



Review Article

Treating the patient not the symptoms: Acupuncture to improve overall health – Evidence, acceptance and strategies

Stephen Birch*

Department of Health Sciences, Kristiania University College, Oslo, Norway

ARTICLE INFO

Article history:

Received 18 June 2018

Received in revised form 25 July 2018

Accepted 26 July 2018

Available online 31 July 2018

Keywords:

Acupuncture

Health

Pattern identification

Health improvement

Research

ABSTRACT

Documented mechanisms of acupuncture suggest the possibility of whole body effects in addition to local and regional effects. Traditional theories of acupuncture predict whole body effects. Does this permit the possibility of applying treatment to target overall health improvement of the patient rather than the symptom? After introducing the term 'health improvement' this paper explores situations where it might be advantageous to do this, giving examples of how health authorities in some countries have proposed broader treatment approaches that focus on health improvement. It also discusses cases where acupuncture has been recommended as a treatment method in a number of these proposals and gives some clinical examples of this kind of whole body 'health improvement' targeted treatment effects. Given that health authorities have already recognised this potential for the application of acupuncture the author then explores evidence of more whole-body 'health improvement' effects from systematic reviews and examples of health experts recommending acupuncture to take advantage of them. Research strategies and foci are then proposed and explored to develop this evidence. What are the best treatment approaches to create these effects? By what mechanisms can 'health improvement' be produced? How can one measure these effects? It is likely that treatments based on 'pattern identification' (PI) may provide the best strategies for producing 'health improvement', thus PI-based acupuncture treatments are likely to be the best strategy for clinical research investigating these effects.

© 2018 Korea Institute of Oriental Medicine. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

It has long been a focus and great strength for modern biomedicine that it is disease focused. Technological advances have allowed increasingly sophisticated means for differentiating, excluding or identifying each pathological condition. Modern medicine has developed increasingly sophisticated methods for matching the disease with a treatment.¹ While great advances have been made in modern medicine, the importance of making treatment more patient focussed is also increasingly recognised.² In addition to including attempts to engage the patient more in decision making, empowering the patient, recognising the importance of patient desires and self-knowledge it can also focus on improving the health of the patient. Modern medicine has ongoing debates and disagreements about what 'health' might be. The World Health Organization defined health in 1948: "Health is a state of complete

physical, mental and social well-being and not merely the absence of disease or infirmity,"³ but this ideological statement is not agreed by all⁴ and there appears to be ongoing discussion of the different ways of defining it.⁵

Despite the difficulty of having a universally agreed upon definition of health, for the purposes of this article the term 'health improvement' is used to refer to treatments that target to improve the overall health of the patient directly or that employ strategies that draw on the multitude of influences within the sphere of the patient, such as engaging them in their health decision making, empowering them to take charge of their health. Potentially some treatments can directly produce health improvement, other treatments employ approaches that engage different resources to support or indirectly produce health improvement.

2. Practical Health Improvement approaches

In recent decades efforts have begun to address the limitations and inefficiencies of disease-oriented treatment approaches. For example, in the UK National Health Service (UK-NHS), strategies were developed to engage the patient with the 'Healthy Living

* Corresponding author at: Department of Health Sciences, Kristiania University College, PB 1190 Sentrum, N-0107 Oslo, Norway
E-mail address: sjbirch@gmail.com

Centres' initiative.⁶ Here the emphasis is on bringing together a wide range of sources and influences within the sphere of the patient in order to address his health problems. It is a practical expression of a more whole health improvement approach.

The Scottish Government developed the 'Self-Directed Support' strategy to help patients⁷ as part of a strategy to create a 'Healthier Scotland'.

The UK-NHS has also pioneered the 'Shared Decision Making' approach to health care^{2,8–10} These approaches can be found emerging in complex health problems like addiction¹¹ where the patient usually feels they have lost control of their problems and part of the strategy is to try to help restore the locus of control to the patient. Similar strategies can be seen in patients who are depressed¹² or have an incurable disease like osteoarthritis where the patients must learn strategies to cope and to help prevent or postpone as long as possible the need for surgery.^{13,14} Like the previous NHS initiative, the approach is a practical expression of a more whole health improvement approach.

In the US, the Department of Veterans Affairs (US-DVA) has made significant progress in dealing with the multitude of problems faced by veterans with the 'Whole Health' approach.^{15–18}

The above examples from the UK-NHS and the US-DVA represent concrete action plans that provide the opportunity to address problems that patients and health care systems are perceived to have. In part these approaches are based on earlier attempts to model the complexities of patient problems and how health care systems can address them. This modelling process can be found emerging in efforts to expand biological understanding of living systems,^{19–22} helping patients with psychiatric problems,²³ helping patients with cancer^{24,25} address issues in CAM therapies.^{26–29} Systems biology which is founded in complexity theory and methods of analysis, has become an influential and growing area for medical research that offers the possibility of also contributing to the dialogue about Whole Health or whole-body changes.^{30,31} To date however, systems biology has been co-opted by the biological and biochemical sciences to allow exploration of complex chemical interactions, it has not yet begun to examine and include the other complex aspects of health care – psychological, social, cultural, spiritual and so on,²³ thus while it can make important contributions, it is likely to be self-limiting until these issues are rectified. With all these efforts, this has become a rich and broad area of development for healthcare in general. Research in this area has adopted different foci such as: theoretical modelling of how to envision the whole person; understanding different levels and forms of interaction by mapping the biological and physical bases of these; addressing the perceived needs of patients who are overwhelmed by their symptoms; addressing the behavioural and psychological changes that may or have resulted from the health problems. Different approaches attempt to cover different components. The UK-NHS and US-DVA approaches are about helping patients find solutions to their complex problems by helping empower the patients, they are less focused on modelling all that might be occurring.

Within some of these 'health improvement' approaches we see that acupuncture is already recognised as a treatment option. It has been recommended within the UK-NHS to help with a broad range of general health or 'health improvement' issues. For example, in substance abuse treatment acupuncture is recommended not only for help with treatment of withdrawal symptoms,^{11,32} but it is also mentioned for its whole-body effectiveness.³² In Scotland, NHS Lothian describes the use of acupuncture as part of a package of care for 'keeping healthy' for patients with drug and alcohol problems.³³ In the context of pain treatment, acupuncture is also recognised in the UK-NHS as being able to "improve sleep & Increase your sense of wellbeing, daily activities and mobility."³⁴

In oncology patients acupuncture is said to have "Balancing effect on hormones, antibody production and allergic responses" and "Leads to an improved sense of well being."³⁵ "improves quality of life".³⁶ The Scottish Government 'Self-Directed Support' model includes the use of acupuncture.⁷ The SDM movement in the NHS has recommended acupuncture as a general treatment option² and more specifically for knee OA, hip OA^{13,14} and in depression where it is listed as a treatment to help with lifestyle and coping strategies¹² The 'Whole Health' approach developing within the US-DVA recommends acupuncture as a standard part of the approach^{18,37}: Whole health "includes self-care and complementary therapies such as acupuncture, massage, and yoga."¹⁸

Given that acupuncture has already been recognised as a potentially useful treatment to help in these more person-centred and 'health improvement' approaches, what evidence do we have to support this? What research strategies can be employed to further develop the evidence of the 'health improvement' treatment effects of acupuncture its' potential contribution in health care?

