

Filling the Whole in Acupuncture

Part 1:1 What are we doing in the supplementation needle technique?

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Introduction

It is my contention that traditional forms of acupuncture practice have been hardly, if at all, investigated in the West. While many clinical and scientific studies of acupuncture have been conducted, these almost never involve the traditional practice methods of acupuncture with their clinical observations and theories of practice. In the present series of papers I attempt to bridge the gap between traditional practices, their historical sources and theories and more modern perspectives with their methods of investigation. Using what is a novel approach, this first paper is published in two parts. The first part describes the clinical observations of the effects of a needling technique and traditional ideas and methods that can be seen to 'explain' those observations (Part 1.1); the second part describes 'scientific' models that have the potential to explain the observations from the first part (Part 1.2).

Building on this phenomenological approach, the second paper in the series attempts to construct a more comprehensive 'whole systems' model that embraces both traditional and modern perspectives so that potential equivalencies can be investigated. The second paper also proposes a more extended and comprehensive 'whole systems' model of clinical practice that attempts to bypass philosophical and cultural issues that arise in such comparisons. The third paper in the series examines and proposes ways of investigating traditional practice methods like acupuncture so that the more complex nature of that practice can be captured and its more whole systems components not lost. This third paper articulates a comprehensive research strategy.

In the current paper I discuss the purposes and possible mechanisms of the supplementation needle technique [Chinese 'bufa' (補法), Japanese 'hoho'] and model what might be happening when we apply it. In Part 1.1, I highlight effects triggered by the needling itself, focusing especially on local and global *qi* circulatory effects and traditional explanations of these. I also highlight effects that arise out of the interaction of the person needling and the person being needled, looking in particular at global changes in the vitality of the patient and the role of the mind of the practitioner. In Part 1.2, I describe various possible scientific perspectives, especially involving electromagnetic phenomena that could explain the effects of the needling and various interactional effects, including mental interactional effects. Finally I briefly discuss implications of this for understanding acupuncture practice.

How does the needling of one channel trigger changes in the others?

I have studied several styles of acupuncture each with its own descriptions of how to apply supplementation with a needle. As a meridian therapy practitioner I have learnt to apply the supplementation technique in two different ways, with very slight insertion and without the needle penetrating the skin. A general method of applying *hoho* is the shallow needle technique (0.5-1.0 mm depth) and this is well described by Denmei Shudo [26]. The non-inserted technique is more specialised, and the needle tip may not actually touch the skin, instead being held a fraction of a millimetre above the skin. In another paper I describe the experiences of applying the supplementation needling technique within the Toyohari tradition [5]. What follows is related to these Japanese meridian therapy methods, but, in principle should be applicable to other styles of traditional acupuncture. To illustrate this, key aspects relevant for understanding the common Chinese style of needling '*de qi*' (得氣) are outlined.

The method I employ is to start with a phenomenological approach – descriptions of the experiences and observations while needling. Then I explore traditional theoretical explanations of these observations. Part two (1.2) examines potential physiological-scientific explanations of the same, highlighting potential correlations.

What is the purpose of the supplementation technique?

The answer to this question is straightforward: if you find vacuity, apply the supplementation needle technique (SNT) to fill the vacuity. As acupuncturists this requires identifying what or where the vacuity is and then applying SNT. In the acupuncture field and the wider field of traditional east Asian medicine (TEAM) there are different theories and methods describing how to identify where the vacuity is [3, 19] and then various technical descriptions on how to apply supplementation techniques [8, 14, 26]. Rather than focus on these differences I will attempt to step behind them to try and illuminate a bigger picture of what is happening when we apply SNT. The method I employ for this is to look first at what happens when SNT is applied in the systems of practice I use and then to expand more generally to other approaches. When SNT is applied to an accurately located correct treatment point on the correct channel, what happens?

Observed effects of the supplementation technique: There is a range of changes that might be observed during the treatment; for example, in the radial pulses, heart rate and breathing. I focus especially on pulse and heart changes as these are catalogued in more detail. We can see two types of change:

1. Changes in the relative strength of each of the individual positions on each wrist. There are said to be three positions on each wrist (*cun/guan/chi*), which are read at two depths (more superficial and deeper), giving a total of twelve position-depths. These twelve are usually interpreted in relation to the channels, since the most common interpretation of the six positions relates them to the twelve channels based on *Nan Jing* chapter eighteen [2]. Thus a relatively weak superficial right *cun* pulse means that the large intestine channel is relatively vacuous or weak, or a relatively weak deep left *chi* pulse means that the kidney channel is relatively vacuous or weak [26].
2. Changes in the overall pulse quality. Essentially the pulse quality informs us about the overall state of *qi* in the body rather than the *qi* flow in any particular channel, this is clearly articulated in the *Nan Jing's* discussion of pulses and the 'stomach *qi*' [30:200-204, see also appendix one]. There are said to be up to 28 different pulse qualities. These qualities are principally constructs of three basic components: the depth, strength and rate of the pulse. Combining these three with the rhythm of the pulse one can derive the 28 pulses. Here I focus on only the three primary qualities of depth, strength and rate.

