



Review Article

## 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

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### ABSTRACT

#### Article history:

Submitted: April 24, 2018

Accepted: April 30, 2018

#### Keywords:

acupuncture, clinical observation, feedback, pattern identification, treatment mechanisms

<https://doi.org/10.13045/jar.2018.00101>  
pISSN 2586-288X eISSN 2586-2898

Acupuncture is a complex intervention that manifests varied theories, treatment methods, diagnostic methods and diagnostic patterns. Traditionally based systems of acupuncture (TBSAs) often have their own diagnostic approaches and patterns. Despite the wide variety that can be found amongst TBSAs, is it possible that they share a common background in clinical observation and practice?

Research has shown that multiple physiological pathways and mechanisms can be triggered by different acupuncture techniques and methods. It is highly likely that clinicians will have observed some of the effects of these responses and used those observations as feedback to help construct the patterns of diagnosis and their associated treatments. This review briefly examines this possibility.

Pattern identification will have developed out of a complex interaction of factors that include; theories current at the time of their development, historical theories, personal choices and beliefs, training, practice methods, clinical observations and the natural feedback that comes from observing how things change once the treatment is applied.

Researchers investigating TBSAs and pattern identification need to be more explicit about the systems they have investigated in order to understand the biological basis of pattern identification and their treatments.

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### Introduction

Acupuncture is a complex intervention [1]. It can involve a number of different components and therapies [2], and may often be used alongside moxibustion as “acumoxa therapy”; (zhenjiu in Chinese and shinkyu in Japanese), and is often practised with other historical methods such as cupping, bloodletting and modern methods such as electrical stimulation and intradermal needles [3-6]. Many practitioners use acupuncture alongside herbal medicine especially in countries like China and South Korea [7], but to a lesser degree in Europe and the US [8, 9]. In Japan on the other hand, only medical doctors can prescribe herbal medicine; it is illegal for non-physician acupuncturists to prescribe herbal medicine [3]. Additionally, practitioners in many countries give dietary advice, lifestyle advice and/or exercise advice alongside acupuncture [1, 10]. These varied practice approaches add further

to the complexity [3].

There are traditionally based systems of acupuncture (TBSAs) [6, 11] that are constructed on the basis of traditional theories and methods of practice, and there are more modern styles that primarily use a modern understanding of the body such as needling to stimulate specific anatomical structures like trigger points [12]. Acupuncture is complex because over 2,000 years in different times and cultures, many different techniques of treatment, varied theories and ways of using those theories to determine which treatments to use, have developed [3, 4, 6]. Acupuncture is also a complex intervention because it can trigger multiple physiological pathways simultaneously [13, 14]. Within the field of acupuncture there is a range of techniques of treatment from deeper insertion of needles with manipulation to produce sensory stimulation (deqi) to “contact” or non-insertion needling [3, 5, 15] each of which will trigger different physiological pathways.

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One of the ways that this diversity manifests can be seen in the manner that data is collected from patients, analysed and organised into patterns. TBSAs employ traditional ideas and methods of data gathering using the 4 diagnoses to formulate “patterns of diagnosis” on the basis of compiling those data and treatments prescribed on the basis of those patterns. This diversity can be seen in the modern period when we look at the 20<sup>th</sup> century Chinese system of *zhongyi* or “traditional Chinese medicine” (TCM) for prescribing herbs and applying acupuncture [16-19], the Korean equivalent of this, “traditional Korean medicine” (TKM) [7] and other traditional Korean systems such as “*Sasang*” which uses herbal prescriptions and more recently acupuncture [20-21]. In Japan we find the “*Kampo*” system for prescribing herbs [22], and “*Keiraku Chiryō*” (Meridian Therapy) for applying acupuncture [23, 24] and in Britain, the system of “traditional” or “five element acupuncture” [25, 26].

### Pattern Identification

What is “pattern identification (PI)?” In China today a common term for “pattern identification” is “*bianzheng*,” in Japanese Meridian Therapy it is known as “*sho kettei*.” This is a process whereby data gathered from observing and questioning the patient (the “4 diagnoses”) are organised following the theories of the treatment system, which can include normal and abnormal physiology (pathology), theories of factors internal and external to the body that can cause disturbance, and thus abnormal physiology (pathology). The pattern(s) of diagnosis refer to disturbances of normal physiology and pathological states that can arise from these disturbances. Within all systems that collect and organise data to arrive at the pattern of diagnosis, there is always a treatment. In Chinese this is expressed with the following, *bianzheng lunzhi*, “treatment follows the pattern” [17] and in Japanese Meridian Therapy it is said “diagnosis is treatment” [23].