3. Acupuncture

3.1. History and nature of practice

When we look at the origins of acupuncture in the early Han dynasty (circa 100 BCE) we find a complex translation of the language and application of self-cultivation (doing something to improve oneself through improving and regulating one's qi) to the language and application of using needles, in efforts to do this to another person.³⁸ The first chapter of the Huangdi Neijing Suwen begins with a dialogue about why people get sick and die young.³⁹ p.30–36 It's explanation clearly describes a kind of idealised state within which one stays healthy and lives long, but that people fall out of this state and hence become sick and die young. The fundamental goal of traditional East Asian Medical (TEAM) treatment is to try to restore that idealised state of qi in the patient. Huangdi Neijing Lingshu chapter 75 defines the purpose of needling as to 'regulate qi'.^{38,40} This notion of restoring order or a higher state of order in the body by regulating qi underlies the notion of a dichotomised treatment approach that also emerges from the early literature. This fundamental qi-regulation approach became known as the 'root treatment' (*zhibenfa*), while applying treatment to target symptoms became known as the branch treatment (*zhibiaofa*).⁴¹ Many traditionally based systems of acupuncture (TBSAs) use a combined approach. For the root treatment TBSAs usually identify a pattern of disturbances to focus on for treatment (pattern identification, PI).⁴² The core theories of physiology (qi, xue, jing mai, zang-fu, etc.) and pathophysiology underlie the practice of PI-based treatments. Often the identified pattern is treated to help restore some more idealised healthy or more ordered state of the body. The branch treatment often uses treatment local or distal to the symptom to reduce it. In principle root treatment that attempts to restore a healthier state in the person can create these whole-body changes. On the other hand, some symptoms themselves can trigger a downgrade of the overall health status of the patient. Sleep problems can cause both psychological changes and result in chronic fatigue, both of which can undermine the ability to cope with and deal with symptoms or life events. Likewise, chronic pain can be very tiring, can result in affective changes and sleep disturbance⁴³ all of which undermine the health status of the patient and reduce their coping skills and ability to deal with life events. In recent years we find that 'chronic pain syndrome' is now listed in the psychiatric section of medical texts due to these and other complications.¹ Thus, addressing symptoms directly in branch treatment can also improve the overall health status of the patient by changing these complex pathways. The 'root' treatment is more explicitly about

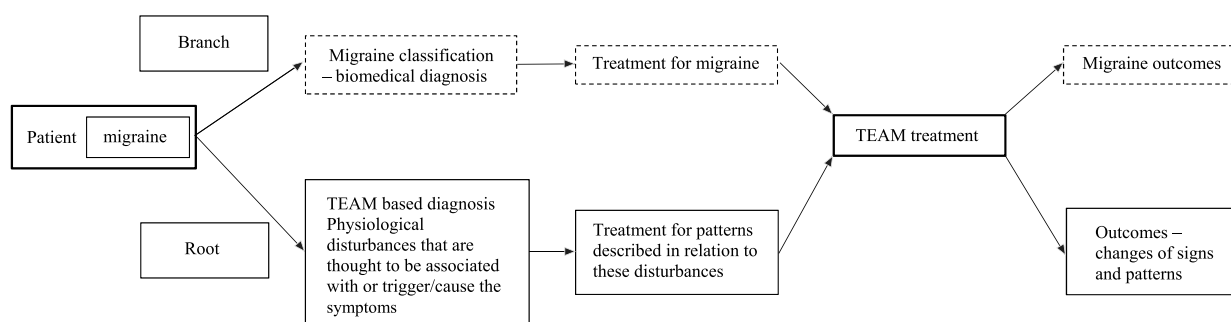


Fig. 1. Illustration of the disease and patient-centred treatment approaches of root and branch and their potential. TEAM, traditional East Asian medicine.

creating whole body changes, to create 'health improvement' while the branch treatments may indirectly contribute to this. In general, the root treatments are based in pattern identification approaches.

3.2. Pattern identification based treatments

Modern clinical trials usually focus on a specific symptom or disease, identify valid outcome measures of that symptom or disease and then apply treatment to improve the measured outcome of that symptom or disease. In the language of TEAM, this focus is on the branch treatment. To improve this situation researchers have tried to incorporate pattern identification to allow at least some form of root treatment to be employed.⁴⁴ But even in trials where this has been done, the pattern-based root treatments do not always show their potential contribution. In an important study on depression where the acupuncturists applied PI diagnosis-based treatments, regardless of the pattern treated, a similar set of acupoints were the most commonly applied, suggesting that they may be related more to the symptom of depression and not the identified patterns.⁴⁵ An older review of PI based diagnosis and treatment of back pain found that the most commonly recommended acupoints are recommended regardless of the PI,⁴⁶ again suggesting that the points are more related to the symptoms than to the PI. While some studies have demonstrated the importance of PI-based treatments,⁴⁷ this is a potential weakness for PI based treatment approaches. Efforts need to be made that the selected treatment is more clearly related to the specific PI it is supposed to be used for if we want to examine the potential for triggering health improvement effects.

Fig. 1 shows the basics of the root-branch combined treatment approach. The specific symptom (migraine) can be treated using empirically based strategies focused on the symptom. Health Improvement is targeted by gathering data across the whole body, organising the data into a pattern-based description (pattern identification – PI) and selecting treatment to correct the identified pattern(s) – which in principle creates health improvement effects.

To guarantee the PI decisions and selected treatments, not only is research needed to validate the PI observations and judgments,^{41,44} it will also be necessary to develop validated outcome assessments related to the PI and its impact as well.⁴¹ This has not been done much in clinical research on acupuncture before.⁴⁸ A few trials have illustrated the potential value of applying good PI based treatments. In a low back pain trial published in 2006 MacPherson and colleagues found that there were treatment effects of acupuncture compared to standard therapy that became significant between the 12-month and 24-month assessments.⁴⁹ If a good root treatment is applied the overall health of the patient should improve so that there will be a growing improvement in their health status. It is possible that this 2006 study demonstrated this. On the other hand, PI based approaches in some countries involve using the PI judgments to guide dietary and lifestyle advice,⁴² which can

also influence longer term improvements in outcomes.^{48,50} Which of these two factors was more important in this 2006 study is difficult to say. But to test the theory of the PI and the application of its root treatment in acupuncture, it will be important to figure out how to identify and separate these needling root treatment effects to see if they can be valuable in health care.

3.3. Physiology and whole-body effects

It is now clear that acupuncture can trigger complex, usually unpredictable multi-system physiological responses⁵¹ that might act or be observed to act locally, regionally, distally, centrally or throughout the whole body.⁵² Thus, in principle whole body effects can occur with any treatment. Perhaps the manner of gathering data through the four diagnoses to select the pattern for treatment and the tools and techniques of treatment for the pattern increases the likelihood of triggering whole body changes that lead to greater health where the PI based treatment responses might be tailored to the specific pattern of observable disruptions in the patient.⁴² But the fact that acupuncture can act on many physiological systems at the same time suggests another potential use of acupuncture in whole-health treatment. In cancer care, many patients have multiple symptoms. In 2001, Dodd and colleagues identified 'symptom clusters' and the need to address this.^{53,54} In cancer care acupuncture has been identified as a potentially useful therapy for conditions where 'symptom clusters' manifest rather than single symptoms: "Acupuncture presents a unique mechanism for a single therapy of symptom clusters. A unique aspect of Oriental medicine in general, and of acupuncture in particular, is recognition of the unique and reciprocal impact of the patient and the disease and its symptoms."⁵⁴ The potential for acupuncture to simultaneously address different symptoms by exploiting the many pathways by which it can act is increasingly becoming recognised in multi-symptom health problems such as cancer⁵⁵ and menopause.⁵⁶ Thus, we see emergent evidence that the multiplicity of responses to acupuncture therapy offers potential for triggering 'health improvement' effects in the patient with the additional possibility that the PI-based diagnosis-treatment approaches of acupuncture might be practical attempts to strategically apply these advantages. Perhaps one of the ways that these multi-system physiological responses affect the patient is through triggering some regulatory mechanisms which have the potential to affect multiple health problems. Studies demonstrate that acupuncture can create effects due to modulation of the somato-sensory system⁵⁷ and of the autonomic nervous system.^{58–61} Are there specific treatment approaches that might be more conducive to triggering these nervous system regulatory effects? Is it possible given the way some root treatment approaches have been constructed and are applied that their techniques of treatment and patterns of treatment trigger these regulatory effects more predictably?⁶² Could the practitioner

Table 1
Documented Examples of Likely and Probable Health Improvement Effects

Likely Health Improvement effects	Probable Health Improvement effects
Enhanced recovery from surgery ⁷¹	Post-op nausea + vomiting (PONV) ⁷⁴
Promoting wound healing ⁷²	Chemotherapy induced N&V (CINV) ⁷⁵
Improved Quality of life (cancer related) ⁷³	Radiation induced N&V (RINV) ⁷⁶
	Surgical anxiety/procedural distress (children) ⁷⁷
	Post-op pain ⁷⁸
	Endoscopy pain ⁷⁹
	Gag reflex ⁸⁰

play a greater role than simply being the person making the diagnosis and applying the treatment?⁶² While not widely recognised within mainstream medicine⁶³ there is evidence that consciousness affects physical processes and biological systems in ways that are quite surprising.^{63–66} One explanation for how these effects occur is that a quietly focused mind can create a higher state of order in the space in which the person resides.^{65,66} Is it possible that this effect of consciousness of helping order the state of the space in which the practitioner and patient work is an additional effect that either directly reorders physiological systems or helps in the process of engaging regulatory systems to create or restore the higher ordered state of physiology?^{38,62}

3.4. Clinical examples

Clinical research on acupuncture is likely to have focused on a measurable symptom using a reliable outcome measurement related to that symptom.⁶⁷ Since 'health' is a complex and developing concept in modern medicine, there is also debate about how to measure it. Thus, there may not be a clear outcome measurement for health improvement and not much research directly focussing on it.