1 – Traditional explanations

Pulse position changes: After we apply SNT is there change in the individual pulse position at the depth corresponding to the channel treated? For example, if we apply SNT to Lu 9, does the right deep *cun* – the lung channel pulse – become stronger? Perhaps, but when SNT is applied to a single point such as Lu 9 we usually observe changes in several pulse positions. This indicates change throughout the channel system, not just in the channel treated. For example the lung and spleen pulses might become slightly stronger, the bladder pulse stronger and harder, while the liver and stomach pulses become weaker and softer. How does the needling of one channel trigger changes in the others?

There are many theoretical descriptions in the historical literature that can explain these changes. *Yin-yang* and five-phase theories help us understand the dynamics of interaction between a single channel and multiple other channels [8,10]. For example, the lung channel is related to the large intestine and stomach channels by *yin-yang* correspondence (*tai yin-yang ming*). Any change in the lung channel can trigger a *yin-yang* balancing of the large intestine or stomach channels. Likewise, the lung channel is related to the spleen, heart, pericardium, liver and kidney channels via the various five-phase relationships: engendering, counter-engendering, restraining and counter-restraining. Any change in the lung channel can trigger five-phase regulatory changes in the spleen, heart, pericardium, liver or kidney channels. I described a model of these interactions elsewhere [10:11-18]. If for example the lung channel is increased by the application of SNT, in principle the kidney and spleen can become stronger, the liver, heart, pericardium, large intestine and stomach channels weaker. *Yin-yang* and five-phase theories and correspondences imply that since the channel system is a dynamical interacting system, a change in one channel can trigger changes in as many as seven other channels and any change in those seven channels can trigger a change in that one channel [10]. This model helps explain a kind of system-wide channel response to the needling of a single point on a single channel. A dynamical shift within the whole channel system occurs. This is probably what we see when we observe the pulse changes described above. Another way of expressing this is that the model of discrete but interacting units (channels) provides a kind of local causality explanation of globally observed changes following SNT. This model of discrete interacting units generally helps explain the changes in pulse positions that we observe following SNT. What about the pulse quality changes?

Pulse quality changes: How do the pulse qualities change after we apply SNT? In meridian therapy the pulse quality changes are not only a characteristic of SNT needling; they are predictable enough that they are expected as an indication of a sufficiently applied technique [34]. In particular the depth, strength and speed of the pulse change as does the sense of consolidation or firmness of the pulse. When SNT is applied well, the pulse will improve, meaning

that the depth will tend towards not too deep, not too superficial, the speed will tend towards not too slow, not too fast, and the strength will tend towards not too strong, not too weak. It is common to see the pulse sink, soften and slow down since more people have pulses that are a bit floating, rapid and hard. But if the pulse had been weak, deep and slow, the pulse would tend to become stronger, less deep and perhaps a little less slow.

The practitioner must be able to feel the arrival of the qi

These pulse quality changes do not relate only to an improved condition of the channel system; they indicate a shift in the whole body: a change in the vitality of the patient. How can we characterise these changes and are there traditional theories that might explain them? If we look for a model of whole body changes following each needling we find a simple model in the *Nan Jing* that seems to explain the observations. Chapter eight of the *Nan Jing* discusses issues of life and death, pulse diagnosis and vitality. The *Nan Jing* refers to an essential vital centre in the body. This centre is called the 'moving *qi* between the kidneys' which is the 'source of vital *qi*', it is 'fundamental to the five viscera and six bowel organs, is the root of the twelve channels, the gate of breathing, the source of the triple burner. Another name for it is the *shen* that protects against evil,' [20:110; 30:130]. This centre is likened to the roots of a tree – while still functioning, the tree is alive, when no longer functioning, the tree is dead. *Nan Jing* chapter 66 [20:111, 30:560-561] also tells us that the 'source *qi*' is transported from the 'moving *qi* between the kidneys' to the 'source points' via the triple burner. Thus this centre of *qi* in the body is also the place from which the source *qi* is emanated. A model has been proposed that this centre can be seen as the centre of the body *qi* field [4, 20:189-193]. Global effects in the whole field are triggered through any change that acts through the field. Another way of expressing this is that there are effects associated with the needling not dependent on the local structures at the site of needling. The supplementation of a single acupoint triggers changes throughout the body that occur independently of the site of needling. These changes are not based on rules of *yin-yang* or five phase interactions. Some practitioners are explicit about these effects [26:31]. See appendix one for a brief discussion of the subsets of *qi* that can be said to relate to this centre and its field and quotes about this from practitioners that are explicit about this.

When we apply SNT we thus tend to see two different changes in the pulse, each of which indicates global shifts in the body and not just localised changes in the channel that was needled. Appendix two presents a simple model of how these global and channel based changes may be related to each other.

