupuncture for the treatment of tension-type headaches. This study is summarized in Table 1.



In a study by Karst (2001), sixty nine patients with tension type headache were assigned to two groups, one using acupuncture, the other using new placebo acupuncture method. The patients' underwent 2 treatments per week for a total of 10 treatments. Acupuncture and placebo needles used the same point locations: GB 20, LI 4, and Lv 3. and depending on the symptoms: Gb 8, GB 14, GB 21, GB 41, UB 2 UB 10, UB 60, LU 7, TB 5, ST 8, ST 36, ST 44, DU 20. A maximum of 15 needles were inserted, but usually 6-10 needles were used. Needles were in place for 30 minutes. For the entire sample, VAS scores at consultations and headache frequencies decreased significantly, at each follow up, not much significant difference between the placebo and the acupuncture groups. VAS of the placebo group was 6.3 before treatment, 4.4 immediately after treatment (first follow up), 4.1 six weeks after treatment (second follow up), and 4.8 five months after treatment (third follow up). VAS of the acupuncture group was 6.4 before treatment, 4.4 immediately after treatment, 4.3 six weeks and 4.4 five months after treatment. Frequency of headache attacks (days per month) decreased by 20% at each follow up in the placebo group. In the acupuncture group there was a more marked reduction (38%) at follow up. In the acupuncture group, the consumption of analgesics decreased by about 29% and 41% at follow ups 1 and 2, as compared with an 11% decrease at follow-up 1 and a 66% increase at follow-up 2 in the placebo group. No significant difference between placebo and acupuncture could be observed immediately, but 6 weeks and 5 months after the end of the treatment there was a significant but weak improvement after acupuncture treatment. The patients were asked to keep a home diary throughout the study, starting 4 weeks prior to the study. Headache frequency, number of days per month with headache were recorded on VAS scale. This study shows the long

term results of acupuncture are retained in comparison to sham acupuncture with results not retained and analgesic use was continued. The placebo acupuncture in this study used a blunt needle that did not actually puncture the skin, making this a viable comparison between acupuncture and sham. This study concluded that acupuncture has long term beneficial effects on lowering the amount of tension type headaches per month, and is more beneficial than sham acupuncture. This study is summarized in Table 1.

In a study by White (2000), acupuncture was compared to a sham control procedure in the treatment of episodic tension-type headache. Fifty subjects received a course of treatment with either brief acupuncture or sham acupuncture procedure. Subjects were followed for 3 months, Changes in headaches were assessed by daily diary, the primary outcome measure being number of days with headache. In the acupuncture group needles were inserted, stimulated for 15 seconds and then extracted and another point was put in, one at a time without retention. In the sham group a cocktail -stick in a guide tube was pressed against bony prominences in four selected areas. Practitioners were careful not to use actual known acupuncture sights. Gentle pressure was applied to the cocktail stick while rotating the stick for 15 seconds. Treatments of acupuncture or sham acupuncture was given 1 time a week for 6 weeks and there were 2 follow-up treatments at 1 and 2 months later. Results show no significant difference between brief acupuncture and the sham acupuncture for tension type headache in any of the variable outcome measures. Both treatments seemed to lower the amount of headaches suffered per month. From the run in period to all other follow up periods was significant;  $p < 0.001$ . Both groups showed a 50% fall in reduction in headaches per month. Thirty percent of subjects

reported themselves as better or totally relieved of headaches. This study concluded that brief acupuncture is not more beneficial than sham in the treatment of tension type headaches. This study is summarized in Table 1.

In the study by Endres (2007), two groups were randomly chosen out of 409 patients male and female with tension- type headaches. Interventions used were acupuncture according to the practice of traditional Chinese medicine TCM, or sham acupuncture consisting of superficial needling of non acupuncture points. Ten 30-minute sessions were given once a week over a six week period, with additional sessions available for a partial response. Response was defined as <50% reduction in headache days/month at six months (NSAIDS were allowed). Patients completed daily diaries of headache and medication use every day from four weeks before to six weeks after randomization. Acupuncture was superior to sham for most secondary endpoints, including headache days (1.8 fewer; 95% CI.6, 3.0;  $p=0.004$ ) . Headache scores rapidly decreased from baseline to six weeks and remained lower after a 6 moth follow up period. There are significant differences between the 2 groups; Headache days  $p=0.002$ , Global assessment  $p=0.009$ , and treatment success  $p=0.002$ . Medication use data shows there are few differences between the 2 groups. This study is summarized in Table 1.

The study by White (1996) a pilot study to the effects of acupuncture as a treatment for TTH. The trial consisted of a 3 week run-in period, then 6 treatments at once a week, and a follow-up period of 3 weeks. Two groups , 3 people in the acupuncture group an 4 in the sham group. The acupuncture group received between 2-6 local points, needled briefly da qi achieved and needles not retained. Li4 was used on all bilaterally , other points were chosen at discretion of practitioner: Gb20,21, 14, Yintang, Taiyang. The Sham group were treated with a blunted cocktail stick delivered through a plastic tube

that was tapped over four different bony protuberances. Tender areas and known acupuncture points were avoided. precautions were taken to keep the participants from knowing which treatment they were receiving. The patients were asked to assess their headaches in a daily diary and record: the duration and intensity of headaches according to a VAS from 0-100. The headache index was calculated by multiplying the duration (min) by intensity (mm) this figure was then multiplied by number of days a headache occurred in each week and divided by 7 to derive the "weekly headache index".

