

# The Use of Traditional Chinese Medicine Principles in Chiropractic Technique

BENJAMIN T. BROWN, ROD BONELLO and HENRY POLLARD

**ABSTRACT:** *Objectives:* The authors of this manuscript seek to define the role, and scientific backing for the inclusion of Traditional Chinese Medicine (TCM) principles in the chiropractic techniques known as Applied Kinesiology (AK) and Neuro-Emotional Technique (NET). A discussion of the suitability of TCM principles within the chiropractic profession is also presented. *Data Sources:* A search through the electronic databases Medline, Meditext, Pubmed, OVID, CINAHL, and the Cochrane Library was performed for the period of 1900 – 2007 using the key words Traditional Chinese Medicine, meridian, five-element, five-phase, acupuncture, chiropractic, Applied Kinesiology, and Neuro-Emotional Technique. The results were limited to works published in English appearing in peer-reviewed journals. A hand search was then performed within the reference lists of the articles retrieved. *Study Selection:* Based on their relevance to the subject, 196 references were obtained. *Data Extraction and Synthesis:* Only those historical principles and current research findings that pertain specifically to the TCM concepts used in AK and NET have been included. *Conclusions:* Principles and philosophies from TCM are incorporated into the diagnostic and treatment protocols of the chiropractic techniques AK and NET. The scientific backing for this inclusion is still evolving and it is clear that further research is required to support the placement of TCM principles and practices within these chiropractic techniques. The welcoming of TCM principles into chiropractic practice may broaden the scope of the chiropractic profession and allow chiropractors to more faithfully adhere to the biopsychosocial model of health care.

INDEX TERMS: MeSH: ACUPUNCTURE; CHIROPRACTIC; MEDICINE, CHINESE TRADITIONAL. (Other): APPLIED KINESIOLOGY; NEURO-EMOTIONAL TECHNIQUE.

Chiropr J Aust 2008; 38: 18-26.

## INTRODUCTION:

Ancient Chinese healing practices initially filtered around the world by way of traveling doctors and missionaries out of China.<sup>1</sup> References to Chinese medical procedures entered the American medical literature in 1836.<sup>2</sup> Historically however interest from medical practitioners and researchers into these eastern concepts has been somewhat sporadic.<sup>3</sup>

In 1972 James Reuston, a respected *New York Times* columnist underwent an emergency appendectomy whilst travelling in China. Reuston was impressed by his post-operative management and went on to write about his experience of acupuncture for post-operative pain.<sup>4</sup> This event sparked renewed interest and prompted the investigation of Traditional Chinese Medicine (TCM) by western medical practitioners and researchers.<sup>4</sup>

Benjamin T. Brown, BChiroSc, MChiro  
Department of Health and Chiropractic,  
Macquarie University

Assoc Prof Rod Bonello, BSc, DC DO, MHA, FICC  
Department of Health and Chiropractic,  
Macquarie University

Assoc Prof Henry Pollard, BSc, Grad Dip Chiro, MSportsSc, PhD  
Department of Health and Chiropractic,  
Macquarie University

Received: 11 July 2008, accepted 9 September 2008 with revisions.

### Conflict of Interest

Benjamin T. Brown and Rod Bonello do not have any competing interests. Henry Pollard is the research director for the ONE Research Foundation. The ONE Research Foundation is the research body for scientific investigation of Neuro-Emotional Technique.

Today, TCM is practiced worldwide<sup>5,6</sup> and TCM principles continue to generate interest throughout western medical circles. The chiropractic profession has begun to utilise these eastern concepts as evidenced by the formal incorporation of principles and philosophies from TCM into various chiropractic techniques such as Applied Kinesiology (AK) and Neuro-Emotional Technique (NET).

### What is Traditional Chinese Medicine?

TCM is an umbrella term used to describe a system of healthcare that originated in China more than 2000 years ago.<sup>7,8</sup> Acupuncture is a well-known component of this ancient healthcare system, however TCM is much more than acupuncture. A description of TCM principles and the rationale behind their use is presented in a later section of this paper.

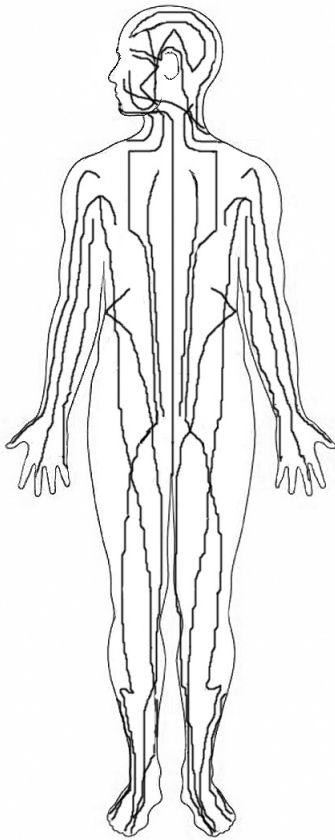


Figure 1 The Meridian System (Anterior)