So far we have discussed two different levels of effect that seem to follow each application of SNT. There are local effects in the treated channel and through that channel more systemic effects throughout the channel system triggered by *yin-yang* and five-phase regulatory effects. There are also general or systemic effects where the vitality of the patient seems to increase. These two effects will not occur independently of each other; their mutual dependence being important for treatment effectiveness. For example if the SNT is applied randomly on the body surface without the intention of correcting the primary imbalances (repletion-vacuity) in the channel systems, it is theoretically more likely that the systemic effects of SNT (increased vitality) will wear off more rapidly as the channel imbalances continue to undermine the overall state of the body. However, if the SNT is applied within the framework of correcting the major imbalances in the body (at specific acupoints related to the specific diagnosis), the systemic effects of SNT (increased vitality) will remain longer in the body since the channel imbalances are lessened or eliminated for some period of time. In order to deepen our understanding of how these effects may occur and interact I introduce a third factor or level from the traditional literature that can help explain the observed effects. This is the role of the consciousness, mental focus, awareness or intention of the practitioner [6, 25]. While most modern texts on acupuncture do not clearly articulate the role of mental focus, awareness or intention while needling, it will become obvious below that it is an important component. Unlike the channel based and vitality based effects described so far, the mental focus/awareness/intention is not an effect per se; rather it is an essential part of the needling if it is to be done well. This becomes clear both in a review of the historical literature on needling and in sections below examining possible scientific explanations of the effects of treatment.

The early acupuncture literature can be dated back to two important texts (circa 200-150 BCE): the *Huang Di Nei Jing Su Wen* and *Huang Di Nei Jing Ling Shu* [8, 18, 29]. Of these two the *Ling Shu* was a very important acupuncture text about clinical practice [8]. The first chapter of the *Ling Shu* discusses the essence of needling. While it is possible to interpret some of the passages in this text differently [8], there are common understandings among translators. The *Ling Shu* describes what can only be understood to be some of the most subtle aspects of treatment. Two key ideas

can be found about effective needling. Treatment only becomes effective after '*qi zhi*' (氣至), the *qi* has arrived at the needle. The arrival of *qi* is 'as if the wind blows away the clouds and leaves a clear blue sky' [17:5, 28:36, 32:3, 33:497]. The practitioner must be able to feel the arrival of the *qi*, which requires sensitivity, training and mental focus [5, 26, 27]. There is also a four character phrase in *Ling Shu* chapter one related to the core aspects of needling therapy describing how mental/spiritual aspects are essential and stresses the importance of focusing on the needle tip. The passage '*shen zai qiu hao*' (神在秋毫) is understood by two translators to refer to how the mind must be focused at the needle tip [28:33, 33:495], by a third to how the '*shen*' (神) or spirit (stored in the heart and associated with all mental, perceptual and cognitive functions) focuses at the needle tip [32:2], while a fourth translation renders various possible interpretations including how the mind focuses at the needle tip [17:5].

A further passage in *Ling Shu* chapter nine clearly states the importance of the mind's focus. Shudo summarises this passage with the following: 'When inserting the needle, do not look, do not listen, do not speak, and do not move. Simply pay close attention to focus on the tip of the needle to feel for the coming and going of *qi*' [27:239]. While this nicely sums up the importance of mental focus for the needling to be effective, it is useful to look at the whole passage from *Ling Shu* chapter nine to see more of the detail that is described. To do this I am grateful to be able to use Charles Chace's more refined translation, which helps highlight the relevance of what is said: '[The practitioner must] deeply reside in a place of stillness and divine the comings and goings of the spirit with one's [sensory] doors and windows shut. [The practitioner's] ethereal and corporeal souls must not be scattered, his mind must be focused, and his essence *qi* [精氣] undivided, and undistracted by human sounds. By concentrating his essence, he must unify his mind and direct his will entirely toward needling. [In this way, the practitioner may skillfully practise] shallow insertion while retaining the needle, or gentle, superficial insertion so as to successfully transform the patient's spirit and as the *qi* arrives then one stops' [11].¹ Chace reasons that the kind of mental focus that comes through residing in a place of stillness with exclusion of sensory input of the external environment is a reference to a Daoist cultivation practice that is clearly articulated in the *Nei Ye* of the late fourth century BCE.² The meditative practice described in the

¹ Wu and Wu render this same passage as: "When pricking, the physician should like staying in a secluded place and deal with the spirit only, he should also like shutting himself in a room with the doors and windows closed, he must be clear in consciousness, pure in thought with consistent mind and concentrating energy; he can hear no voice of the people beside, keeping a sound mind and concentrates his attention to the pricking only. He should apply the twisting and lift the needle softly to shift away the fearful feeling of the patient until getting the acupuncture feeling under the needle" [33:553]. Sunu and Lee render the same passage thus: "At the time of applying acupuncture, one should observe minutely the mental state of a patient in silence in a comfortable place, shut the door, calm oneself down, and concentrate one's mind entirely on the needle in such surroundings, so voices of other people are not discordant to the ears. For the treatment of the man who is in fear of acupuncture, one should, at first, insert the needle shallowly, leave it in position, and after he feels no more fear, insert it deeply until the *Ch'i* (sic) of nourishment arrives and cease the acupuncture treatment when, at last, the *Ch'i* (sic) of nourishment arrives" [17:127]. Although I feel these passages do not so accurately render the actual *Ling Shu* passage, they still highlight the importance of the role of mental focus of the practitioner for the arrival of *qi* to occur.