Are there medical circumstances where treatment is applied in such a way as to indirectly assess the impact of that treatment on health improvement, or potentially allow for its indirect assessment? One area is when a treatment is applied to improve recovery from a medical procedure such as surgery, another might be when treatment is applied preventatively before the procedure to reduce or prevent onset of symptoms from the procedure, another might be when the treatment is applied during the procedure to reduce or prevent onset of symptoms from the procedure. Another might be to apply treatment to produce or restore a more ordered state of physiology in the hope that it will trigger improved functioning and impact an otherwise untreatable symptom.

While only anecdotal, the following clinical examples illustrate the various ways that treating to target health improvement rather than to target symptoms can produce clear treatment effects, evidence related to this can be seen in [Table 1](#). Case 1: A hospitalised five-year old boy with complex medical history including many abdominal surgeries was awaiting major abdominal surgery. He had improved recovery outcomes following the application of a light treatment.⁶⁸ In this case it was not possible to treat symptoms, rather treatment was focused on improving his vitality, restoring a better state of order in his body using a specialised Japanese paediatric method called 'Shonishin'.⁶⁹ In this case needles were not inserted instead a very light treatment was applied to the skin surface to help strengthen and balance the 'qi' of the patient. The following cases are examples of the same strategy. Case 2: Young was asked to treat a 45-year old woman in an isolation unit at the hospital who was very ill following heavy immunosuppression treatment for acute myeloid leukaemia, awaiting bone marrow transplant.⁷⁰ Following the super light non-inserted treatments,

the patient was able to improve enough to allow the transplant procedures to proceed. Case 3: Rodriguez had a 3-day old baby present with postnatal lethargy and lack of suckle reflex. She had not taken any breast milk since birth and was becoming acutely dehydrated. The parents stopped for treatment on the way to the hospital. Within 15 min of the Shonishin treatment, the baby started suckling and drinking milk greedily.⁶⁹ p.316–317 Case 4: A 13-year old girl was treated for poor appetite and slow growth. She had been born with severe cleft palate and had to be fed for a prolonged period with naso-gastric tube. Following successful surgical repairs of the cleft palate she started to eat orally. But since she had not developed a normal hunger reflex she had always had poor appetite and had only ever eaten small quantities. She was small for her age and still struggled with her eating difficulties. Treatment involved applying light non-invasive PI-based root treatment coupled with very light insertion of needles to a depth of 0.5–2 mm using non-stimulative techniques. After the second treatment she developed a strong appetite and started to eat more normally, exhibiting rapid growth after this.⁶⁹ p.330–331 These cases illustrate how application of root treatment could create enough health improvement changes that the five-year old boy could recover much more quickly from major surgeries, the 45-year old woman could recover more quickly so she could have the bone marrow transplant surgery, the three-day old baby could manifest the normal physiological suckle reflex and the 13-year old girl could develop a more normal hunger reflex and eating pattern.

3.5. Acupuncture clinical evidence of 'health improvement' effects and its recognition

While few clinical trials have focused on directly health improvement, there have been a few medical situations where treatments have focused on supporting the healing, recovery or overall resistance of the patient. [Table 1](#) shows situations where acupuncture has been found to be effective or trending towards being effective in systematic reviews where it was used as treatment within these categories.

In addition to this evidence, we also have evidence of acupuncture effectiveness across an extensive range of health problems. In a recent paper, evidence is given for 96 different health problems.⁸¹ This wide range of documented treatment effects also supports the notion that acupuncture could be good for 'symptom clusters'⁵⁵ and potentially has a broader underlying health improvement effect capable of affecting this large range of health disturbances.

We have already seen that medical experts within the UK-NHS and US-DVA have recommended acupuncture as part of a package of care related to 'health improvement'. Have other medical experts also recommended acupuncture to take advantage of 'health improvement' effects in the treatment of different health problems? The issue of acupuncture recommendations is partially addressed in a recent paper,⁸¹ where the results of an extensive search (as of August 31, 2017) of clinical practice guidelines (CPGs) and treatment guidelines (TGs) are presented. The reader is referred to that paper for search methods, strategies, definitions and findings. The ongoing search has found additional CPGs and TGs that recommend acupuncture. [Table 2](#) gives examples that have recommended acupuncture to take advantage of perceived health improvement effects. Acupuncture has been widely recommended for some of these symptoms, indicating widespread international acceptance of acupuncture for them.

Based on the complexity of physiological effects of needling we can propose that acupuncture has the potential to create positive health improvement effects, which in principle are likely to be stronger when PI-based root treatments are applied. We have seen that there is a developing evidence base of these effects or

Table 2
Examples of Recommendations to Use Acupuncture in Relation to Overall Health Improvement

Likely health improvement effects	Probable Health Improvement effects
Quality of Life in Cancer ^{82–84}	Post-op pain ^{92,93}
Well-being in cancer ⁸⁴	Post-op dental pain ⁹⁴
Health improvement (health living) ⁶	Gag reflex in dentistry ⁹⁴
Chronic stress management ^{85,86}	Procedural pain (children) ⁹⁵
Whole body effects (more relaxed, better mood, better energy, better sleep, etc.) ^{32,34,87,88}	Pain associated (procedural) fear/anxiety ⁹⁵
Breech version ^{89,90}	Endoscopy pain ⁹⁶
Improve physical performance ⁹¹	Pain in oocyte retrieval ⁹³
Delayed onset muscle soreness ⁹¹	PONV ^{93,97}
	CINV ^{98,99}
	RINV ¹⁰⁰
	Fatigue in cancer patients ^{82,83,92}

that possibly take advantage of these health improvement effects to help the patient. We have also seen a growing recognition of these effects and the adoption and recommendation of acupuncture in relation to this within government based and expert practitioner-based publications about treatment. The potential for the use of acupuncture to create and use these 'health improvement' effects in health care could be quite important. What research can be done that can help develop the evidence for this and that can highlight these whole-body treatment effects?

4. Research issues

4.1. Developing a comprehensive strategy to capture the whole body 'health improvement' treatment effects

Since treatment of the patient rather than the symptom to create health improvement changes is not yet a well-developed area there will be a range of basic steps that will be needed to lay the ground work for more detailed and focused studies on this theme. In principle this can be a very important area, since as seen in the UK-NHS and US-DVA movements, this has the potential to change the way that many patients can be treated. If the patient

is brought into a healthier state by improving their physiology or by empowering the patient to help themselves more, etc., this can make any therapy more effective. The following section sketches out basic and more complex research questions and their potential solutions.

4.2. Defining terms

We have seen different approaches have developed that approach the issue of what in this paper is termed 'health improvement.' Table 3 gives examples of statements about this. It will be necessary for diverse experts to come together to seek a common terminology and clearer articulation of this.