### Traditional Chinese Medical Theory

The concepts used in Traditional Chinese Medicine, are drawn from the ancient text “The Yellow Emperor’s Classic of Internal Medicine.”<sup>6,7</sup> It is thought that this historical text was compiled between 300 and 100 BC.<sup>7,9</sup> Traditional Chinese medical practices are based on the Ying and Yang theory.<sup>9,10</sup> According to this theory vital life-force energy (*Qi*) and blood flow through the body along channels known as meridians which are linked by acupuncture points.<sup>6,9,11</sup> These channels may be visualized as lines on the skin’s surface with key spots along the lines recognized as acupuncture points (Figure 1). These channels link to form a network that connects all aspects of the body (upper and lower, internal and external) and allows *Qi*, the vital force, to circulate.<sup>6,11</sup>

The word ‘Meridian’ is a translation of the Chinese characters *Jingluo*. *Jing* means the longitudinal thread in fabric and describes the main path of the meridians. *Luo* means to connect or twine and portrays the connecting branches of the meridian system.<sup>9</sup>

There are twelve principal meridians that span the body and link the acupuncture points together with each meridian being associated with a particular organ.<sup>6</sup> Table 1 describes the principal meridians.<sup>4</sup> It is important to note that the names of the meridians do not refer specifically to internal organs, instead the names ascribed to the meridians describe functional energy channels.<sup>9,10,12</sup>

Table 1

PRINCIPAL MERIDIANS
Lung
Large Intestine
Kidney
Bladder
Liver
Gall Bladder
Heart
Small Intestine
Spleen
Stomach
Pericardium
Triple Heater

The twelve regular meridians link and form a network in which *Qi* and blood flow from one meridian to the next in a specific sequence.<sup>6</sup> The flow of *Qi* from one meridian to the next adheres to a specific circadian rhythm with each meridian having a 2-hour period (within a 24-hr cycle) in which the flow of energy through that specific meridian is at its maximum.<sup>4,9</sup> The anatomical regions (skin, muscles, ligaments, tendons etc.) that are traversed by a meridian channel are said to be the related structures of that meridian.<sup>9</sup>

There are also eight extraordinary meridians that are said to regulate the flow of *Qi* throughout the principal meridian system.<sup>4,6,9</sup> Only two of the extraordinary meridians (Conception Vessel *Ren* and Governing Vessel *Du*) have unique acupoints.<sup>9</sup> The remaining six extraordinary meridians share points with the regular meridian system.<sup>9</sup>

In addition to the principal and extraordinary meridians there are 15 collateral meridians called *Luo*. These collaterals are said to strengthen the links between the meridians of the body.<sup>4,9</sup>

### Acupuncture Points

Acupuncture points or Acupoints are located primarily on the principal meridians.<sup>9</sup> There is consensus with regard to the location of the main points however there is inconsistency with reference to location of the extra points and the internal branches within the acupuncture literature.<sup>13</sup> There are 365

Table 2

CLASSIFICATION OF ACUPUNCTURE POINTS	
ACUPOINT	EXPLANATION
Meridian	These points are located on the twelve regular meridians and the two main extraordinary meridians ( <i>Ren</i> and <i>Du</i> ) and are referred to as the 'classical points'
Extraordinary	These points are not located on the regular meridians or the two main extraordinary meridians and have specific names and precise locations
<i>A-shi</i>	These points do not have definite names or fixed locations and are identified by positive signs such as tenderness or scleroma

Table 3

SPECIFIC TYPES OF MERIDIAN ACUPUNCTURE POINTS		
TYPE	CHINESE NAME	PROPERTIES
Transport (Five types)	<i>Shu</i>	Used primarily to encourage the movement of <i>Qi</i> and blood. Their use is based on the assumption that the flow of <i>Qi</i> differs at various points along a meridian channel
Source	<i>Yuan</i>	Used in the treatment of dysfunction with a meridian's internal organ to tonify deficiency and balance Yin Yang
Connecting	<i>Luo</i>	Serve as connecting points between Yin and Yang meridians
Back Transport	Back <i>Shu</i>	The <i>shu</i> points located on the back and are important for treating internal organs and their related tissues
Assembly	<i>Mu</i>	Located on the front of the body and used for diagnosis
Cleft	<i>Xi</i>	Described as points of <i>Qi</i> and blood convergence, these points can be used to accelerate the flow <i>Qi</i> along a specific meridian. These points are commonly used for acute conditions
Convergence (Six points)	<i>He</i>	Located near the elbow and knee and used for digestive problems and rebellious <i>Qi</i> (cough and diarrhoea)
Influent	<i>Hui</i> (I)	Stimulation of these points can influence specific types of tissues, e.g. tendons
Confluence	<i>Hui</i> (II)	Used to activate the eight extraordinary meridians
Intersection	<i>Jiaohui</i>	Points of intersection between meridians. Stimulation of these points can influence the intersecting meridians