Participants also recorded their analgesics use in the diary throughout the 11 week period. This study concluded there was no significant difference between brief acupuncture and sham for treatment of TTH. This study had one patient with excessively high headache scores compared to the other 9 participants. This large variance in such a small study made the comparisons meaningless. This pilot study realized it needed a larger study. This study is summarized in Table 1.

In the study by Tavola (1992), acupuncture was compared to minimal acupuncture in the treatment of TTH. 15 participants were assigned to each group, blinded to which one they were in. The 1st group was treated with traditional acupuncture on known TCM points consisting of 6-10 points inserted 10-20 mm. The points chosen were made on an individual basis according to the practitioners' diagnosis. The 2nd group received minimal acupuncture, the same number of needles inserted at 2-4 mm in the same regions as the acupuncture group, but avoiding known acupuncture points. An electrical point finder was used to avoid known points. Both groups underwent 8-20 minute treatments over an 8 week period. Patients in both groups recorded in daily diaries: 1) pain duration

(in hours) of headache episodes, 2) pain intensity 1-4, 3) intake of analgesics. The study consisted of a one month run-in period to establish baseline, and continued during 2 months of treatment and a 12 months after follow-up. This study found no significant difference between acupuncture group and minimal acupuncture group in the treatment of TTH. There was no significant change in intensity or duration of headaches, but the frequency of headaches and analgesic use decreased significantly over time for both groups. This study is summarized in Table 1.

#### **IV. 3 Summary of All Articles**

All 6 of the included trials compared acupuncture to control groups. 3 trials used minimal acupuncture on non acupuncture points Melchart (2005), Endres (2007) and Travoli (1992). 1 trial used sham acupuncture, with blunted needles that did not penetrate the skin Karst (2001). 2 trials used blunted cocktail stick in a guide tube White (2000) and White (1998). In order to get clinically significant outcome measurements the following results were extracted from each group: Mean days per 4 weeks with headache, measured post randomization shown in table 7. Headache intensity scores, frequency of medication use, and Headache scores (sum of intensity rating). The main outcome measure was at 8 weeks, 3-4 months, 6 months and >6 months. Table 1 below shows a summary of all 6 studies.

**Table 1. Summary of Studies Included in Review**

<b>Author</b>	<b>No Participants Acu/Control</b>	<b>Interventions</b>	<b>Control</b>	<b>Duration/Frequency</b>	<b>Follow-up</b>	<b>Outcomes Measures</b>
<b>Melchart 2012</b> Germany	270/234  Mean age 43  Episodic and chronic TTH	Acupuncture on TCM points/ da qi sensation achieved	Minimal Acupuncture w/ Superficial distal points  Waiting list No treatment for 12 weeks, then 12 treatments' received	12/ 30 min sessions Over 8 weeks 2 a week for 4 weeks, then one a week for 4 weeks	Baseline, 4 weeks, 8 weeks of treatment 12 weeks follow up.	Main outcome, difference in days with headache at 9-12 weeks recorded by patients in diaries, Other; headache days, intensity, analgesic use and headache scores
<b>Karst 2001</b> London	69/61  Mean age 48.1  Episodic and chronic TTH  27/24 long term follow-up	Acupuncture on TCM points da qi sensation achieved	Placebo with sham needles on TCM points were fixed to the points	10/30 minute sessions for a total of 10 treatments	Baseline 4 weeks, follow up 1 -last day of treatment. follow up 2 - 6 weeks after treatment, follow up 3 - 5 months after treatment	Frequency of H/A days per month recorded in patient diaries. Other; analgesic, pain intensity, headache score.

**Table 1. - Continued**

<b>Author</b>	<b>No Participants Acu/Control</b>	<b>Interventions</b>	<b>Control</b>	<b>Duration/Frequency</b>	<b>Follow-up</b>	<b>Outcomes Measures</b>
<b>White 2000</b> England	50/50  Mean age 49  Episodic and chronic TTH	Brief Acupuncture on TCM 4 or more points treated with needle, da qi sensation achieved, in succession and needles not retained	Sham acupuncture on TCM points a blunted cocktail stick in a guide tube tapped against bony prominences in four standard areas.	1 time a week for 6 weeks	Baseline 3 weeks, 5 weeks of treatment, 3 month follow up	Number of days with H/A per week. Other; intensity, duration, analgesic use
<b>Endres 2007</b> Germany	409/409  Mean age 38  Episodic and chronic TTH	Acupuncture on 6-10 TCM points, da qi sensation achieved	Sham acupuncture with superficial needling at non-acupuncture points	10/ 30 minute sessions over six week period, with additional sessions available for partial response	Baseline weeks, 6 weeks treatment 20 weeks follow up	Frequency of H/A days per month as recorded by patients in headache diaries 4 weeks. Other; quality of life, chronic pain scale