4.3. How to measure or assess 'health improvement'?

The research methods and approaches proposed by the British Medical Research Council in its publications on 'Complex interventions' potentially offer useful strategies for developing structured ways of testing and developing how treatments may affect the whole person rather than just specific outcomes/symptoms.^{104,105} Likewise, integrative research modelling approaches^{24–26,28,29} may also be helpful as guides on how to capture data on and document 'health improvement' effects, Bell and colleagues validated a global well-being outcome rating scale that could be useful to capture these data.⁶⁷ With the shifting of focus towards patient health and well-being such as we see with the US-DVA and UK-NHS we also find a shifting towards 'Patient Centred Outcome Measures', with a US based centre devoted to this [<https://www.pcori.org/>] and publications exploring the implementation of these outcome measures in different health scenarios.^{106,107} Together with older validated tools like the MYMOP¹⁰⁸ these can play a role in the assessment of these data. Once the scope of health improvement is more clearly defined and its terminology agreed upon it may be necessary to develop specific reliable and valid instruments and methods for assessing and measuring it.

Table 3
Examples of Statements about Overall Health, Health Improvement and Strategies for it

Source	Statements
(NHS Executive 1999) ⁶	Examples from the UK, Government, Department of Health and NHS sources "Healthy living centres will focus on health in its broadest sense, providing opportunities to improve quality of life and enable people to achieve their full potential"
(NHS-2gether 2010) ³²	"Regular treatments of ear acupuncture can help clear your mind, build energy and give you a sense of wellbeing. People receiving the treatment have commented on the peaceful, calming and empowering effects that have helped to reduce anxiety and improve their sleep. The general effect is to aid the body to balance itself in order to maintain health and wellbeing"
(UK Government 2014) ⁸⁷	"Auricular acupuncture helps support young people in managing withdrawal symptoms that are often compounded by complex mental health issues and the challenges of residing in a custodial environment. Acupuncture is frequently provided to young people who are identified as being at risk of self-harm and/or suicide and that are being managed through the ACCT (Assessment, Care in Custody and Teamwork) process. In these instances the provision of auricular acupuncture forms part of the young person's individual care map. The treatment provides them a quiet space for relaxation and an alternative method of coping which is very important in relation to reducing stress and anxiety."
(NHS 2003) ¹⁰¹	"Relaxation / increase sense of well being - some patients report feeling more relaxed and generally feel better. This may help you to cope more effectively with your pain."
(USDVA 2018) ¹⁸	The US-DVA has published the 'Components of Proactive Health and Wellbeing' which models eight important areas for the patient to pay attention to embedding them into their personal situation and environment. ¹⁰² "Healthcare usually focuses on preventive care, lowering risk, and illness and disease. Are your cancer screenings and flu shot up-to-date? Do you feel sick or are you injured? Do you smoke or is your weight healthy? What medicines do you take and how are your test results? These things are still important. And whole health is more than that. It focuses on what is important to you in your life and how you want to live your life. It includes self-care and things you can do to increase healing and improve your health and well-being. You and your healthcare team work together to help you do what you want to do. Together, you discuss what you are doing well and what type of support from others may help you be healthy."
(CCNSW 2008) ¹⁰³	In Australia, the Cancer Council has written extensively on the use of complementary medicine, the following statement is about the role of 'Complementary Medicine'. The following is from Cancer Council New South Wales (CCNSW) "Complementary therapies may help you enhance your general well-being and cope better with side effects such as pain. They may also increase your sense of control over what is happening to you, decrease your stress and anxiety, and improve your mood."

4.4. How to attribute causality to observed effects?

In much of modern medicine, a specific intervention is applied to target specific physiological pathways, producing predictable measurable changes. Much of this is based on having employed reductionist methods to study the intervention – such as examining isolated chemicals when applied in controlled situations – in test-tubes in a laboratory. These methods allow association between the applied intervention and a measurable outcome that is describable as having been caused by the intervention. Much of this causality attribution is also based on immediate real time changes that are predictable from evidence chains derived from earlier research.

Applying treatment to create health improvement is not likely to follow the same approach. Rather than triggering specific pathways with direct changes that can be causally associated, in many cases it is more likely that 'health improvement' based treatment approaches gradually shift the matrix of physiological systems in which any specific physiological changes occur. Change is likely to occur very gradually over more extended time periods making it difficult to attribute causality to the changes. This is seen for example when someone changes their diet, starts to do some exercise or starts psychological therapies. These life-style/therapy changes create gradual shifts in the person that may eventually show as a measurable change in a specific symptom of complaint. Is it possible to assess changes during this more gradual process of shifting physiology? One possibility could be to develop tools for assessing lived experiences: rather than assess specific complaints or symptoms or well-being, we try to assess changes in feelings, both emotional and bodily, that the person experiences, assess changes in psychological and bodily expression, sense of self, changing mental, physical abilities, and so on. For example, rather than focus on how the pain feels, which may not change for a while, focus on things like, bodily flexibility, mental acuity, daily affect, shifting functional systems. The process of change is likely to be non-linear requiring the utilisation of more complex non-linear dynamical systems modelling and analysis methods.¹⁰⁹ Perhaps the tools now available in systems biology can also be helpful.¹¹⁰ Large population-based studies will probably be needed to capture these findings.

4.5. In what ways can 'health improvement' be produced?

The term 'health improvement' in this paper has embraced a range of approaches that can potentially produce it. These include and are not limited to strategies to empower the patient; strategies to engage the patient more actively in their health care; strategies that attempt to treat the patient rather than the symptom to trigger improved physiological regulation; strategies to treat the patient to improve 'vitality'; applying treatments in patients with 'symptom clusters' that are capable of triggering effects across the range of symptoms.

4.6. How might 'health improvement' be phrased in the language of TEAM?

This is a question that needs to be addressed through a scholarly literature review of historical and modern literatures coupled with expert consultation and probably interview or survey approaches. It does not appear to be a well-articulated concept in much of the modern TEAM literature, probably because much of the literature of TEAM, following the direction that TCM developed in the 1950s, seems to be disease focussed. In the terms of TEAM we find the following kind of ideas: balancing the flow of qi/energy in the body,¹¹¹ potentially through local and global effects.⁶²

General modelling of this has been attempted⁶⁹ (p.109–111),¹⁰⁹ with specific discussion of when it can be important to focus

on applying this patient oriented 'improving vitality' treatment.⁶⁹ p. 296

4.7. What are the physiological bases of 'health improvement' and how to measure these?

It is beyond the range of existing technology to be able to grasp the entirety of a person's physiological disorder and develop specific treatments capable of targeting that complex pattern of physiological disturbance. It is the goal of 'personalised medicine' and 'systems biology' approaches to try to achieve or approach this. In more general terms it is reasonable to suggest that perhaps 'health improvement' effects occur by triggering autonomic regulation, or via complex neurophysiological processing, creating regulatory effects that can be observed in the brain. In the literature discussed above we have seen reference to application of auricular acupuncture treatments. Perhaps auricular acupuncture takes advantage of the vagal nerve autonomic stimulating effects, which could in principle trigger whole body influences and even autonomic regulation.^{112–114} Another possibility is that 'health improvement' based treatments take advantage of the organising properties of the newly discovered organ system, the 'interstitium'¹¹⁵ which penetrates all structures within the body acting as a single organ system. Acupuncture needles once inserted necessarily contact and therefore influence this organ system, potentially influencing change anywhere within the organ and thus the whole body.

4.8. Are there physical sub-physiological effects that can be observed or measured in 'health improvement' that might be indicators of health improvement?

There is some evidence of subtle electrical effects capable of triggering physiological effects transferred from person to person,¹¹⁶ could this be a component of how effects are transferred from practitioner to patient? If so, how to measure this? Via assessment of heart rate variability?^{117,118} In addition, subtle bio-electrical signals that are produced within the body and transmitted within the extracellular matrix and its surrounding fluids of the interstitium are not random and without biological effects, there is evidence that these play a very important role in biological processes such as growth, repair and healing.¹¹⁹ It is likely that the electrical signalling properties of the connective tissue matrix will act together with the fluid of the interstitium which surrounds the matrix. Understanding how to research these aspects together could be important for understanding how health improvement effects occur and potentially how to measure them, at least, indirectly. Do the subtle ordering effects of consciousness⁶⁶ play a role in how practitioners can influence patients? If so, how to measure this and can this be trained or reinforced?