² The *Nei Ye* predates other important Daoist texts like the *Dao De Jing* and the *Zhuang Zi* and is thought to be the earliest Chinese text describing meditation practices [23]. This text has been recently translated with extensive explanation and commentary by Roth [23] and also by Rickett [22] with further discussions and explanations by Puett [21]. These translations and explanations are only possible because of recent archaeological findings and scholarship of those findings. Its influences on the early medical corpus are quite clear [22:31].

Nei Ye allows the person practising to cultivate and refine their *qi* to become like *jing qi* (essence *qi*) and thus like *shen* (spirit) [神] [21:113-6]; it allows the person to have knowledge of, connect to and influence other things or beings in the cosmos [21:115], and creates change without expending energy [23:62].³ The *Ling Shu*'s reference to the essence *qi* probably follows the *Nei Ye*'s use of the term (as a more refined and concentrated form of *qi*). Likewise the reference to the mental quieting practices during needling in order to contact or trigger and feel the arrival of *qi* strongly parallels the *Nei Ye* which describes: 'therefore this vital energy cannot be halted by force, yet can be secured by inner power (*de*). Cannot be summoned by speech, yet can be welcomed by the awareness (*yi*) [意]' [23:48].⁴ The *qi* arrives not by physical action but is welcomed by a quiet state of awareness.

This discussion is paralleled by Guoyu of the Han dynasty who described 'Medicine is attention (*yi*). The regions of the skin are very finely divided. Following the flow of *qi* requires consummate skill. When inserting needles, an error of a hair's breadth will mean failure. A kind of spirit connects the physician's heart with his hand, and that is something I can know but cannot explain' [24:176-177]. The relative importance of focusing the mind while needling is described in later acupuncture texts such as the *Zhen Jiu Da Cheng* of 1601: 'In the mind (*xin*) of the physician there should be no desires, only a receptive and accepting attitude, then the mind can become spirit (*shen*). The mind of the physician and the mind of the patient should be level, in harmony, following the movements of the needle.' [20:38]. Iwata of 1684 described it thus: 'Pay close attention and focus on the tip of the needle. It is vague and difficult to feel, but the coming and going of *qi* is like a fishhook and it causes movements like floating and sinking' [27:237]. Not only do these historical descriptions match the clinical application of the needling in Toyohari and explicit instructions about how to perform the needling [15:157] – 'one must focus one's entire being on the movement of *ki* (*qi*)' [15:156] – but they agree with fundamental concepts about the mind in East Asia in general and TEAM.

The Chinese character or term for 'heart' is '*xin*' (心), the same term that is used in Chinese to refer to the 'mind' [1, 13, 20]. In fact, in the historical Chinese literature, it is often difficult to separate 'mind' and 'heart' when the '*xin*' is discussed, leading some to suggest a compound translation of '*xin*' as the 'heart-and-mind' [1]. There is an interesting story in the *Lie Zi*, circa 300 ce about how two people have their hearts exchanged and each returns to the home of the person from whom the received heart came. Each person now believed that they were the other person [16:106-107]. This allegorical tale informs us about a profound

linking between what we call 'heart' and 'mind' and shows a clear understanding of the two as one. Virtually all emotional, feeling and cognitive states described in the historical Chinese literature employ characters that include '*xin*' or 'heart' as a radical in the character [1]. The literature and scholarship of this literature clearly support the interpretation of what is called separately the 'heart' and 'mind' as a compound interactive unit. This matches ideas in other cultures including our own that places the emotions (mind) as seated in the heart [1]. It is also interesting to note further correlations. The '*xin*' or 'heart-and-mind' is involved in producing what Hall and Ames have characterised as 'focal awareness' and 'field awareness' [1]. 'Focal awareness' is the action of the '*xin*' or 'heart-and-mind' while focusing on something. 'Field awareness' is the action of the '*xin*' or 'heart-and-mind' while taking in something in the context of the total field of experience or background against which all focal events occur. Ideally one maintains field awareness while focusing on something; it is important to be able to remain aware of the total state and change of the patient while focusing on the tip of the needle. In fact, as suggested by the quotes from the *Ling Shu*, *Zhen Jiu Da Cheng*, Iwata, Fukushima and Shudo above, and supported by clinical experience and teaching experience, without this clear mental focus on the needle tip, the SNT treatment does not work well, if at all. Ames and Hall pointed to the dependency and interconnectedness of 'focal' and 'field' awareness in the effects of our actions on the world, especially if we are to achieve the goals of our actions. The relevance of this will become clearer in the next section, but, for now, what is important to note is that the concentrated mental focus required to perform SNT with the needle implies an effect of the mind on the *qi*. This has many parallels in Chinese culture. For example, one finds references in the martial arts on how the mind influences the *qi* to 'move the *ch'i* (*qi*) with the mind and the body with the *ch'i* (*qi*)' [12:55]. The medical traditions give many examples of the interrelationship between the physical body, *qi* movements and functions and mental, emotional states. In the *Nei Jing* we find for example: 'with thinking (*si*) the heart-mind (*xin*) has a focal point... the *qi* becomes stagnant' and 'over thinking (*si*) injures the spleen' [20:33-45].