Each TBSA has its own diagnostic “patterns,” selectively analyzing, organizing and prioritizing gathered data to make a decision about the “pattern” and its consequent treatment. In *Keiraku Chiryō* for example, great emphasis is given to data gathered by palpation of the radial arteries and the abdominal region to make these decisions [23, 24], whilst in TCM, emphasis is given to data gathered from patient consultations (symptoms, medical history), observations (tongue inspection) and palpation (radial artery palpation) to decide the patterns [16]. In *Keiraku Chiryō* the decision involves selection of 1 of 4 primary patterns [23, 24], whilst in TCM there are many more patterns to decide between [16, 17, 27]. The diagnostic labels of each system are superficially similar in so far as they use the same or similar words and terms of traditional origin in Chinese, but they refer to different things.

TBSA diagnoses are framed in historical terms such as *yin-yang*, *qi-xue*, *jing mai*, *luo mai*, *zang-fu*, *xu-shi*, *bu-xie* and so on. Many researchers probably feel uncertain about, or uncomfortable with these terms which may hold them back from investigating them. This hesitation is quite understandable given the potential complexities involved in trying to study them [28] but it should not block research from proceeding. Since many acupuncture schools teach theories and patterns of diagnosis which form the basis of how treatments are decided, then it is important that they be further investigated. Diagnoses made in TBSAs are different to those diagnoses made in modern medicine [3, 4, 29]. In modern medicine there is a common body of knowledge about anatomy and physiology that forms the foundation for description of pathology and diseases. TBSAs do not have common models, instead they describe system-specific diagnostic patterns that

permit different treatment methods. Is it possible that there may be a common origin for TBSA diagnostic thinking that lies (at least in part) in a biological model of the body?

When considering *acumoxa* therapy and the methods used for its selection and application, it makes sense to imagine that at some point in the past, it was determined that a range of (biological) changes could be provoked by inserting needles or applying heat stimulation (*moxa*) to the body. Of course, the manner and reasons for the development of needling and *moxa* therapies are more complex [3, 15], but they probably involved careful observations of how the body responded to each technique. Since varied techniques of treatment will trigger different physiological responses, observational feedback from these treatments may have informed judgments about how to diagnose patients. Whilst the language and story of those observations will not replicate the precision of modern biology, a summary review of biological mechanisms associated with needling would help to reveal the ways of thinking behind diagnosis and treatment development.

### Mechanisms

What happens when we insert needles into the body? For the sake of argument, discussion of the role of placebo is controversial as there is increasing evidence that acupuncture trials have been unable to control for placebo effects and thus, we cannot realistically measure the magnitude of the placebo effect [14, 30]. Furthermore, there is evidence to suggest that efforts to control for placebo effects have accidentally biased against acupuncture [31, 32]. Thus, we will not consider placebo any further here and focus instead on basic biology. Humans are incredibly sensitive organisms with multiple, redundant systems for detecting and responding to things in the environment. The body has multiple systems which respond to bruises, cuts, or burns or, splinters, and help to block pain, reduce blood-loss, reduce risk of infection from loss of skin integrity, attack invading microbes, clean up, repair and replace damaged tissues, reduce inflammation, stimulate internal activities to compensate for any potential or perceived loss or threat, alter activities, behaviour, cognition and so on. In relation to acupuncture needle insertion these basic biological functions have been referred to as the “splinter effect” [3, 63, 33].

There are good reviews of the many laboratory studies examining how acupuncture might work [14, 34-42]. They cover a broad range of physiological systems, ranging from single chemicals to whole biological systems. The 2012 review by Zhang [14] showed illustrations of anatomical structures that can be influenced by needling and documented evidence of at least 17 possible pathways involved in needling. Additionally, effects have been described related to touch and pressure to the skin [43-46], physiological effects of shallow insertion needling [47-51], non-inserted needling [44, 52], deeper needling with varying forms of manipulation [14, 42] including electrical stimulation of the needles [40, 42, 53, 54]. Other studies demonstrate that acupuncture can also create effects due to modulation of the somato-sensory system [55], autonomic nervous system [51, 56-58], and microcirculatory [48, 59], anti-inflammatory [60, 61] and immunological effects [62-64]. It is believed that *moxibustion* may also stimulate a wide spectrum of physiological changes including effects on the immune system and the blood [4]. With all these potential pathways that can be activated, we can see local, regional, distal and/or systemic changes in the body as different techniques are applied to different points or body parts. As practitioners observe these changes at the time of treatment, such as reddening around the area of *moxa* or needling, relaxation of muscles in distal parts of the body, or an increased state of relaxation of the patient, these observations

will have informed thinking and judgments about the patient. It is reasonable to suggest feedback loops where observed effects influence and refine judgments about what the patterns are, and how to treat them.

If we look only at the use of needles in acupuncture we see that they can simultaneously activate multiple physiological pathways in the body, provoking both local and whole-body responses. Traditional acupuncture has used needles and other tools to stimulate discrete loci on the body in order to help restore a higher level of functioning, and thus relieve symptoms [15]. Traditionally acupuncture avoided trying to focus on the complex details of how a particular problem developed, for which it lacked the explanatory models [28]. This is not too dissimilar to the problem that modern medicine faces when it is confronted with patients with symptoms and diseases that defy simple explanatory pathways, where multiple bio-psycho-social factors come together and multiple physiological systems may be involved. To address this problem practically, traditional acupuncture developed a language that permitted examination of a broad range of indicators and signs in a patient to identify patterns that can be treated with the tools available, needles, moxibustion, etc. The pattern is not the disease, it is the treatment, the focus was always on solving the problem not struggling with “explanatory models”.