4.9. In what medical circumstances can we see the value of focusing on 'health improvement' as a treatment in research?

This has been briefly discussed and some examples given above. Table 4 summarises medical situations where it may be possible to see 'health improvement' and examine how the patient changes or how their symptoms change as it does so.

4.10. What role might PI-based treatments have in 'health improvement'?

The purposes of PI-based practice need to be more clearly defined and different types need to be more clearly outlined. PI-based treatment approaches where the PI focuses around understanding and treating the main symptom may have a draw back

Table 4
Potential Research Targets for Health Improvement Research

- As preventive treatment? But preventive of what and in what circumstances – this can require long term follow-up and monitoring and can require large sample sizes in more population-based studies rather than RCTs.
- To help reduce intervention side effects and sequelae – for example: to improve post-surgical recovery; reduce post-op pain; reduce post-op nausea & vomiting; reduce chemotherapy induced nausea & vomiting; reduce radiation induced nausea & vomiting; reduce vasomotor effects of hormonal treatments in breast cancer or prostate cancer patients;
- To help reduce problems that make performing the intervention sub-optimal – reduce procedural pain; reduce procedural fear, anxiety
- Application of only PI based root treatments (especially those that make no claims of causality) before procedures/events (e.g. pre-surgery, pre-chemo, pre-sports event)
- When the patient has a condition for which no known treatment exists, or none have worked – e.g. case of lack of suckling in new born & case of poor appetite since birth; the very fatigued patient with cancer or other complex health problems;
- Application of only PI based root treatments (especially those that make no claims of causality) in patients with complex health problems (such as in cancer patients with multi-symptoms) or preventatively (such as in the latter stages of pregnancy to improve labour outcomes – shorter time, less pain, less complications)
- Treatment to turn the foetus in breech version
- When the patient has a range of health problems that may be related (symptom clusters – cancer/menopause)

* See the discussions about causality above and below.

in that the practitioners may end up unintentionally focusing on symptom improvement which might hide or downplay the potential for PI-based treatments to create clear whole body 'health improvement' changes. PI-based treatment approaches that more clearly articulate targeting patient change rather than targeting the symptom might offer a better opportunity to capture data about and measure 'health improvement' changes. These possibilities need to be explored and research strategies developed to maximise the possibility of measuring these changes. Likewise, specific PI related assessments and measurements will need to be developed if PI based treatments are to be investigated, to help as an inclusion criterion and potential outcome measure for studies.

4.11. Are some PI-based acupuncture approaches more likely to trigger clearly measurable 'health improvement' effects?

As suggested above, it is possible that some PI-based treatment approaches more readily create 'health improvement' changes. However, the claims of different PI-based systems of practice need to be investigated and tested in order to answer this question.

4.12. What role does skill and technical training play in the ability to trigger 'health improvement' effects?

In any human endeavour or performance, skill and experience are usually important. The more experienced, the more skilled, the better the performance. This may appear to be common sense, but it is not how beginners like to think about what they are doing. Thus, in acupuncture educational contexts, this is often not brought into discussion as it could undermine the ability of the beginner to perform.^{120,121} However, in the acupuncture literature the important role of the practitioner is clearly articulated in the early literature,^{38,121,122} especially in relation to how the practitioner touches the patient.^{38,121,123,124} Is this a skill-based practical aspect of needling to trigger 'health improvement' effects? This

issue needs to be explored to uncover what skills might maximise 'health improvement' effects and then how to accelerate those in less experienced practitioners.

5. Conclusions

In this introductory paper the author has introduced and given examples of the concept of 'health improvement.' He has outlined potential evidence and recognition of the effects of acupuncture to treat the patient by improving his health. It is possible that certain forms of pattern identification-based treatment approaches are efficient at producing these kinds of effects. It is also possible that certain forms of acupuncture take advantage of the neurophysiological stimulating effects of that treatment, such as auricular acupuncture on specific vagal nerve branches, light needling on the autonomic nervous system, to produce regulatory effects on the body. The author has outlined key areas for addressing the use of acupuncture in 'health improvement' and what kinds of modelling and research approaches might be useful for investigating this.

Conflict of interest

The author declares no conflicts of interest.

Acknowledgement

Thanks to Myeong Soo Lee for feedback and encouragement. To my teachers Dr Yoshio Manaka, Mr Kodo Fukushima and Mr Akihiro Takai for inspiration.

References

1. Papadakis MA, McPhee SJ, Rabow MW, editors. *Current medical diagnosis & treatment 2017*. New York, NY: McGraw-Hill; 2017. Available from: <http://accessmedicine.mhmedical.com/content.aspx?bookid=1843§ionid=135761209>. Accessed February 28, 2017.
2. UK Department of Health, Available from: https://consultations.dh.gov.uk/choice/choice-future-proposals/supporting_documents/Choice%20consultation%20No%20decision%20about%20me%20without%20me.pdf, 2012.. Accessed May 26, 2018.
3. World Health Organization – WHO 1948. Preamble to the Constitution of WHO as adopted by the International Health Conference, New York, 19 June–22 July 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of WHO, No. 2, p. 100) and entered into force on 7 April 1948.
4. Huber M, Knottnerus JA, Green L, van der Horst H, Jadad AR, Kromhout D, et al. *BMJ* 2011;2011:343. <http://dx.doi.org/10.1136/bmj.d4163>.
5. University of Ottawa. Definitions of Health. 1 Core knowledge. http://www.med.uottawa.ca/sim/data/health_definitions_e.htm. Accessed May 25, 2018.
6. NHS Executive, Available from: http://webarchive.nationalarchives.gov.uk/20040315042710_1999_/http://www.dh.gov.uk:80/assetRoot/04/01/19/33/04011933.pdf. Accessed April 26, 2018.
7. Scottish Government, Available from: <https://www.nhslothian.scot.nhs.uk/OurOrganisation/Strategies/Documents/SelfDirectedSupport.pdf>, 2010.. Accessed May 28, 2018.
8. NHS, Available from: http://www.sdhl.nhs.uk/assets/docs/sdm/Totally_Health_Shared_Decision_Making_Booklet.pdf, 2013.. Accessed May 21, 2018.
9. NHS Right Care, Available from: <https://www.aquanw.nhs.uk/resources/shared-decision-making/Your-Health-Your-Decision-Evaluation-Report.pdf>, 2013.. Accessed May 23, 2018.
10. NHS England, Available from: <https://www.england.nhs.uk/shared-decision-making/>, 2018.. Accessed May 21, 2018.
11. UK Department of Health, Scottish Office Department of Health, Welsh Office Department of Health and Social Services, Northern Ireland, Available from: http://webarchive.nationalarchives.gov.uk/20031221213309_1999_/http://www.doh.gov.uk/pub/docs/doh/dmfull.pdf. Accessed March 31, 2018.
12. NHS England, Available from: <http://www.enhertscg.nhs.uk/sites/default/files/pathways/Depression%20January%202017.pdf>, 2017.. Accessed February 28, 2018.
13. NHS England, Available from: <http://www.northdurhamccg.nhs.uk/wp-content/uploads/2013/07/Osteoarthritis-of-the-Knee-updated-february-2017.pdf>, 2017.. Accessed January 21, 2018.
14. NHS England, Available from: <http://www.northdurhamccg.nhs.uk/wp-content/uploads/2013/07/Osteoarthritis-of-the-Hip-updated-february-2017.pdf>, 2017.. Accessed January 21, 2018.