**Table 1. - Continued**

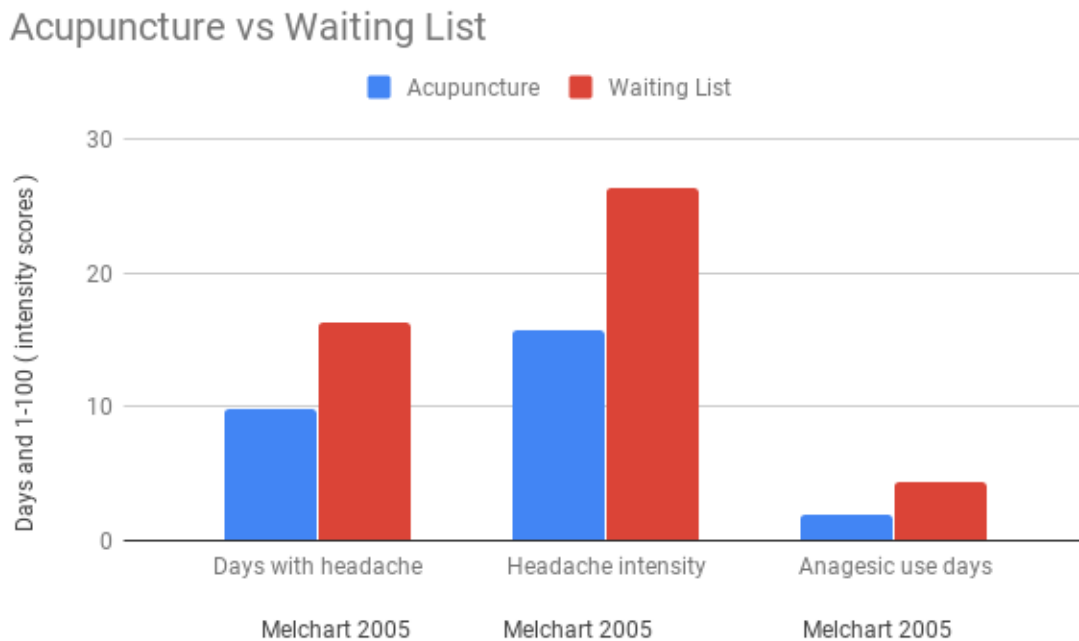
<b>Tavola 1992</b>	30/30 Mean age 33 Episodic and chronic TTH	Acupuncture on TCM da qi sensation achieved	Minimal acupuncture on non TCM points in same region as acupuncture treatment, no da qi sensation achieved	8 20 minute sessions once a week for 8 weeks	Baseline 4 weeks, 8 weeks, follow up and 12 months follow up	No of headaches per month recorded in diaries, Other; headache index, analgesic use
<b>White 1996</b>	10/9 Mean age 57 Episodic and chronic TTH	Brief Acupuncture on TCM 4 or more points treated with needle, da qi sensation achieved, in succession and needles not retained	Sham acupuncture on TCM 6 points a blunted cocktail stick in a guide tube tapped against bony prominences in four standard areas.	6 sessions of brief acupuncture 1 time a week for 6 weeks	Baseline 3 weeks, 6 week treatment 6 weeks follow up	Days with head per month, Other; intensity, duration, analgesics



## IV.4 Summary of Results

### Acupuncture vs. No Acupuncture

In the study by Melchart (2005), a 3 arm study that compared acupuncture to sham and a control group waiting list (no acupuncture), the waiting list group did not receive treatment for 12 weeks after randomization. We were able to compare acupuncture to no acupuncture (waiting list) for secondary measurement only. We found a significant benefit of acupuncture over waiting list group. Table 7 below shows scores for three outcomes, at randomization and secondary outcomes measurements for days with headache, headache intensity and analgesic use.



**Figure 3. Melchart 2005 Acupuncture vs Waiting List (no acupuncture)**

. Acupuncture group had less days with headache, lower intensity of headaches and less days with medication at secondary measurement than waiting list group. There were significantly better results for all measures in the acupuncture group. Acupuncture is more effective than no acupuncture in the treatment of TTH. Figure 3 below shows results for acupuncture vs sham secondary measurements.

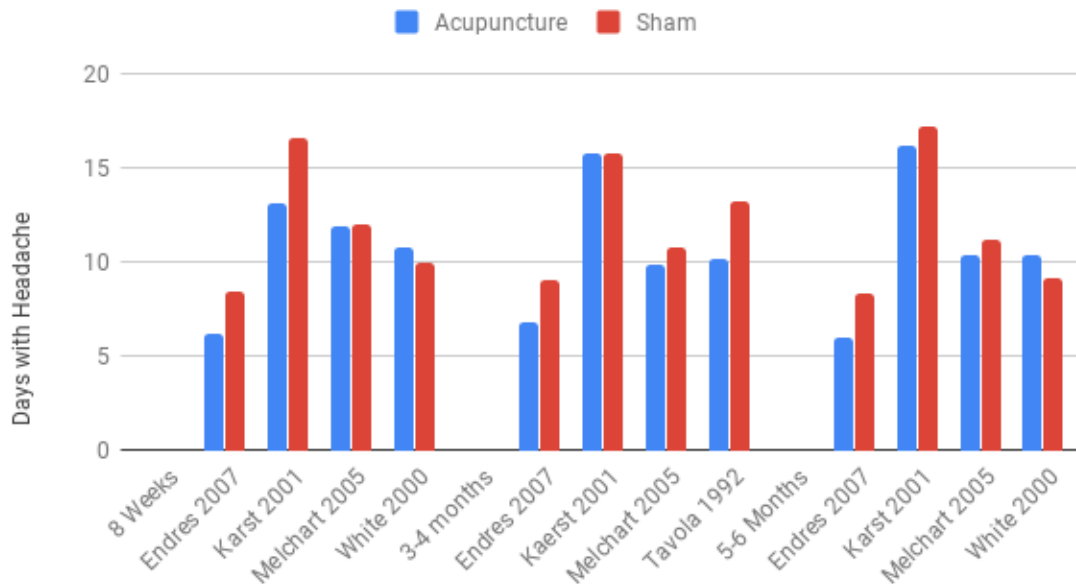
### **Summary of Results: Acupuncture vs. Sham**