Given that no “diagnosis” exists in TBSAs without a prescribed treatment, optimal treatment can theoretically be selected by weighing up and judging signs. Theories can serve as a guide to this complex process, to help simplify things and make it practical [3]. Biological mechanisms of acupuncture help us understand why there may have been a natural fit between the patterning of diagnoses (according to universal principles of yin-yang, 5 phases and employing the language of qi, jingmai, zang-fu). In a sense, given that acupuncture cannot stimulate single pathways, and that one cannot (theoretically) limit its effects to local tissues only, it makes sense to look across the whole body for signs and symptoms to help select treatments and this should be the starting point for patterns of diagnosis.

The patterns will have developed out of a complex interaction of factors that include, theories current at the time of their development, historical theories, personal choices and beliefs, training, practice methods, clinical observations and the natural feedback that comes from observing how things change once the treatment is applied. These factors will have evolved in many different ways as different patterns of diagnosis were developed.

Take for example the observation of a flushed reddened facial complexion in a patient. In TCM which has roots in the practice of herbal medicine, where early descriptions of herbs show an affinity to the language of hot and cold [65], the observation of a reddened face will often be framed in the language of heat patterns. This maybe a consequence of the early focus on febrile diseases where fevers and chills are common symptoms. As herbs are given or acupoints needled with a resultant observation of reduction of flushed appearance, this will have supported the labelling of the pattern, as a hot pattern. Meridian Therapy in Japan evolved independently of herbal practice and attempted to reproduce historical teachings about acupuncture, where acupuncture (needling) is defined as a treatment to regulate qi [15]. The manifestation of the flushed reddened face can be seen as a sign of “counter-flow qi,” the reddened appearance is not described as a sign of heat, rather as a dysregulation of qi, so that it rises up (is counter-flow), giving the reddened appearance, this is especially so if the feet are cold. When following instructions to regulate qi, needling is applied at certain points and the flushed face is observed to reduce in reddening at the time or to occur less frequently or occur less intensely over time, this reinforces

the labelling of the signs within the pattern of “counter-flow qi.” This can be a dynamic process for example after the incorporation of acu-moxa therapy into the herbal framework of TCM with its focus on hot-cold patterns and signs, moxibustion became known as a treatment that is warming for cold patients and thus became contraindicated for patients labelled as hot [66]. The accidental discovery in the 1980’s that moxibustion effectively reduces the signs of heat (including fever) [67] changed the way that acumoxa-therapy is thought about within TCM practice. Decisions about how patterns are described and how treatments are applied will naturally have included clinical observation and feedback, where the signs can be related to physiological changes triggered by the needling. Patterns will have developed based on the signs themselves, but it is possible to see how the physiological changes triggered by the treatment, and observation of those changed signs will have reinforced description of the patterns.

The naturalistic language of TBSAs, following their emergence in China in the first half of the Han dynasty refers to the individual person within the environment, subject to environmental stresses and with a hierarchy of systems operating within the body to help mediate and regulate these things to produce health and deal with health challenges [3, 68, 69]. Treatment with needles and moxa took advantage of the observed effects of their application to help restore a healthier state for the patient. How the techniques are applied naturally produces different changes: the observation being interpreted within the framework of thinking at that time, in that place. Observations of treatment effects can inform different diagnostic conclusions which are tied into the treatment methods that were applied. The probability that feedback from the observation of treatment effects informed decisions about the patterns raises important questions for research on pattern identification, including the nature of the patterns.

## Conclusion

We have clear evidence that different treatment techniques will trigger different physiological changes, ranging from local, regional and distal to systemic, many of which can be observed. It is reasonable to propose that the observation of these varied needling effects has informed decisions about patterns and diagnoses through feedback. This will have played an important role in the development and utilisation of PI in TBSA treatments. This raises certain challenges for the researcher. Validating patterns through studies such as literature reviews, expert panels, reliability studies and physiological studies helps establish those patterns as relevant for health care but how generalizable are those findings? It has been considered that there is a close relationship between the patterns and their treatments. As treatment techniques vary, so do the patterns and diagnoses. Researchers should be careful to restrict conclusions from studies of PI to only that system of PI and thoroughly describe which system of practice was studied. To better understand the pattern under investigation it may be helpful to more thoroughly explore the background of its’ development and to examine details of the physiological actions of the treatment techniques used. The needling methods common to TCM, with the sensory stimulation experienced by the patient called “deqi” will trigger very different responses than the needling methods of Keiraku Chiryō where the patient does not have these sensory experiences because very fine, shallowly inserted needles are used instead. The biological effects of each method help lead to and support the different PI systems.



## Conflicts of Interest

The author have no conflicts of interest to declare.

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