Table 4

TECHNIQUES USED IN TRADITIONAL CHINESE MEDICINE	
TECHNIQUE	EXPLANATION
Acupuncture	Stimulation of acupoints using fine needles
Electro-acupuncture	Stimulation of acupoints using small electrical impulses
Laser acupuncture	Stimulation of acupoints points using a low intensity, non-thermal laser
Acupressure/Chinese massage	Stimulation of acupoints by manual pressure/specific massage techniques
Micro-system acupuncture	The stimulation of acupoints on a small region of the body as a representation of the whole body, (e.g. the whole body mapped onto the surface of the ear)
Cupping	The application of a glass suction cup/s to regions of the body
Moxibustion	The practice of heating an acupuncture point or needle with a smouldering dried herb
Skin Scraping	The practice of scraping the skin using ceramic or metal instruments
Herbal Medicine/Pharmacology	The use of animal parts, minerals and botanicals for medicinal purposes
Qigong	The use of specific breathing, movement and meditation practices
Tai Chi	A form of Chinese martial arts that promotes relaxation of the mind and body

different acupuncture points described in the classic texts.<sup>5,14</sup> There are 52 points that lie directly on the midline of the body with the remaining points being distributed symmetrically.<sup>6</sup> The modern practitioner of acupuncture is guided by visual charts in conjunction with written guidelines for specific point location. Anatomical landmarks (eg. bony prominences) as well as patient-specific proportional measurements (described in acupuncture texts) guide the practitioner to the salient points.<sup>13</sup> For example, the acupuncture point Large Intestine - 1 (LI-1) is located at the proximal, radial corner of the nail of the index finger.<sup>15</sup>

### Classification of Acupuncture Points

There is an extensive network of acupuncture points throughout the body. These acupuncture points are divided into three main groups, meridian acupoints, extraordinary acupoints and *a-shi* points (Table 2).<sup>9</sup> The meridian acupoints are the most commonly used points clinically and are subdivided into ten groups with each group having specific therapeutic properties (Table 3).<sup>9,16</sup>

### Treatment Principles in TCM

According to the meridian theory obstruction or disruption to the flow of blood and energy along the meridian channels

can result in pain, dysfunction and/or illness. Therefore “health” is defined as a state in which the flow of *Qi* and blood throughout the meridians is uninterrupted.<sup>11,17</sup> For this reason, the TCM practitioner is concerned primarily with identifying and removing obstruction within the meridian network.<sup>17</sup> It is important to note that TCM does not follow a biomedical model in which illness or disease is attributed to a failure of the soma resulting either from inflammation, injury or inheritance.<sup>12</sup> In TCM the understanding of the nature of the energy imbalance takes precedence over the identification of a specific pathological entity.<sup>16</sup> As a result Chinese disease names and descriptions cannot be interlaced into western therapeutic context.<sup>12</sup>

The meridian theory recognises that the human body maintains a continual interaction with its social and natural environment<sup>18</sup> and asserts that forces known as Yin, Yang<sup>5</sup> and the Five Phases act upon the normal balance of the body.<sup>9</sup> The concepts of Yin and Yang from Taoist philosophy represent polar opposite forces that originate from the primal energy source of creation.<sup>9</sup> The Five Phases, fire, wood, earth, metal and water, describe circadian and circannual variances in the outside world.<sup>9,19</sup> For example the Wood phase is associated with the early hours of the morning and from a seasonal/circannual perspective the wood phase is

associated with Spring time. This knowledge, in conjunction with information obtained from the clinical interview and physical examination, direct the TCM practitioner to the area/s of meridian disturbance.<sup>17,20</sup>

The physical examination may involve an analysis of the face and/or tongue and a bilateral assessment of the radial pulses.<sup>10</sup> A variety of different techniques are used to remove obstruction, and restore the normal flow of *Qi* and blood throughout the body.<sup>7,21</sup> Table 4 depicts the common practices used in TCM.<sup>7</sup>

### **TRADITIONAL CHINESE MEDICAL PRINCIPLES IN CHIROPRACTIC**

There is a diverse range of techniques that are used by chiropractors in modern practice settings. Kopansky-Giles and Papadopoulos have created a database of Canadian chiropractic practice which reveals that 15.5% of practitioners held qualification in alternative therapies, of which Acupuncture was highly represented.<sup>22</sup> Of course a greater percentage of practitioners make use of the aspects of these therapies without qualification. Equally extensive is the list of paradigms or philosophies that are used to justify the utilization of these techniques. Such paradigms or philosophies can exist anywhere on the scale from conservative ideas through to more esoteric concepts. University-based chiropractic institutions train students in techniques that resemble the traditional manual procedures described by the early chiropractic educators. This however has not discouraged the use and creation of techniques with differing lineage.

There is an extensive list of chiropractic techniques that incorporate acupuncture points and TCM principles. Two common examples of this utilization are the chiropractic techniques AK and NET.