5 trials were used for interpretation, Melchart (2005), Endres (2007), White (2000), Karst( 2001) and Tavola (1992), all using sham to compare to acupuncture treatment for tension-type headaches. Tavola (1992) was the only study with a 12 month follow up. The other 4 trials had follow up periods of 6 months. The following four outcomes were measured: days with headache, headache intensity scores, analgesic use and headache scores (sum of intensity score).

### **Days with Headaches**

Only Endres (2007) found significant difference in days with headache at 8 weeks, 3-4 months from the beginning of trial. Due to its large study size this brought the pooled results to a significant difference. In the 5-6 Month period the difference in days with headache was not significant. Figure 4 below shows the results for days with headache.

## Acupuncture vs Sham



**Figure 4. Days with Headache at 8 Weeks, 3-4 Months and 5-6 Months after Treatment**

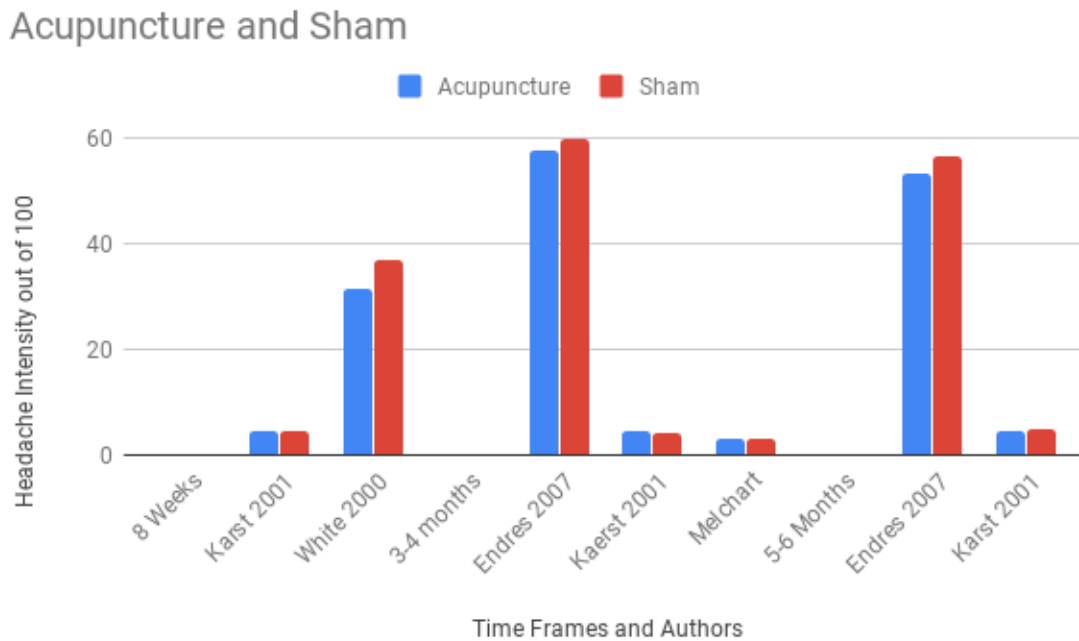
At 8 weeks and at 3-4 months there was a significant difference in days with headache.

At 5-6 months the total for days with headache for acupuncture group were 43.5 and the totals for sham were 46, this is not a significant difference. Acupuncture is more effective than sham for days with headache. Long term results, 5-6 months, do not show a significant difference between acupuncture and sham for days with headache.

### Headache Intensity Scores

The headache intensity scores were only found to be significant at 5-6 months after

treatment. Acupuncture is not significantly more effective than sham at lowering headache intensity at 8 weeks or 3-4 months after treatment. Acupuncture is more effective than sham at lowering headache intensity at an extended period of time of 6 months after treatment. Results are shown in Figure 5 below.