Do we have any further evidence regarding the observed effects of SNT and these possible traditional explanations? Here it is interesting and useful to examine some scientific research that seems to be relevant. This is the topic of the second half of this paper.

³ As Puett states it: 'Thus since all things consist of *qi*, that which possesses the most refined *qi* (as do the spirits) possesses both knowledge about and power over that which possesses less refined *qi*. By accumulating essence within himself, man becomes like a spirit; able to understand the changes of forms, avoid being harmed by them, and even gain control over them' [21:115].

⁴ Rickett translates the same passage as: 'Thus, this vital force – Never to be restrained by physical strength, it may be brought to rest by spiritual power (*de*) Never to be summoned by one's call, it may be made welcome by one's power of awareness (*yi*).' [22:39-40].

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Appendix one:

The basic *qi* of the body that has as its epicentre the 'moving *qi* between the kidneys' has been given various names by different authors and traditions. Here I briefly discuss the '*sheng qi*' (生氣) or 'vital *qi*', '*zheng qi*' (正氣) or 'right *qi*', '*yuan qi*' (元氣) or 'original *qi*', '*yuan qi*' (原氣) or 'source *qi*' and '*wei qi*' (胃氣) or 'stomach *qi*'.

The term 'vital *qi*' is, in Chinese '*sheng qi*', literally 'living *qi*'. Of the '*sheng qi*' Wiseman says [31:657]: it is 1) the '*qi* developing in spring time that is vital to the growth of all things'; 2) 'the original *qi* (*yuan qi*)'; and that 3) it 'loosely refers to the life force'. We can thus see that the term '*sheng qi*' or 'vital *qi*' refers basically to that which sustains life. But there are a number of other terms that are used to mean or refer to similar concepts. The '*zheng qi*' or 'right *qi*' – sometimes called 'normal *qi*' (in Japanese *seiki*), is usually used to refer to that which combats disease. The 'right *qi*' fights the '*xie qi*' or 'pathogenic *qi*'. The 'right *qi*' is all over the body and in everything and 'stands in opposition to evil *qi*' [31: 507]. The '*yuan qi*' or 'original *qi*' is often understood to be the first or primordial form of *qi* from which all other forms of *qi* are derived [20:83-84]; it is sometimes equated with both the 'right *qi*' and 'source *qi*' [31:421]. In the body it is the basic *qi* from which the various subsets of *qi* are derived. Of the '*yuan qi*' or 'source *qi*' Wiseman says [31:548]: the source *qi* is 'the basic form of *qi* in the body which is made up of a combination of three other forms, the essential *qi* of the kidney, the *qi* of water and grains – derived through the transformative functions of the spleen and the air (great *qi*) drawn in through the lungs. The source *qi* springs from the kidney. It reaches all parts of the body through the pathways of the triple burner, activating all the organs. It is the basis of all physiological activity. All other forms of *qi* inherent in the body are considered to be manifestations or derivatives of source *qi*'.

It seems that the four terms 'original *qi*', 'source *qi*', 'right *qi*' and 'vital *qi*' are used interchangeably. Certainly different authors and schools seem to use one or more of these terms to refer to pretty much the same thing. One could argue that the original *qi* is the most basic, that a derived fundamental form of it is the source *qi*, another derived and fundamental form of it is the vital *qi*. The latter two seem to be used interchangeably, but are not so clearly distinguished from the original *qi*. Perhaps these three refer to a basic *qi* substrate in the body, which is a model that fits well with evidence for original descriptions of an undifferentiated *qi* that was followed for practical reasons by the categorisation of *qi* into various subsets [13]. A vital functional part of this substrate is the right *qi*, that which combats disease. Whatever the preference for choice of label, it is clear that the 'moving *qi* between the kidneys' was thought to be the source or centre of at least the source *qi* and vital *qi*.