15. Miller BF, Gilchrist EC, Ross KM, Wong SL, Green LA, Available from: <http://farleyhealthpolicycenter.org/wp-content/uploads/2016/02/Culture-of-Whole-Health-Full-report.pdf>, 2016., Accessed May 17, 2018.
16. Rindfleisch JA, Available from: <http://projects.hsl.wisc.edu/SERVICE/key-resources/PDF%20Passport%20to%20Whole%20Health%20FINAL%2011-10-16.pdf>, 2016., Accessed May 17, 2018.
17. United States Department of Veterans Affairs, Available from: <https://www.va.gov/PATIENTCENTEREDCARE/explore/about-whole-health.asp>, 2017., Accessed May 21, 2018.
18. United States Department of Veterans Affairs, Available from: <http://www.veteranshealthlibrary.org/Search/142,41540.VA>, 2018., Accessed May 17, 2018.
19. Schöffeniels E. *Anti-chance*. New York: Pergamon Press; 1976.
20. Foss L, Rothenberg K. *The second medical revolution*. Boston: Shambhala Publications; 1987.
21. Ho MW, Popp FA. Biological organization, coherence, and light emission from living organisms. In: Stein W, Varela FL, editors. *Thinking about biology: an invitation to current theoretical biology*. Santa Fe: Santa Fe Institute; 1993:183–213.
22. Bischof M. Field concepts and the emergence of a holistic biophysics. In: Belousov LV, Popp FA, Voeikov VL, van Wijk R, editors. *Biophotonics and coherent systems*. Moscow: Moscow University Press; 2000:1–25.
23. Engel GL. The need for a new medical model: a challenge for biomedicine. *Science* 1977;196:129–36, <http://dx.doi.org/10.1126/science.847460>.
24. Bell IR, Koithan M. Models for the study of whole systems. *Integr Cancer Ther* 2006;5:293–307.
25. Jonas WB, Beckner W, Coulter I. Proposal for an integrated evaluation model for the study of whole systems health care in cancer. *Integr Cancer Ther* 2006;5:315–9.
26. Lewith G, Jonas W, Walach H. *Clinical research in complementary therapies: principle, problems and solutions*. Edinburgh: Churchill Livingstone; 2002.
27. Hyland ME. Extended Network Generalized Entanglement Theory: therapeutic mechanisms, empirical predictions, and investigations. *J Altern Complement Med* 2003;9:919–36.
28. Bell IR, Koithan M, Pincus D. Methodological implications of nonlinear dynamical systems models for the systems of complementary and alternative medicine. *Forsch Komplementmed* 2012;19(Suppl 1):15–21.
29. Koithan M, Bell IR, Niemeyer K, Pincus D. A complex systems science perspective for whole systems of complementary and alternative medicine research. *Forsch Komplementmed* 2012;19(suppl 1):7–14.
30. Nicholson JK. Global systems biology, personalized medicine and molecular epidemiology. *Mol Syst Biol* 2006;3, <http://dx.doi.org/10.1038/msb4100095>, 6 pp.
31. Chen R, Mias GI, Li-Pook-Than J, Jiang JH, Lam HYK, Chen R, et al. Personal omics profiling reveals dynamic molecular and medical phenotypes. *Cell* 2012;148:1293–307, <http://dx.doi.org/10.1016/j.cell.2012.02.009>.
32. *2gether. Ear acupuncture and relaxation*. NHS Foundation Trust for Gloucestershire; 2010. Available from: <http://webarchive.nationalarchives.gov.uk/20120830091208/>, / <http://www.2gether.nhs.uk/files/Ear%20Acupuncture.pdf>, Accessed May 20, 2018.
33. NHS Lothian, Available from: <https://www.nhslothian.scot.nhs.uk/Community/MidlothianCHP/Services/Pages/KeepingHealthy.aspx>, 2011., Accessed May 27, 2018.
34. NHS North Bristol, Available from: <https://www.nbt.nhs.uk/our-services/a-z-services/pain-clinic-services/pain-clinic-patient-information-leaflets>, 2018., Accessed May 28, 2018.
35. NHS Epsom and St Helier University Hospitals. *Complementary therapies*; NHS Trust, 2010. Available from: <http://webarchive.nationalarchives.gov.uk/20100710012821/http://www.epsom-sthelier.nhs.uk/patients-and-visitors/help-and-support-services/the-macmillan-butterfly-centre-and-room/complementary-therapies/?assetdetesc1643990=19542>. Accessed May 31, 2018.
36. Cancer Council Australia, Available from: http://www.cancer.org.au/content/about_cancer/treatment/Understanding%20complementary%20therapies_booklet_May%202015.pdf#.ga=1.110743814.269136440.1468331040.2015, Accessed July 15, 2016.
37. United States Department of Veterans Affairs, Available from: <http://projects.hsl.wisc.edu/SERVICE/courses/whole-health-for-pain-and-suffering/Whole-Health-for-Pain-and-Suffering-Manual.pdf>, 2017., Accessed May 17, 2018.
38. Birch S. The jingmai and qi: acupuncture perspectives. In: Birch S, Cabrer Mir MA, Rodriguez Cuadras M, editors. *Restoring order in health and Chinese medicine: studies of the development and use of qi and the channels*. Barcelona (Spain): La Liebre & Jade Stone Group; 2014:183–266.
39. Unschuld PU, Tessenow H, Jinsheng Z. *Huang Di nei jing su wen: an annotated translation of Huang Di's inner classic – basic questions*. vols. 1 and 2. Berkeley: University of California Press; 2011.
40. Rochat de la Vallee E. *A study of Qi in classical texts*. London: Monkey Press; 2006.
41. Birch S, Alraek T. Traditional East Asian medicine: how to understand and approach diagnostic findings and patterns in a modern scientific framework? *Chin J Integr Med* 2014;20:333–7.
42. Birch S. Acupuncture: how might the mechanisms of treatment have contributed to the diagnosis of “patterns” and pattern-based treatments – speculations on the evolution of acupuncture as a therapy. Implications for researchers. *J Acupunct Res* 2018;35:47–51.
43. Dieppe P. Chronic musculoskeletal pain. *BMJ* 2013;346, <http://dx.doi.org/10.1136/bmj.f3146>.