**Figure 5. Headache Intensity Outcomes at 8 Weeks, 3-4 Months and 5-6 Months after Treatment**

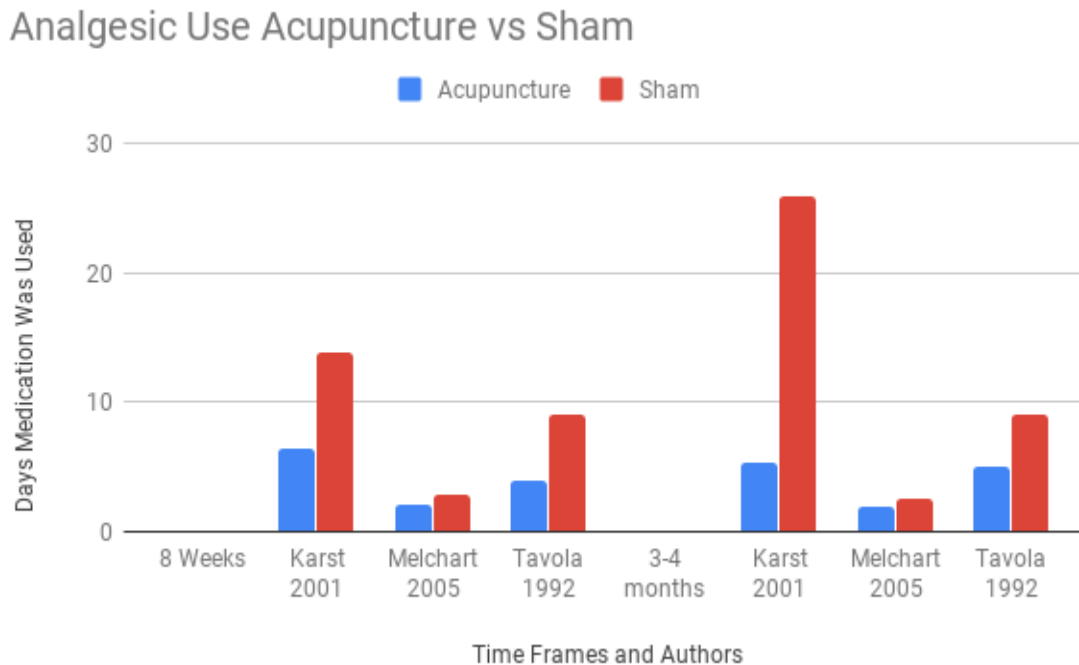
The results show a significant improvement in headache intensity only after 5-6 months.

### **Analgesic Use**

The trials by Karst (2001), Melchart (2005) and Tavola (1992) were the only ones with measurable outcomes for analgesic. At both 8 weeks and 3-4 months there was a

significant decline in medication use in the acupuncture group vs the sham group.

Acupuncture is significantly more effective than sham in lowering analgesic use for the treatment of TTH. Results are shown in Figure 6 below.



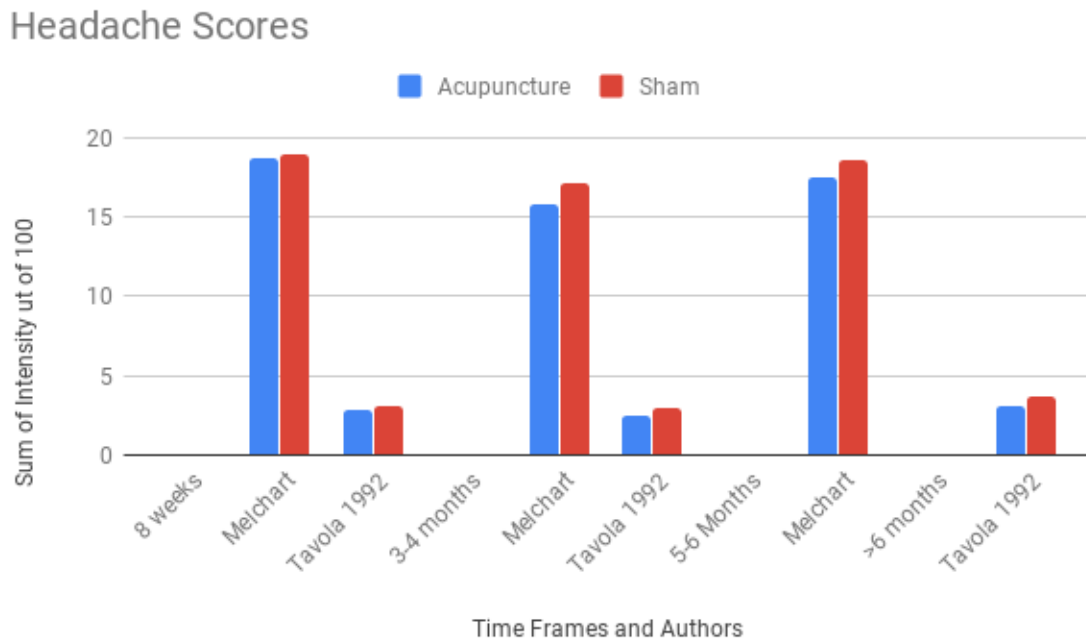
**Figure 6. Analgesic Use at 8 weeks and 3-4 Months after Treatment**

These two trials both show benefits of acupuncture over sham for analgesic use at 8 weeks and 3-4 months.

### **Headache Scores**

Headache scores were obtained by adding the totals of intensity scores. Headache scores were only measurable in 2 studies, Melchart (2005) and Tavola (1992) In both studies

alone or pooled there was not a significant difference between the acupuncture and sham headache scores. This study does not prove that there is a significant difference between acupuncture and sham in overall headache scores. Results are shown in Figure 7 below.



**Figure 7. Headache Scores for 8 Weeks, 3-4 Months and 5-6 Months**

Headache scores do not show a significant difference between acupuncture and sham.