The term 'stomach *qi*' is today used in TCM texts to refer to the stomach functions [31:578] but in the *Su Wen* and *Nan Jing*, it had a much broader meaning. *Nan Jing* chapter fifteen describes the stomach as 'the sea of water and grains; it is responsible for

supplying [the depots during all] four seasons. Hence the influences of the stomach constitute the basis for all [the depots]' [30:203]. This description arises in the context of a discussion of seasonal pulse qualities, how the body adjusts normally and abnormally to seasonal changes, and as an elaboration or clarification of prior discussions found in *Su Wen* chapters eighteen and nineteen. Although modern descriptions tend to focus on 'stomach *qi*' as 'the power manifest in stomach function' [31:578], it is also said 'the presence of stomach *qi* means life, the absence of stomach *qi* means death' [31:578].

In the Toyohari acupuncture system, the term 'right *qi*' ('*seiki*') is the preferred term for referring to the general *qi* of the body. This choice of terms is probably due to the fact that the supplementation needle technique is said to make the pathogenic *qi* more obvious in the pulse. This is understood to result from having strengthened the 'right *qi*' – that which stands in opposition to the pathogenic *qi*. As the right *qi* becomes stronger it provokes stronger reactions to the 'pathogenic *qi*', thus making it more obvious in the pulse. Various authors have been explicit about how SNT is performed in order to increase the general vitality of the patient. Shudo discusses how supplementation means 'to increase the normal *qi* [*zheng qi* (*seiki*) – 正氣] (i.e. that which strengthens the life force) which is lacking in certain organs or meridians by drawing *qi* over from another part of the body, or adding it from an outside source' [26:31]. He quotes Honma who in 1949 wrote 'Tonification is used to augment the normal *qi*, reinforce the life force, and strengthen life functions. In other words, [tonification] means to increase and strengthen the source *qi* (原氣) of the triple burner, which plays a central role in recovery from illness' [26:31]. Additionally he quotes Yanagiya who in 1976 wrote: 'Tonification means to give, increase, or add... What is added, according to classical concepts, is *qi* and blood.... This is the wellspring of all nourishment... Normal *qi* is that which extends the life force... To tonify is thus to increase the normal *qi*' [26:31]. We thus see various practitioners making explicit the idea of increasing the body's systemic, global *qi* (here mentioned as right/normal *qi* or source *qi*) with the technique of supplementation.

Whichever of the four terms a particular school of acupuncture chooses to refer to this fundamental *qi* substrate, the 'moving *qi* between the kidneys' supplies this vitality to the body and the channels are rooted there (and thus derived from there). Thus any changes in the channels must trigger changes in the moving *qi* between the kidneys and thus manifest throughout the body. Changes in the vitality of the patient are system-wide and are thus systemic. These changes occur regardless of where the needling is applied. It occurs if one applies SNT to Lu 9 for a lung vacuity patient, Sp 3 for a spleen vacuity patient, to Liv 8 for a liver vacuity patient or Ki 7 for a kidney vacuity patient, etc. The effects are thus independent of location and are instead technique-dependent since the SNT must be well done for the effects to occur [5].

Appendix two:

The increase in vitality that appears to follow SNT could be said to occur because the channels have their root at the moving *qi* between the kidneys and a change in the channel system affects this root. *Nan Jing* chapter eight tells us 'each of the twelve channels has a relationship to the source of vital *qi*' which is the 'moving *qi* between the kidneys'. This seems to imply that the

change in each channel could affect the whole through the root. However not every change in the channel system creates this increase of vitality effect, so it is not clear that this alone is a sufficient explanation of the global change. We can propose other possible mechanisms.⁵

See figures 1-3 below

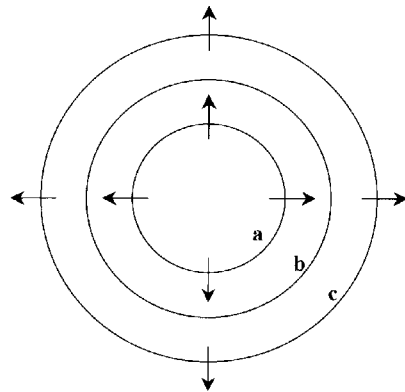


Figure 1. Idealised healthy state

- a Functional systems (*Zang Fu*, etc)
- b Channel systems
- c Vitality: Global *Qi* of the body