### **The Use of Traditional Chinese Medical Principles in AK**

Applied Kinesiology was founded in 1964 by George Goodheart Jr. a chiropractor.<sup>23-25</sup> Applied Kinesiology is a diagnostic system and represents an adjunct to standard chiropractic procedures.<sup>26</sup> The examination and treatment approach in AK focuses on the detection and removal of aberration/dysfunction in the nervous, lymphatic, vascular, meridian, and the cranial-sacral respiratory systems.<sup>26,27</sup> Manual muscle testing (MMT) along with other forms of assessment guide the AK practitioner to the area/s of dysfunction.<sup>26</sup>

Goodheart introduced meridian therapy into the AK syllabus in 1966 after noticing that imbalances in the meridians could influence the function of the musculoskeletal system.<sup>26</sup> Specific principles and philosophies from TCM were then added to AK to complement the existing procedures.<sup>26,27</sup>

With regards to meridian dysfunction the AK practitioner seeks to balance the flow of *Qi* through the 12 regular meridians and the two extraordinary meridians (*Ren* and *Du*).<sup>26</sup> Acupuncture points from the regular meridians (including the specific points) and the two extraordinary meridians are incorporated into AK diagnostic and treatment methods. The laws defining meridian flow, meridian specific

organs and tissues, as well as the concepts of Yin and Yang and the Five Phases are incorporated into AK protocols. In addition to these TCM principles Goodheart and colleagues observed that dysfunctional areas of the spine or peripheral skeleton could contribute to meridian imbalance.<sup>26</sup>

It is important to note that Goodheart incorporated only those concepts from TCM that were both salient to the AK paradigm and relevant to the chiropractic profession. For example methods of point stimulation such as acupressure, tapping, and moxibustion are promoted in place of needling techniques.<sup>26</sup>

### **The Use of Traditional Chinese Medical Principles in NET**

NET was developed by chiropractor Scott Walker in 1985.<sup>28</sup> It is a methodology designed to diagnose and remove neurological and meridian aberration.<sup>28</sup> Walker originally developed NET after analysing treatment outcomes in the clients who visited his clinic. He noted that some individuals would respond well to treatment whilst others with a similar condition did not respond as favourably to comparable interventions.

This prompted Walker to investigate the factors that could influence an individual's response to treatment.<sup>28</sup> According to the Five-Phase theory of TCM emotion can contribute to meridian imbalance.<sup>29</sup> In TCM the experience of emotion is not a pathological occurrence however when emotions become excessive or deficient they can create disharmony within the meridian system.<sup>29</sup> Using this paradigm, in conjunction with the knowledge that meridian imbalance can influence the musculoskeletal system, Walker went on to investigate the link between emotion and treatment outcomes in his clients.<sup>28</sup>

Today NET is a 15-step standardised protocol that identifies emotions that are contributing to meridian imbalance.<sup>28</sup> Using diagnostic strategies from Applied Kinesiology such as manual muscle testing<sup>23,26-28,30</sup> the NET practitioner finds and corrects aberrations in the meridian system that may be relevant to a patient's condition. The meridian aberrations detected may be resultant or causal to the individual's presentation.<sup>28</sup> The major components from the meridian theory including principles of *Qi* flow, pulse diagnosis and the concepts of Yin and Yang are incorporated into NET protocols. In addition to the above-mentioned TCM concepts NET also uses points on the body known as Meridian Access Points (MAPs). In NET the MAPs describe points on the surface of the body in which the internal organs and their associated meridians may be examined.<sup>28</sup> Some of these MAP points correspond with the *mu* points of TCM whilst others are simply areas on the body overlying internal organs.

NET utilises concepts from a variety of different sources including TCM and AK. The framework of NET does not reflect any of these sources in their entirety, instead components of each modality have been incorporated pragmatically for a clearly designed purpose.<sup>28</sup>

NET was originally designed to enhance the recovery of patients suffering from Type M conditions by addressing meridian imbalance resulting from emotional or psychosocial influences. The phenomenon of emotion results in activity in the central, autonomic and somatic nervous systems, as well



as neuroendocrine changes. There are also accompanying changes in motivation, appraisal, and processing with the phenomenon of emotion.<sup>31</sup> Therefore by addressing the psychosocial aspects of a patient's presentation the influence on the system may extend beyond the neuromusculoskeletal system.

### Research into TCM

There have been numerous theories put forward to explain the meridian system and the effects observed following acupoint stimulation. However no one theory has managed to sufficiently explain TCM principles as a whole. As a result the literature on TCM contains a considerable body of unsubstantiated theories and hypotheses that represent attempts by researchers to define this complex system. A brief description of the more prominent theories is now presented.

### Neurohumoral Theory

The Neurohumoral Theory (NHT) represents a group of hypotheses that link the meridian system with the nervous system.<sup>32</sup> It proposes that acupuncture points/meridians are connected to the nervous system and the effects of acupuncture are mediated via neurohumoral mechanisms. This line of thought aligns favourably with the field of psychoneuroimmunology (PNI) which is the study of behavioural, neural, endocrine and immunological interactions.<sup>33</sup>

NHT is based on three main principles:

The meridian system is an independent system that is connected to the cortex via nerves.

The meridian system acts through this nervous connection.