## V. CONCLUSION

This study concluded that acupuncture is more effective than no acupuncture (waiting list) and acupuncture is more effective than sham in the treatment of tension-type headaches. Acupuncture vs no acupuncture (waiting list) we found acupuncture is significantly more effective than no acupuncture for: days with headache, headache intensity and analgesic use. In the comparison between acupuncture and sham we found that acupuncture is more effective than sham for days with headache, and analgesic. For the headache intensity scores we found no significant difference between acupuncture and sham until after the 5-6 month measurement. Acupuncture is more effective than sham in treatment of tension-type headaches for days with headache and analgesic use, and may be effective in lowering headache intensity at over 5-6 months period after treatment. This study did not find a significant difference in headache scores (sum of intensity scores) between acupuncture and sham.

The most significant difference in all the studies was in the only 3 arm study by [Melchart 2005] where acupuncture could be compared to no acupuncture/waiting list. Future studies would be advised to use a 3rd group not receiving treatment for a period of time to gain more information. The most information obtained in this study came from the larger trials and the long term benefits were limited. Future trials could use larger study groups with longer follow up time. Also medication use is an important outcome measurement, that future studies are advised to record. The need for less medication is an important factor in the benefits of alternative medicine. This trial also shows that minimal acupuncture on non acupuncture points has a physiological effect and can treat tension type headaches. future studies may be more focused on which points or areas around points are the most effective in treatment of tension-type headaches.

## REFERENCES

- Acupuncture for Tension-Type Headache: a Multicentre, Sham-Controlled, Patient and Observer-Blinded, Randomised Trial. (2008). *Deutsche Zeitschrift für Akupunktur*, 51(2), 47-48. doi:10.1016/j.dza.2008.04.005
- Acupuncture modulates the abnormal brainstem activity in migraine without aura patients. (n.d.). Retrieved from <http://ncbi.nlm.nih.gov/pmc/articles/PMC5447510?>
- Adams, J., Barbery, G., & Lui, C. (2012). Complementary and Alternative Medicine Use for Headache and Migraine: A Critical Review of the Literature. *Headache: The Journal of Head and Face Pain*, 53(3), 459-473. doi:10.1111/j.1526-4610.2012.02271.x
- Allais, G. (2003). Non-pharmacological approaches to chronic headaches: transcutaneous electrical nerve stimulation, lasertherapy and acupuncture in transformed migraine treatment. *Neurol Sci*, 24, S138-S142.
- Allais, G., Romoli, M., Rolando, S., Airola, G., Castagnoli Gabellari, I., Allais, R., & Benedetto, C. (2011). Ear acupuncture in the treatment of migraine attacks: a randomized trial on the efficacy of appropriate versus inappropriate acupoints. *Neurological Sciences*, 32(S1), 173-175. doi:10.1007/s10072-011-0525-4
- Amir Zaidi, S., & Ahme, F. (2016). Acupuncture in Primary Headache Disorders; Review of the Evidence. *Journal of Neurological Disorders*, 4(5). doi:10.4172/2329-6895.1000288



- Ashina, M. (2004). Neurobiology of Chronic Tension-Type Headache. *Cephalalgia*, 24(3), 161-172. doi:10.1111/j.1468-2982.2003.00644.x
- Atlas of Migraine and Other Headaches. (2005). doi:10.1201/9780203696569
- Bendtsen, L., Evers, S., Linde, M., Mitsikostas, D. D., Sandrini, G., & Schoenen, J. (2010). EFNS guideline on the treatment of tension-type headache - Report of an EFNS task force. *European Journal of Neurology*, 17(11), 1318-1325. doi:10.1111/j.1468-1331.2010.03070.x
- Bowing, G. (2010, February). Differences in Chinese diagnoses for migraines and tension-type headache: an analysis of the German acupuncture trials (GERAC) for headache. Retrieved from <http://ncbi.nlm.nih.gov>
- Bussone, G., & Grazzi, L. (2013). Understanding the relationship between pain and emotion in idiopathic headaches. *Neurological Sciences*, 34(S1), 29-31. doi:10.1007/s10072-013-1362-4
- Campbell, M. (2000). Framework for design and evaluation of complex interventions to improve health. *BMJ*, 321(7262), 694-696. doi:10.1136/bmj.321.7262.694
- Cao, K., Han, F., Lin, A., Yang, W., Zhao, J., Zhang, H., ... Gao, Y. (2016). Zhengtian Capsule versus flunarizine in patients with migraine: a multi-center, double-blind, double-dummy, randomized controlled, non-inferior clinical trial. *BMC Complementary and Alternative Medicine*, 16(1). doi:10.1186/s12906-016-1321-8
- Chassot, M., Dussan-Sarria, J. A., Sehn, F. C., Deitos, A., De Souza, A., Vercelino, R., ... Caumo, W. (2015). Electroacupuncture analgesia is associated with increased serum brain-derived neurotrophic factor in chronic tension-type headache: a