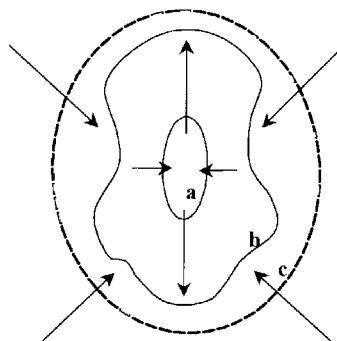


Figure 2. Patient in diseased disordered state

- a Weakening, dysfunctional
- b Imbalanced
- c Weakened

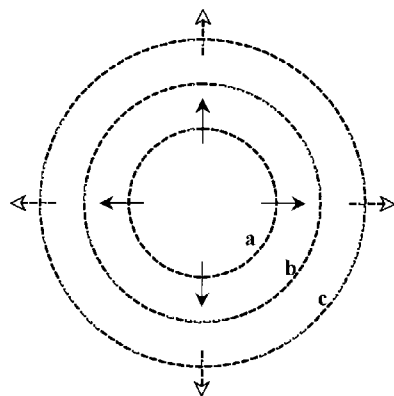


Figure 3. Patient after treatment

- a Functions improving
- b More balanced
- c Stronger

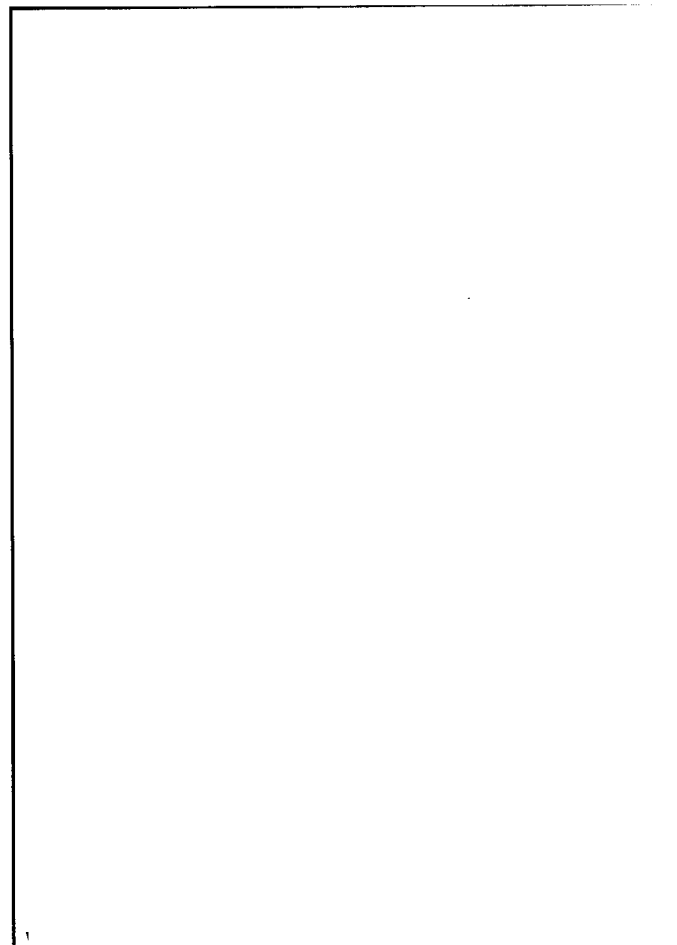
⁵ I am working on a paper with Mark Friedman that attempts to mathematically describe the dynamics and nature of interactions of these three levels so that we can understand them better, especially in relation to healing in acupuncture [9].

Figures 1 to 3 describe a model showing an idealised state of health (1), the typical presentation of a patient (2) and the effects of each treatment (3). The figures show the basic relationship between the organ-functional systems (a), the channel-regulatory system (b), and the vitality-global *qi* of the body (c), centred at the 'moving *qi*' between the kidneys. In each figure, the middle line represents the relative state of the channel system. Figure 1 is the idealised 'healthy' state where the middle line is circular, implying that it is free of major imbalances so that *qi* circulates properly. In Figure 2 the middle line (channel system) has various vacuities (depressions) and repletions (bumps). These depressions and bumps represent the various imbalances in the channel system that trigger health problems and a decline in the health status of the patient. Figure 3 shows the relative circular state (balance) of the middle line (channels) following treatment.

In Figure 1, when the channel system (*qi* circulation) is balanced, the organ and tissue/fluid systems – or functional systems inside the body (the area bounded by the inner circle) – maintain optimal efficiency. The arrows moving away from the centre indicate the optimal efficiency of the whole. In Figure 2, the inner circle is small, indicating that the organ/functional systems are functioning at less than optimal efficiency, thereby triggering various problems and making the ability of the body to recover weaker or triggering an inability to naturally overcome particular problems, (represented by some of the arrows being inwardly directed). Figure 3 shows the effects of treatment on the channel system and the effects this has on the organ/functional systems. The inner circle is larger than in Figure 2 and the arrows are all outwardly directed indicating an increasing efficiency.

The outer circle in Figure 1 is continuous showing that the vitality is strong and thus that the body's ability to recover from, overcome or resist problems is strong. In Figure 2 the outer circle is smaller and its line dotted, indicating a weakening of the vitality and thus ability to recover from disease. In Figure 3 the outer circle line is more solid and is larger than in Figure 2 indicating a strengthening of vitality and thus ability to recover from disease.