The resultant nervous action of the meridian system is achieved by humoral mechanisms.<sup>4,34</sup>

More recently it was stated that acupuncture first stimulates corresponding brain cortices via the nervous system and therefore mediates chemical and hormone release to visceral structures.<sup>35</sup> For many years chiropractors have alluded to changes in neurophysiological pathways following spinal manipulative therapy (SMT). In a similar manner to those pathways described by the neurohumoral theory of acupuncture Hardy and colleagues purport that the changes described by chiropractors following SMT may be modulated by supraspinal centres.<sup>36</sup>

Shang states that the NHT was salient in establishing the scientific validity of acupuncture, however as a paradigm it has inadequate predictive powers and has been unable to account for several observations in clinical and research settings.<sup>4,32</sup> The non-specific activation of acupuncture points is one such example. Different nerves in the body respond to different types of stimuli, acupuncture points however can be stimulated using multiple methods and do not adhere to the same rules of stimulus specificity as nervous tissue.<sup>32</sup>

Tsuei states that the attempt by researchers to weave TCM into western medicine has resulted in biased research methodologies. By placing emphasis on genetics, anatomy,

physiology and biochemistry, the potential energetic element of acupuncture has been somewhat obscured. Tsuei purports that this bias may be detrimental in defining the mechanism of acupuncture, and suggests that a bio-energetic paradigm would be more supportive.<sup>4</sup>

### Morphogenetic Singularity Theory

Due to the shortcomings of earlier theories Cheng Shang set out to construct a more concise theory that would be compatible with both the NHT and the current research findings. This saw the emergence of the Morphogenetic Singularity Theory (MST).<sup>37</sup>

The premise behind the MST is that acupuncture points are singular points in the body's surface bioelectric field. A singular point is a mathematical term used to describe a point where the rate of change of one variable versus another becomes infinite. Small changes at these singular points can create massive changes in the variables being examined.<sup>37</sup>

Epithelia typically maintain a potential difference of 30-100mV across cell layers. Research into acupuncture has revealed that certain acupoints have a high density of gap junctions and represent areas of high electrical conductivity.<sup>38</sup> The MST states that acupuncture points are areas of local maximum electrical conductivity. These areas or singular points are regions in which small changes can cause large changes within the system.

The next component of the MST is that organizing centres in the body are singular points. Organizing centres are regions that control the developmental fate of cells. In light of observations that cellular growth can be influenced by electric field intensity<sup>39</sup> Shang postulates that organizing centres may be regions of low electrical resistance.<sup>37</sup> Various authors have demonstrated high electric conductivity, high current density and large concentrations of gap junctions at the sites of organizing centres.<sup>40-42</sup> Based on the findings of these researchers regarding electrical properties (field strength, conductivity, resistance) in conjunction with biochemical and anatomical findings at acupuncture points, Shang purports that these organizing centres may correspond to acupuncture points, hence human health can be influenced by changes in electro-potential, temperature gradient and electrical resistance.<sup>37</sup>

While the MST conforms to findings from neurohumoral studies many aspects of this theory remain unanswered. It is clear that further examination and clarification of the acupuncture points are necessary.<sup>43</sup>

### Research on Acupuncture Points

According to meridian theory, acupuncture points exist along the course of channels known as meridians and that the body's  $Qi$ <sup>10</sup> flows along these channels, however the confirmation of this theory poses a dilemma for researchers. One of the main difficulties facing researchers in this field is that the three entities acupuncture points, meridians, and  $Qi$  are anatomically invisible. Unlike the circulatory or nervous systems there are few easily definable anatomical correlates to track the course of the meridian system.<sup>35,44</sup> For this reason a large proportion of the inquest into TCM has focused on

the examination and analysis of acupuncture points and their properties with the idea that individual acupuncture points represent the more quantifiable components of this elusive system. The investigation of acupuncture points has been approached from many different research perspectives, which is reflected in the literature on TCM.

### **Acupoints and Anatomical Findings**

In 1977 Melzack and colleagues studied the possible relationship between acupuncture points and trigger points for the treatment of pain. Melzack and colleagues reported a 71% correspondence between trigger points and acupuncture points.<sup>45</sup> Birch states however that the 1977 study had several conceptual errors within the study design and therefore the results of the study do not confirm the original hypothesis proposed by Melzack and colleagues. Birch goes on to state that recent advances in acupuncture research fail to confirm the correspondence described by Melzack and colleagues.<sup>46</sup> Travell and Simons, authors of seminal work on trigger points state that while there is some correspondence between trigger points and acupuncture points, the two terms should not be used interchangeably.<sup>47</sup>

Langevin and Landow investigated the correlation between connective tissue planes and acupuncture points, hypothesising that the meridian system is represented via a network formed by interstitial connective tissue of the body. Traditional acupuncture points were marked on cross sections of an upper arm post mortem. Researchers then sought to examine whether or not these points corresponded to connective tissue planes by examining ultrasonic cross sections. The results of this study demonstrated that of the acupuncture points under scrutiny over 80% corresponded to intramuscular or intermuscular connective tissue planes.<sup>13</sup>

Li *et al* performed a study to explore the correlation between afferent nerve endings and acupuncture points in rats. The results of this study demonstrated that the density of peripheral nerve endings in the skin and the muscles is much greater in acupuncture points. Li *et al* postulate that acupuncture points may be areas of high-density nerve endings and receptive fields.<sup>48</sup>