- randomized, sham controlled, crossover trial. *BMC Complementary and Alternative Medicine*, 15(1). doi:10.1186/s12906-015-0664-x
- Cheng, X., & Deng, L. (2010). *Chinese acupuncture and moxibustion*. Beijing: Foreign Language Press.
- Chessman, A. W. (2016). Review: Acupuncture reduces migraine frequency more than usual care, sham acupuncture, or prophylactic drugs. *Annals of Internal Medicine*, 165(8), JC44. doi:10.7326/acpjc-2016-165-8-044
- Dalla Libera, D., Colombo, B., Pavan, G., & Comi, G. (2014). Complementary and alternative medicine (CAM) use in an Italian cohort of pediatric headache patients: the tip of the iceberg. *Neurological Sciences*, 35(S1), 145-148. doi:10.1007/s10072-014-1756-y
- Flaws, B., & Sionneau, P. (2007). *The treatment of modern western medical diseases with Chinese Medicine: A textbook & clinical manual*. Boulder: Blue Poppy Press.
- Georgoudis, G., Felah, B., Nikolaidis, P., & Damigos, D. (2017). The effect of myofascial release and microwave diathermy combined with acupuncture versus acupuncture therapy in tension-type headache patients: A pragmatic randomized controlled trial. *Physiotherapy Research International*, 23(2), e1700. doi:10.1002/pri.1700
- Hao, X., Xue, C. C., Dong, L., & Zheng, Z. (2013). Factors Associated with Conflicting Findings on Acupuncture for Tension-Type Headache: Qualitative and Quantitative Analyses. *The Journal of Alternative and Complementary Medicine*, 19(4), 285-297. doi:10.1089/acm.2011.0914

- Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition. (2018). *Cephalalgia*, 38(1), 1-211. doi:10.1177/0333102417738202
- He, A., Song, D., Zhang, L., & Li, C. (2017). Unveiling the relative efficacy, safety and tolerability of prophylactic medications for migraine: pairwise and network-meta analysis. *The Journal of Headache and Pain*, 18(1). doi:10.1186/s10194-017-0720-7
- Kalita, J., Bhoi, S. K., & Misra, U. K. (2013). Amitriptyline vs divalproate in migraine prophylaxis: a randomized controlled trial. *Acta Neurologica Scandinavica*, 128(1), 65-72. doi:10.1111/ane.12081
- Karst, M., Reinhard, M., Thum, P., Wiese, B., Rollnik, J., & Fink, M. (2001). Needle Acupuncture in Tension-Type Headache: A Randomized, Placebo-Controlled Study. *Cephalalgia*, 21(6), 637-642. doi:10.1046/j.1468-2982.2001.00198.x
- Langevin, H. M., Schnyer, R., MacPherson, H., Davis, R., Harris, R. E., & Napadow, V. (2015). Manual and Electrical Needle Stimulation in Acupuncture Research: Pitfalls and Challenges of Heterogeneity. *The Journal of Alternative and Complementary Medicine*, 21(3), 113-128. doi:10.1089/acm.2014.0186
- Linde, K., Allais, G., Brinkhaus, B., Manheimer, E., Vickers, A., & White, A. R. (2009). Acupuncture for tension-type headache. *Cochrane Database of Systematic Reviews*. doi:10.1002/14651858.cd007587
- Loh, L., Nathan, P. W., Schott, G. D., & Zilkha, K. J. (1985). Neurology Acupuncture versus medical treatment for migraine and muscle tension headaches. *Pain*, 21(2), 200. doi:10.1016/0304-3959(85)90301-x

- Lu, L., Zheng, H., Zheng, Q., Hao, X., Zhou, S., Zhang, S., ... Li, Y. (2017). The long-term effect of acupuncture for patients with chronic tension-type headache: study protocol for a randomized controlled trial. *Trials*, *18*(1). doi:10.1186/s13063-017-2188-9
- Lund, I., & Lundeberg, T. (2006). Are minimal, superficial or sham acupuncture procedures acceptable as inert placebo controls? *Acupuncture in Medicine*, *24*(1), 13-15.  
doi:10.1136/aim.24.1.13
- Maciocia, G. (2005). *The foundations of Chinese medicine: A comprehensive text for acupuncturists and herbalists*. Edinburgh: Elsevier Churchill Livingstone.
- Maciocia, G. (2008). *The practice of Chinese medicine: The treatment of diseases with acupuncture and Chinese herbs*. Edinburgh: Churchill Livingstone/Elsevier.
- Martelletti, Paolo Haimanot, Redda T La?inez, Miguel J A Rapoport, Alan M Ravishankar, K Sakai, Fumihiko Silberstein, Stephen Vincent, Maurice Steiner, Timothy J. (2005). *The Global Campaign (GC) to Reduce the Burden of Headache Worldwide. The International Team for Specialist Education (ITSE)*. Jefferson Digital Commons.
- Melchart, D. (2012). Acupuncture Randomised Trial in patients with Tension-Type Headache. <http://isrctn.org/>. doi:10.1186/isrctn97373659
- Melchart, D., Linde, K., Fischer, P., White, A., Allais, G., Vickers, A., & Berman, B. (1999). Acupuncture for Recurrent Headaches: A Systematic Review of Randomized Controlled Trials. *Cephalalgia*, *19*(9), 779-786. doi:10.1046/j.1468-2982.1999.1909779.x