44. Schnyer R, Birch S, MacPherson H. Acupuncture practice as the foundation for clinical evaluation. In: MacPherson H, Hammerschlag R, Lewith G, Schnyer R, editors. *Acupuncture research: strategies for building an evidence base*. London: Elsevier; 2007:153–79.
45. MacPherson H, Elliot B, Hopton A, Lansdown H, Richmond S. Acupuncture for depression: patterns of diagnosis and treatment within a randomised controlled trial. *Evid-Based Complement Altern Med* 2013;2013:286048, <http://dx.doi.org/10.1155/2013/286048>, 9 p.
46. Birch S, Sherman K. Zhong yi acupuncture and low back pain: traditional Chinese medical acupuncture differential diagnoses and treatments for chronic lumbar pain. *J Altern Complement Med* 1999;5:415–25.
47. Alraek T, Baerheim A. The effect of prophylactic treatment in women with recurrent cystitis: kidney patients fare better. *J Altern Complement Med* 2003;9:651–8.
48. MacPherson H, Elliot B, Hopton A, Lansdown H, Birch S, Hewitt C. Acupuncture-related diagnosis and integral lifestyle advice for patients with chronic neck pain: secondary analysis of outcomes within a randomized controlled trial. *J Altern Complement Med* 2017;23:180–7.
49. Thomas KJ, MacPherson H, Thorpe L, Brazier J, Fitter M, Campbell MJ, et al. Randomised controlled trial of a short course of traditional acupuncture compared with usual care for persistent non-specific low back pain. *BMJ* 2006;333:623–6.
50. MacPherson H, Thomas K. Self-help advice as a process integral to traditional acupuncture care: implications for trial design. *Complement Ther Med* 2008;16:101–6.
51. Zhang ZJ, Wang XM, McAlonan GM. Neural acupuncture unit: a new concept for interpreting effects and mechanisms of acupuncture. *Evid Based Complement Altern Med* 2012;2012:429412.
52. Birch S, Alraek T, Kim KH, Lee MS. Placebo controlled trials in acupuncture: problems and solutions. In: Leung S, Hu H, editors. *Evidence-based research methods for Chinese medicine*. 2016:55–64, http://dx.doi.org/10.1007/978-981-10-2290-6_4 [Chapter 4].
53. Dodd MJ, Miaskowski C, Paul SM. Symptom clusters and their effect on the functional status of patients with cancer. *Oncol Nurs Forum* 2001;28:465–70.
54. Johnstone PAS. Acupuncture as cancer symptom therapy: what a difference a decade makes. *J Acupunct Meridian Stud* 2011;4:209–13.
55. Thompson LMA, Johnstone PAS, Available from: <http://www.ascopost.com/issues/january-25-2016/acupuncture-for-cancer-symptom-clusters/>, 2016., Accessed June 30, 2016.
56. Taylor-Swanson L, Thomas A, Ismail R, Schnall JG, Cray L, Mitchell ES, et al. Effects of traditional Chinese medicine on symptom clusters during the menopausal transition. *Climacteric* 2015;18:142–56, <http://dx.doi.org/10.3109/13697137.2014.937687>. Epub 2014 Oct 18.
57. Napadow V, Dhond RP, Kim J, LaCount L, Vangel M, Harris RE, et al. Brain encoding of acupuncture sensation—coupling on-line rating with fMRI. *Neuroimage* 2009;47:1055–65, <http://dx.doi.org/10.1016/j.neuroimage.2009.05.079>.
58. Tanaka TH, Leisman G, Nishijo K. The physiological responses induced by superficial acupuncture: a comparative study of acupuncture stimulation during exhalation phase and continuous stimulation. *Int J Neurosci* 1997;90:45–58, <http://dx.doi.org/10.3109/00207459709000625>.
59. Lee MHM, Ernst M. Clinical research observations on acupuncture analgesia and thermography. In: Stux G, Pomeranz B, editors. *Scientific bases of acupuncture*. Berlin (Germany: Springer Verlag; 1988:157–75.
60. Li QQ, Shi GX, Xu Q, Wang J, Liu CZ, Wang LP. Acupuncture effect and central autonomic regulation. *Evid Based Complement Altern Med* 2013;2013:267959, <http://dx.doi.org/10.1155/2013/267959>.
61. Nishijo K, Mori H, Yosikawa K, Yazawa K. Decreased heart rate by acupuncture stimulation in humans via facilitation of cardiac vagal activity and suppression of cardiac sympathetic nerve. *Neurosci Lett* 1997;227:165–8, [http://dx.doi.org/10.1016/S0304-3940\(97\)00337-6](http://dx.doi.org/10.1016/S0304-3940(97)00337-6).
62. Birch S. Filling the whole in acupuncture. Part 1: What are we doing in the supplementation needle technique? *Eur J Oriental Med*, part 1.1 2009;6:25–35. Part 1:2, 2009;6(3):18–27.
63. Jonas WB, Crawford CC. *Healing, intention and energy medicine*. Edinburgh: Churchill Livingstone; 2003.
64. Jahn R, Dunne B. *Margins of reality: the role of consciousness in the physical world*. New York: Harcourt Brace Jovanovich; 1987.
65. Radin D. Paraview/Pocket Books. In: *Entangled minds: extrasensory experiences in a quantum reality*; 2006.
66. Jahn RG, Dunne BJ. *Consciousness and the source of reality. The PEAR odyssey*. Princeton: ICRL Press; 2011.
67. Bell IR, Cunningham V, Caspi O, Meek P, Ferro L. Development and validation of a new global well-being outcomes rating scale for integrative medicine research. *BMC Complement Altern Med* 2004;4:1 <http://www.biomedcentral.com/1472-6882/4/1>.
68. Birch S. Improving vitality – a case history. In: *Thieme Almanac 2007: acupuncture and Chinese medicine*. Stuttgart: George Thieme Verlag; 2007:80–7.
69. Birch S. *Shonishin: Japanese pediatric acupuncture*. Stuttgart: Thieme Medical Publishers; 2011. Second edition, 2016.
70. Young M. Acupuncture as supportive therapy during aggressive immunosuppression therapy. In: *Thieme Almanac – Acupuncture and Chinese Medicine*. Stuttgart: Thieme Medical Publishers; 2008:86–90.