### **Physiological Properties of Acupoints**

Due to the scarcity of physically observable correlates associated with acupuncture meridians a considerable proportion of research has focused on the biochemical properties of acupuncture points. Xu *et al* performed a study that measured the partial pressure of oxygen ( $pO_2$ ) in the tissues of animals *in vivo*.<sup>49</sup> The measurement of  $pO_2$  is commonly used to determine oxygen concentration in the body which may reflect aspects of biochemical and physiological reactions. Xu *et al* found that the  $pO_2$  is much higher in acupuncture points as compared to non-acupuncture points, which may prove to be useful information in the study of the biochemical and physiological properties of these specific regions.<sup>49</sup>

Wentao *et al* researched acupuncture points and the formation of liquid crystals.<sup>50</sup> Liquid crystals of bio-molecules form ubiquitously in biological systems and it has been noted

that liquid crystals accumulate in extracellular fluids during physiological and pathological processes. Wentao *et al* designed an experiment to assess the formation of liquid crystals in traditional acupuncture points following needle stimulation to a distant point on the same meridian. Points adjacent to the traditional acupoints were chosen as control points. The results demonstrated liquid crystal formation in an acupuncture point following the stimulation of another acupuncture point on the same meridian. There was no significant crystal formation in the control points.<sup>50</sup>

Jones and Bae studied the use of ultrasonic techniques for the stimulation and location of acupuncture points.<sup>51</sup> The results of the study indicated that acupuncture points can be stimulated using ultrasound and that acupuncture points may correspond to regions of enhanced elasticity/increased ultrasonic attenuation (attenuation describes the scattering and absorption of ultrasonic waves).<sup>51</sup>

Research has demonstrated that acupuncture can influence neuronal potential, ion concentrations ( $K^+$ ,  $Na^+$ ,  $Ca^{2+}$ ), neurotransmitters and neuropeptides.<sup>52</sup> Fu states these changes are the consequence of nerve cell activity and hypothesizes that the material base behind acupuncture and the meridian system are the nerve cells and the central nervous system.<sup>52</sup> Fu postulates that by using silver needles with high conductive properties an electric charge may be transferred from practitioner to patient during the needling process which can potentially depolarise/polarise nerve cells. This may account for some of the effects of acupuncture.<sup>52</sup>

Various researchers have used radioactive tracers injected into acupoints in an attempt to track the paths of the meridians. However, these methods of exploration have not yet provided consistent evidence for the existence of meridian channels.<sup>16</sup>

### **Acupoints and the Brain**

Functional magnetic resonance imaging (fMRI) has been used to explore the relationship between acupuncture points and brain cortices. Research suggests that specific acupuncture points may be related to certain regions of the brain. Cho *et al* state that if this relationship is accurate then acupuncture treatment may operate via the CNS as opposed to an acupoint-viscera interaction as traditionally thought.<sup>35</sup> Cho *et al* noticed that stimulation to the acupuncture points that traditionally relate to the eyes resulted in fMRI changes in regions of the occipital lobe.<sup>35</sup>

Yoo *et al* examined the neural substrates modulated by acupuncture stimulation using fMRI.<sup>53</sup> Pericardium - 6 (PC6) was stimulated using a single needle whilst participants underwent fMRI of the head. The results of the study indicated that various regions of the cerebellum and cerebral loci responded to acupuncture stimulation of PC6.<sup>53</sup>

Cho *et al* further examined pain-specific acupuncture points using fMRI.<sup>54</sup> Participants were subjected to pain stimuli and the resultant activation of the brain was mapped. Participants then received meridian acupuncture and were re-exposed to the noxious stimuli. The protocol was repeated several times and results compiled. Cho and colleagues

reported that acupuncture stimulation desensitised or reduced the activation of brain areas thought to be involved with pain stimulus processing.<sup>54</sup>

## DISCUSSION

In 2003 the World Health Organization (WHO) produced a publication that provided a review and analysis of controlled trials in acupuncture therapy as reported by the current literature.<sup>55</sup> The review was not intended to be a definitive conclusion on acupuncture applications. Instead the aim of the review was to promote research and evaluation of acupuncture employment. Literature included in the review was in the structure of formally published papers describing either randomised controlled trials or non-randomised controlled clinical trials. The trials included in the review had to have adequate numbers of participants and in the case of comparative trials, the various groups involved in the individual studies had to have comparable conditions prior to the commencement of treatment. Results were then divided into groups of conditions and further subdivided into groups based on the efficacy of acupuncture as a treatment for each condition. The results of this review detailed a list of Type M and Type O conditions in which there is considerable evidence to support the use of acupuncture as a treatment. A second list was described listing diseases and disorders in which the therapeutic effect has been shown, however further proof is required before solid recommendations can be made regarding the efficacy.<sup>55</sup> Therefore it could be argued that the inclusion of TCM principles may expand the list of conditions to which chiropractic treatment can be applied and potentially improve the effectiveness of current approaches.