- Paterson, C., & Dieppe, P. (2005). Characteristic and incidental (placebo) effects in complex interventions such as acupuncture. *BMJ*, *330*(7501), 1202-1205. doi:10.1136/bmj.330.7501.1202
- Puca, F. (2000). Psychological and social stressors and psychiatric comorbidity in patients with migraine without aura from headache centers in Italy: a comparison with tension-type headache patients. *The Journal of Headache and Pain*, *1*(1), 17-25. doi:10.1007/s101940050005
- Quirico, P. E., Allais, G., Ferrando, M., De Lorenzo, C., Burzio, C., Bergandi, F., ... Benedetto, C. (2014). Effects of the acupoints PC 6 Neiguan and LR 3 Taichong on cerebral blood flow in normal subjects and in migraine patients. *Neurological Sciences*, *35*(S1), 129-133. doi:10.1007/s10072-014-1754-0
- Sciences*, *35*(S1), 129-133. doi:10.1007/s10072-014-1754-0
- Schiapparelli, P., Allais, G., Rolando, S., Airola, G., Borgogno, P., Terzi, M. G., & Benedetto, C. (2011). Acupuncture in primary headache treatment. *Neurological Sciences*, *32*(S1), 15-18. doi:10.1007/s10072-011-0548-x
- Smith, C. A., Zaslowski, C. J., Cochrane, S., Zhu, X., Zheng, Z., Loyeung, B., ... Bensoussan, A. (2017). Reliability of the NICMAN Scale: An Instrument to Assess the Quality of Acupuncture Administered in Clinical Trials. *Evidence-Based Complementary and Alternative Medicine*, *2017*, 1-8. doi:10.1155/2017/5694083
- Steiner, T., Scher, A., Stewart, W., Kolodner, K., Liberman, J., & Lipton, R. (2003). The Prevalence and Disability Burden of Adult Migraine in England and their

- Relationships to Age, Gender and Ethnicity. *Cephalalgia*, 23(7), 519-527.  
doi:10.1046/j.1468-2982.2003.00568.x
- Stovner, L. J., & Hagen, K. (2006). Prevalence, burden, and cost of headache disorders. *Current Opinion in Neurology*, 19(3), 281-285.  
doi:10.1097/01.wco.0000227039.16071.92
- Sun, Y., & Gan, T. J. (2008). Acupuncture for the Management of Chronic Headache: A Systematic Review. *Anesthesia & Analgesia*, 107(6), 2038-2047.  
doi:10.1213/ane.0b013e318187c76a
- Sun, Y., & Gan, T. J. (2008). Acupuncture for the Management of Chronic Headache: A Systematic Review. *Anesthesia & Analgesia*, 107(6), 2038-2047.  
doi:10.1213/ane.0b013e318187c76a
- Tension type headache. (n.d.). Retrieved from  
<http://ncbi.nlm.nih.gov/pmc/articles/PMC3444224/>
- Vas, J. (2012). Study protocol for a pragmatic randomised controlled trial in general practice investigating the effectiveness of acupuncture against migraine. <http://isrctn.org/>. doi:10.1186/isrctn98703707
- Vickers, A., Rees, R., Zollman, C., McCarney, R., Smith, C., Ellis, N., ... Grieve, R. (2004). Acupuncture of chronic headache disorders in primary care: randomised controlled trial and economic analysis. *Health Technology Assessment*, 8(48).  
doi:10.3310/hta8480
- Wallasch, T., Weinschuetz, T., Mueller, B., & Kropp, P. (2012). Cerebrovascular Response in Migraineurs During Prophylactic Treatment with Acupuncture: A Randomized Controlled Trial. *The Journal of Alternative and Complementary*

*Medicine*, 18(8), 777-783. doi:10.1089/acm.2011.0308

Wang, L. (2012). Efficacy and safety of Acupuncture for Migraine Prophylaxis - a multicenter, randomized, controlled clinical trial. <http://isrctn.org/>. doi:10.1186/isrctn49839714

Wang, Y., Xue, C. C., Helme, R., Da Costa, C., & Zheng, Z. (2015). Acupuncture for Frequent Migraine: A Randomized, Patient/Assessor Blinded, Controlled Trial with One-Year Follow-Up. *Evidence-Based Complementary and Alternative Medicine*, 2015, 1-14. doi:10.1155/2015/920353

Wang, Y., Xue, C. C., Helme, R., Da Costa, C., & Zheng, Z. (2015). Acupuncture for Frequent Migraine: A Randomized, Patient/Assessor Blinded, Controlled Trial with One-Year Follow-Up. *Evidence-Based Complementary and Alternative Medicine*, 2015, 1-14. doi:10.1155/2015/920353

White, A., Resch, K., Chan, J., Norris, C., Modi, S., Patel, J., & Ernst, E. (2000). Acupuncture for episodic tension-type headache: a multicentre randomized controlled trial. *Cephalalgia*, 20(7), 632-637. doi:10.1046/j.1468-2982.2000.00097.x

WHO | World Health Organization. (n.d.). Retrieved from <http://who.int>

Zhang, Y., Wang, L., Liu, H., Li, N., Li, J., & Yi, J. (2009). The design and protocol of acupuncture for migraine prophylaxis: A multicenter randomized controlled trial. *Trials*, 10(1). doi:10.1186/1745-6215-10-25

Zhao, L., Guo, Y., Wang, W., & Yan, L. (2011). Systematic review on randomized controlled clinical trials of acupuncture therapy for neurovascular

headache. *Chinese Journal of Integrative Medicine*, 17(8), 580-586.

doi:10.1007/s11655-011-0709-z

Zhao, L., Liu, J., Zhang, F., Dong, X., Peng, Y., Qin, W., ... Liang, F. (2014). Effects of long-term acupuncture treatment on resting-state brain activity in migraine patients: A randomized controlled trial on active acupoints and inactive acupoints. *European Journal of Integrative Medicine*, 6(6), 703.

doi:10.1016/j.eujim.2014.09