71. Yoo JE, Oh DS. Potential benefits of acupuncture for enhanced recovery in gynaecological surgery. *Forsch Komplementmed* 2015;22:111–6. <http://dx.doi.org/10.1159/000381360>. Epub 2015 Apr 22.
72. vd Berg-Wolf M, Burgoon T. Acupuncture and cutaneous medicine: is it effective? *Med Acupunct* 2017;29:269–75.
73. Haddad NE, Palesh O. Acupuncture in the treatment of cancer-related psychological symptoms. *Integr Cancer Ther* 2014;13:371–85. <http://dx.doi.org/10.1177/1534735413520181>. Epub 2014 Feb 4.
74. Shin HC, Kim JS, Lee SK, Kwon SH, Kim MS, Lee EJ, et al. The effect of acupuncture on postoperative nausea and vomiting after pediatric tonsillectomy: a meta-analysis and systematic review. *Laryngoscope* 2016;126:1761–7. <http://dx.doi.org/10.1002/lary.25883>. Epub 2016 Feb 10.
75. Cassileth BR, Yarett I. Available from: <http://www.ascopost.com/issues/july-25-2016/acupuncture-does-it-alleviate-symptoms-associated-with-cancer-care/>, 2016., Accessed October 31, 2016.
76. Asadpour R, Meng ZQ, Kessel KA, Combs SE. Use of acupuncture to alleviate side effects in radiation oncology: Current evidence and future directions. *Adv Radiat Oncol* 2016;1:344–50.
77. Manyande A, Cyna AM, Yip P, Chooi C, Middleton P. Non-pharmacological interventions for assisting the induction of anaesthesia in children. *Cochrane Database Syst Rev* 2015:CD006447. <http://dx.doi.org/10.1002/14651858.CD006447.pub3>.
78. Tedesco D, Gori D, Desai KR, Asch S, Carroll IR, Curtin C, et al. Drug-free interventions to reduce pain or opioid consumption after total knee arthroplasty. A systematic review and meta-analysis. *JAMA Surg* 2017. <http://dx.doi.org/10.1001/jamasurg.2017.2872>. Published online August 16, 2017.
79. Lee H, Ernst E. Acupuncture for GI endoscopy: a systematic review. *Gastrointest Endosc* 2004;60:784–9.
80. Daneshkazemi A, Daneshkazemi P, Davoudi A, Badrian H, Firouzabadi VP. Is acupuncture effective in controlling the gag reflex during dental procedures? A review of literature. *Anesth Essays Res* 2016;10:173–7. <http://dx.doi.org/10.4103/0259-1162.177182>.
81. Birch S, Lee MS, Alraek T, Kim TH. Overview of treatment guidelines and clinical practical guidelines that recommend the use of acupuncture: a bibliometric analysis. *J Altern Complement Med* 2018;24:752–69.
82. Breast Cancer Aotearoa Coalition. Available from: <https://www.breastcancer.org.nz/content/guidelines-best-complementary-therapies-breast-cancer-patients>, 2017., Accessed July 24, 2017.
83. Greenlee H, DuPont-Reyes MJ, Balneaves LG, Carlson LE, Cohen MR, Deng G, et al. Clinical practice guidelines on the evidence-based use of integrative therapies during and after breast cancer treatment. *CA Cancer J Clin* 2017. <http://dx.doi.org/10.3322/caac.21397> [Epub ahead of print].
84. NHS Lambeth. Available from: <http://webarchive.nationalarchives.gov.uk/20091106172832/http://www.lambethpct.nhs.uk/documents/845.pdf>, 2008., Accessed March 30, 2018.
85. Hogan C. Chronic stress. *Aust Fam Phys* 2013;42:542–5.
86. NHS-Infom. Available from: <https://www.nhsinform.scot/care-support-and-rights/palliative-care/practical-help/managing-emotional-effects-complementary-therapies>, 2017., Accessed January 20, 2018.
87. UK Government, Justice. Available from: http://webarchive.nationalarchives.gov.uk/20150401180955_2014/ | <https://www.justice.gov.uk/youth-justice/effective-practice-library/auricular-acupuncture>., Accessed February 27, 2018.
88. South Gloucestershire Council. Available from: http://webarchive.nationalarchives.gov.uk/20140715035945_2014/ | <http://www.southglos.gov.uk/health-and-social-care/drugs-and-alcohol/acupuncture-and-other-holistic-therapies/>., Accessed April 26, 2018.
89. King V, Slaughter-Mason S, King A, Frew P, Thompson J, Evans R, et al. Available from: http://hca.wa.gov/assets/program/toolkit_for_reducing_caeserean_sections.pdf, 2013., Accessed October 31, 2016.
90. NHS Whittington Health. Available from: https://maternity.whittington.nhs.uk/pregnancy_acupuncture.php, 2018., Accessed February 28, 2018.
91. Malone M. The utility of acupuncture in sports medicine: a review of the recent literature. *J Sports Med Ther* 2017;2:020–7. <http://dx.doi.org/10.29328/journal.jsmt.1001004>.
92. Arbeitsgemeinschaft Gynäkologische Onkologie. Available from: http://www.ago-online.de/fileadmin/downloads/leitlinien/mamma/maerz2015/en/2015E_Updated_Guidelines.pdf, 2015., Accessed May 6, 2016.
93. Schug SA, Palmer GM, Scott DA, Halliwell R, Trince J, on behalf of the ANZCA. Acute pain management: scientific evidence, fourth edition, 2015. *MJA* 2016;204: 315–317.e1. See also: <http://www.anzca.edu.au/resources/college-publications>.
94. Gupta D, Dalai DR, Swapnadeep MP, Indra BN, Rastogi S, Jain A, et al. Acupuncture (zhēn jiū) – an emerging adjunct in routine oral care. *J Tradit Complement Med* 2014;4:218–23. <http://dx.doi.org/10.4103/2225-4110.139113>.
95. Mazur A, Radziejewicz Winnicki I, Szczepański T. Pain management in children. *Ann Agric Environ Med* 2013. Special Issue: 28–34.
96. Trevisani L, Zelante A, Sartori S. Colonoscopy, pain and fears: is it an indissoluble trinomial? *World J Gastrointest Endosc* 2014;6:227–33.
97. Scottish Intercollegiate Guidelines Network. www.sign.ac.uk, 2010.
98. NHS-Infom. *Breast cancer (female)*; 2017. Available from: <https://www.nhsinform.scot/illnesses-and-conditions/cancer/cancer-types-in-adults/breast-cancer-female#treatment>. This publication refers the reader to <https://www.breastcancercare.org.uk/information-support/facing-breast-cancer/living-beyond-breast-cancer/complementary-therapies>, which contains the publication 'Complementary therapies; health and wellbeing' - https://www.breastcancercare.org.uk/sites/default/files/publications/pdf/complementary_therapies_final_web_1.pdf. Accessed January 20, 2018.
99. Wright M, Harding M, Huins H. Available from: patient.info/doctor/complementary-and-alternative-medicine, 2016., Accessed October 31, 2016.
100. Kraeftens Bekaempelse. Available from: <https://www.cancer.dk/hjaelp-viden/det-kan-du-selv-goere/alternativ-behandling/behandlingsformer/akupunktur/>, 2016., Accessed May 16, 2017.
101. NHS Gloucestershire Hospitals. Available from: http://webarchive.nationalarchives.gov.uk/20081113023020/http://www.glospain.nhs.uk/06what_can_we_do/stimulation-produced_analgesia/Acupuncture.htm, 2003., Accessed May 20, 2018.
102. United States Department of Veterans Affairs. Available from: <https://www.va.gov/PATIENTCENTEREDCARE/resources/components-of-proactive-health.asp>, 2018., Accessed May 26, 2018.
103. Cancer Council New South Wales. *Understanding Acute Leukaemia. A guide for people with leukaemia, their families and friends* 2008. Available from: <http://www.mylifehouse.org.au/wp-content/uploads/2016/05/acute-leukaemia.pdf>., Accessed May 31, 2018.
104. Medical Research Council (Great Britain) [Internet]. Available from: http://www.mrc.ac.uk/pru/pdfmrc_cpr.pdf, 2000.
105. Craig P, Dieppe P, MacIntyre S, Mitchie S, Nazareth I. Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ* 2008;337:979–83.
106. Tavares AP, Paparelli C, Kishimoto CS, Cortizo SA, Ebina K, Braz MS, et al. Implementing a patient-centred outcome measure in daily routine in a specialist palliative care inpatient hospital unit: an observational study. *Palliat Med* 2017;31:275–82. <http://dx.doi.org/10.1177/0269216316655349>. Epub 2016 Jul 11.
107. Hibbard J, Hilbert H. Available from: https://www.kingsfund.org.uk/sites/default/files/field/publication_file/supporting-people-manage-health-patient-activation-may14.pdf, 2014., Accessed July 22, 2018.
108. Paterson C, Britten N. In pursuit of patient-centred outcomes: a qualitative evaluation of MYMOP, Measure Yourself Medical Outcome Profile. *J Health Serv Res Policy* 2000;5:27–36.
109. Friedman MJ, Birch S, Tiller WA. Mathematical modelling as a tool in basic research in acupuncture. *J Altern Complement Med* 1997;3(Suppl 1):S89–99.
110. Jia J, Yu Y, Deng JH, Robinson N, Bovey M, Cui YH, et al. A review of Omics research in acupuncture: the relevance and future prospects for understanding the nature of meridians and acupoints. *J Ethnopharmacol* 2012;140:594–603.
111. Irish Cancer Society. Available from: https://www.cancer.ie/sites/default/files/content-attachments/complementary_therapies.2008.3.pdf, 2008., Accessed May 31, 2018.
112. Yu YT, Zhao JJ, Guo X, Rong PJ. Transcutaneous auricular vagus nerve stimulation on neurological and mental disorders: from germination to future. *J Clin Trials* 2016;6:277. <http://dx.doi.org/10.4172/2167-0870.1000277>.
113. Kong J, Fang JL, Parl J, Li SY, Rong PJ. Treating depression with transcutaneous auricular vagus nerve stimulation: state of the art and future perspectives. *Front Psychiatry* 2018;9:20. <http://dx.doi.org/10.3389/fpsy.2018.00020>. Published online 2018 Feb 5.
114. Mercante B, Deriu F, Rangan CM. Auricular neuromodulation: the emerging concept beyond the stimulation of vagus and trigeminal nerves. *Medicines* 2018;5:10. <http://dx.doi.org/10.3390/medicines5010010>.
115. Benias PC, Wells RG, Sackey-Aboagye B, Klavan H, Reidy J, Buonocore D, et al. Structure and distribution of an unrecognized interstitium in human tissues. *Sci Rep* 2018;8(4947). <http://dx.doi.org/10.1038/s41598-018-23062-6>.
116. McCraty R, Atkinson M, Tomasiño D, Tiller WA. The electricity of touch: detection and measurement of cardiac energy exchange between people. In: Pribram KH, editor. *Brain and values: is a biological science of values possible*. Mahwah, NJ: 1998:359–79.
117. Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology. Heart rate variability: standards of measurement, physiological interpretation, and clinical use. *Circulation* 1996;93:1043–65.
118. Tiller WA, McCraty R, Atkinson M. Cardiac coherence: a new, noninvasive measure of autonomic nervous system disorder. *Altern Ther Med* 1996;2:52–65.
119. Oschman J. *Energy medicine: the scientific basis*. Edinburgh: Churchill Livingstone; 2000.
120. Lai XS, Tong Z. A study on the classification and the 'catching' of the 'arrived qi' in acupuncture. *J Tradit Chinese Med* 2010;30:3–8.
121. Birch S. Historical and clinical perspectives on de qi: exposing limitations in the scientific study of de qi. *J Altern Complement Med* 2015;21:1–7.
122. Unschuld PU, Ching N. *The classic of difficult issues*. Berkeley: University of California Press; 1986.
123. Wang JY. *Applied channel theory in Chinese medicine*. Seattle: Eastland Press; 2008.
124. Shudo D. *Introduction to Meridian therapy*. Seattle: Eastland Press; 1990.