The biopsychosocial model of health care has become the prominent model in educational, research and healthcare settings. It is therefore important that healthcare professions such as chiropractic incorporate techniques that align with this paradigm. In the case of NET the incorporation of principles and philosophies from TCM serves to broaden the scope of chiropractic practice by including tools that can address the psychosocial dimensions of an individual's presentation.

TCM principles do not however fit seamlessly into the western healthcare paradigm. The diagnostic procedures of TCM are not designed to identify a specific tissue lesion. Instead illness is described in a series of traditional pathophysiologic metaphors that pertain to internal and external imbalance.<sup>5</sup> This difference in the diagnostic approach between practitioners of TCM and more western trained practitioners presents some considerable communication difficulties. These difficulties would not only exist amongst practitioners but the individuals utilising these hybrid healthcare services may also suffer a certain degree of confusion.

The chiropractic techniques, AK and NET incorporate acupuncture points and elements of TCM into their respective protocols. This inclusion whilst proving anecdotally important requires further input from the scientific community.

There is a considerable body of research into TCM, however the characterization of anatomical correlates and physiological properties of acupuncture points, meridians and *Qi* continues to challenge researchers.

## CONCLUSION

TCM is a system of healthcare that has been in place for over 2000 years. TCM describes a preventative system in which illness and disease are viewed as forms of energy imbalance. Chiropractic techniques such as AK and NET include acupuncture points and meridian theory within their respective diagnostic and therapeutic protocols. The scientific backing for this inclusion is still evolving and it is clear that further research is required to support the placement of TCM principles and practices within chiropractic technique. The biopsychosocial model has become the predominant healthcare paradigm. For this reason, it is important that procedures and protocols within the chiropractic profession maintain congruency with this healthcare concept. Through the incorporation of elements from TCM as seen in techniques such as AK and NET practitioners may adhere to a more wholistic approach as supported by the biopsychosocial model.

## REFERENCES

1. Cadwell V. A primer on acupuncture. *J Emerg Nurs* 1998; 24:514-7.
2. Lee W. Acupuncture as a remedy for rheumatism. *South Med J* 1836; 1:129-33.
3. Millman B. Acupuncture: context and critique. *Annu Rev Med* 1977; 28:223-34.
4. Tsuei J The science of acupuncture-theory and practice. *IEEE Eng Med Biol* 1996; 96:52-7.
5. Sierpina VA, Frenkel, MA. Acupuncture: a clinical review. *South Med J* 2005; 98(3):330-8.
6. Wolfson V. The puzzle of acupuncture. *Am J Chinese Med* 2003; 31(6):983-90.
7. Robinson N. Integrated traditional Chinese medicine. *Complement Thera Clin Pract* 2006; 12:132-40.
8. Stern A. Acupuncture: Ancient and current health care. *SRM* 2004; 2(3):163-8.
9. Xinghua B, Baron, RB. Acupuncture: visible holism. Oxford: Butterworth-Heinemann; 2001.
10. Vickers A, Zollman, C. ABC of complementary medicine: acupuncture. *BMJ* 1999; 319:973-6.
11. Mayer D. Acupuncture: an evidence-based review of the clinical literature. *Annu Rev Med* 2000; 51:49-63.
12. Breuner CC. Complementary medicine in pediatrics: A Review of Acupuncture, Homeopathy, Massage and Chiropractic Therapies. *Curr Probl Pediatr Adolesc Health Care* 2002; 32:353-84.
13. Langevin HM, Yandow, JA. Relationship of acupuncture points and meridians to connective tissue planes. *Anat Rec* 2002; 269:257-65.
14. Kaptchuk TJ. Acupuncture: theory, efficacy and practice. *Ann Intern Med* 2002; 136:374-83.
15. Comunetti A, Laage, S, Scheissl, N, Kistler, A. Characterisation of human skin conductance at acupuncture points. *Experientia* 1995; 51: 328-31.
16. Birch S, Cummings M, Filshie J. et al. Acupuncture: a scientific appraisal. Oxford: Butterworth-Heinemann; 1999.
17. Tsang I. Establishing the efficacy of traditional Chinese medicine. *Nat Clin Pract Rheumatol* 2007; 3(2):60-1.
18. Lu A, Jia HW, Xiao C, Lu QP. Theory of traditional Chinese medicine and therapeutic method of diseases. *World J Gastroenterol* 2004; 10(13):1854-6.



19. Dong X, Dai R. Traditional Chinese medicine from the point of view of system science. *Clin Acupunct Oriental Med* 2003; 4:34-7.
20. Ulett G, Han J, Han S. Traditional and evidence-based acupuncture: history, mechanisms, and present status. *South Med J* 1998; 91(12): 1115-20.
21. Tai D. What is acupuncture? *Complement Ther Nurs Midwifery* 2002; 8:155-9.
22. Kopansky-Giles D, Papadopoulos C. Canadian chiropractic resources databank: a profile of Canadian chiropractors. *J Canad Chiro Assoc* 1997; 41(3):155-91.
23. Perle S. Applied kinesiology. *Chiropractic Technique* 1995; 7(3): 103-7.
24. Gin R, Green, BN. George Goodheart, Jr., D.C., and a history of applied kinesiology. *J Manipulative Physiol Thera* 1997; 20(5):331-8.
25. Perle S. Applied kinesiology. *Chiropr Technique*. 1995; 7(3):103-7.
26. Walther DS. *Applied Kinesiology-Synopsis*. 2nd ed. Pueblo, Colorado USA: Systems DC; 2000.
27. Gin R, Green, BN. George Goodheart, Jr., D.C., and a history of applied kinesiology. *J Manipulative Physiol Ther* 1997; 20(5):331-8.
28. Walker S. *NET Basic Seminar Manual*. Sydney, Australia; 2005.
29. Ross J. Zang Fu: The organ systems of traditional Chinese medicine. 2nd ed. Melbourne: Churchill Livingstone; 1984.
30. Monti DA, Sinnott J, Marchese M, Kunkel EJS, Greeson, JM. Muscle test comparisons of congruent and incongruent self-referential statements. *Percept Motor Skill* 1999; 88:1019-28.
31. Scherer K. What are emotions? And how can they be measured? *Soc Sci Inf* 2005; 44(4):695-729.
32. Shang C. Mechanism of acupuncture-beyond neurohumoral theory. *Med Acupunct* 1999; 11(2).
33. Ader R, Cohen N. Psychoneuroimmunology: conditioning and stress. *Annu Rev Psychol* 1993; 44:53-85.
34. Chang H, Xie YK, Wen YY, Zhang SY, Qu JH, Lu WH. Investigation on the hypothesis of meridian-cortex-viscera interrelationship. *Am J Chin Med* 1983; 11:5-13.
35. Cho Z, Chung, SC., Jones, JP, Park, JB., Parks, HJ., Lee, HJ., Wong, EK., Min, BI. New findings of the correlation between acupoints and corresponding brain cortices using functional MRI. *Proc Natl Acad Sci* 1998; 95:2670-3.
36. Hardy K, Pollard H. The organisation of the stress response, and its relevance to chiropractors: a commentary. *Chiropr Osteopat* 2006; 14(25):1-13.
37. Shang C. Singular point, organizing center and acupuncture point. *Am J Chin Med* 1989; 17:119-27.
38. Nakatani Y. An aspect of the study of ryodoraku. *Clin Chin Med* 1956;3(7):54.
39. McGinnis M, Venable JW. Voltage gradients in newt limb stumps. *Clin Biol Res* 1986; 2120:213-38.
40. Jaffe L, Stern CD. Strong electrical currents leave the primitive streak of chick embryos. *Science* 1979; 206:569-71.
41. Laird D, Yancey SB, Bugga L, Revel JP. Connexin expression and junction communication compartments in the developing mouse limb. *Dev Dyn* 1992; 195:153-61.
42. Hotary K, Robinson, KR. Endogenous electrical currents and voltage gradients in *Xenopus* embryos and the consequences of their disruption. *Dev Biol* 1994; 166:797.
43. Shang C. The past, present and future of meridian system research. *Clin Acupunct Oriental Med* 2000; 1:115-24.
44. Ho M, Keynes W, Knight D. The acupuncture system and the liquid crystal collagen fibres of the connective tissues. *Am J Complement Med*. *In press*.
45. Melzack R, Stillwell DM, Fox EJ. Trigger points and acupuncture points for pain: correlations and implications. *Pain* 1977; 3:3-23.
46. Birch S. Trigger point-acupuncture point correlations revisited. *J Altern Complement Med* 2003; 9(1):91-103.
47. Travell J, Simons DG. *Myofascial pain and dysfunction: the trigger point manual* Baltimore: Williams & Wilkins; 1983.
48. Li A, Zhang J, Xie Y. Human acupuncture points mapped in rats are associated with excitable muscle/skin-nerve complexes with enriched nerve endings. *Brain Res* 2003; 1012:154-9.
49. Xu W, Ma W, Li K, Hu J, Shen, L. A needle-electrochemical micro-sensor for in vivo measurement of the partial pressure of oxygen in acupuncture points. *Sens Actuators* 2002; B(86):174-9.
50. Wentao M, Hua T, Jiming H, Lianxin C. Appearance of liquid crystals in acupuncture points. *Liq Cryst* 2001; 28(11):1597-601.
51. Jones J, Bae Y. Ultrasonic visualisation and stimulation of classical oriental acupuncture points. *Med Acupunct* 2004; 15(2).
52. Fu H. What is the material base of acupuncture? The nerves! *Med Hypotheses* 2000; 54(3):358-9.
53. Yoo S, Teh E., Blinder RA, Jolesz FA. Modulation of cerebellar activities by acupuncture stimulation - evidence from MRI study *Neuro Imag* 2004; 22:932-40.
54. Cho Z, Son Y, Han J. et al. fMRI Neurophysiological evidence of acupuncture mechanisms. *Med Acupunct* 2003; 14(1).
55. WHO. *Acupuncture: review and analysis of reports on controlled clinical trials* Geneva; 2003.