In essence, treatment tries to restore the system represented by Figure 2 to the ideal state represented by Figure 1. Figure 3 represents a temporary state that follows each treatment. After each treatment the system tends to return back towards the state represented in Figure 2. With repeated treatments the state represented by Figure 3 lasts longer and there is less return towards the state indicated in Figure 2. Further, with repeated treatments, the state indicated in Figure 2 improves so that the unevenness (bumps and depressions/the repletions and vacuities) of the channel system evens out (the middle line becomes rounder), the inner circle becomes larger and the arrows directed outwards become larger and the outer circle line becomes larger and more solid. This gives a basic description of how the vitality as a whole increases and the patient starts to experience increased health. Whether this increase in vitality is thought of as an increase in *sheng qi*, *zheng qi*, or either form of *yuan qi* is not important. These are virtually interchangeable terms and it will depend on the perspectives and model of each clinician as to which terms they prefer to use. In Part 2, I explore other scientific explanations of the effects of SNT that parallel these observations and models [7].

Filling the Whole in Acupuncture

Part 1:2 What are we doing in the supplementation needle technique? Scientific perspectives

Stephen Birch

Introduction

In the first half of this paper I discussed the purposes, traditional explanations and possible mechanisms of the supplementation needle technique (SNT) [Chinese '*bu fa*' (補法), Japanese '*hoho*'] and began to model what might be happening when we apply it. I highlighted effects triggered by the needling itself, focusing especially on local and global *qi* circulatory effects and traditional explanations of these. I also highlighted effects that arise out of the interaction of the person needling and the person being needled, looking in particular at global changes in the vitality of the patient and the effects of the mind of the practitioner. In this second half I propose various scientific perspectives and models that could explain the same observed effects of the needling, their various interactional effects, including mental interactional effects. Finally I briefly discuss implications of this for understanding acupuncture practice.

Scientific explanations

Possible electro-magnetic effects: It has been clearly established that small electrical currents in the body and the weak electromagnetic fields of the body generated by its various constituent chemicals, tissues and organs play important biological roles and may even be vital to living processes [3, 10, 12, 56, 60, 69, 70, 78]. The body necessarily generates an ambient electromagnetic (EM) field which will be the sum of all the EM fields in the body [37, 56]. This total field will have as its approximate epicentre the centre of gravity of the body, which when standing upright is in the lower abdomen, the same location as *qi hai dan tian* or the 'moving *qi* between the kidneys' [37, 78]. How might these general electromagnetic models explain acupuncture effects?

Research examining the electro-dermal properties of the skin (impedance, conductivity, resistance) supports the hypothesis that there are discrete points of lowered electrical resistance that seem to correlate with the acu-points, and that these are connected as lines of lowered electrical resistance that seem to correlate with the channel system [3, 22, 36, 37, 49, 50, 56, 70, 76, 77, 78, 85]. While there are some technical problems with the interpretation of some of these findings [9, 14, 77], there is general agreement that these electrical properties seem to exist. Others working with these findings have also claimed that these electrical properties can be affected by acupuncture treatments [49, 50, 51] and that one can see changes in the distribution of electrical resistance properties that correlate with imbalances in, and corrections of, the channel system [49, 50, 51, 55].

If the hypothesis is correct that the electro-magnetic properties of the body and its tissues are important for proper functioning, it makes sense to suggest that the channel system might be involved

in this as a kind of regulatory system [36]. Models of this have utilised the idea that there are complex dynamical interactions between the electrical properties of each channel that play a role in helping regulate the body [16, 17]. Thus one can propose a model for the local effects of SNT described above. Treatment triggers electrical effects including changes in the electrical characteristics of the channel being treated which, via auto-regulatory responses, trigger changes in the electrical characteristics of other channels, resulting in a state of increased 'balance' of the channels. These changes in electrical characteristics of the channels help produce better physiological functioning of the internal systems. This, or something like it, has been claimed by various groups working with the electrical properties of the channel system for diagnosing imbalances and prescribing acupuncture treatments [49, 50, 51, 76, 77]. Thus we have a reasonable model for understanding the local (channel based) effects of supplementation needling. What about the systemic changes in vitality?

Nakatani's method of measuring the electrical characteristics of the channels specifically relates these to the galvanic skin response [51, 55], which is often used as a measure of the state of the autonomic nervous system (ANS) [55]. The pulse quality changes that we observe imply that the treatment triggers autonomic regulatory effects since the ANS is the principle regulator of the cardiovascular system. Together these two suggest involvement of the ANS in the effects of SNT. Thus it is useful to explore the ANS in more detail.

Autonomic effects: To understand how the autonomic nervous system may be involved we need to return again to the observed effects of SNT. When SNT is applied well the following changes are observed [83]: the heart rate usually slows down; often the heart moves into a new rhythm; the tonus of artery walls becomes clearly defined and springy; the force of heart beat and thus strength of pulse waves felt in the arteries usually becomes softer; respiration usually slows, becomes deeper and often more rhythmic.

The important point about these changes is that the ANS is involved in their regulation. Autonomically mediated effects of acupuncture needling have been documented by other researchers [34, 54, 55, 75]. The ANS has been found to be involved in a number of important and sometimes surprising areas since the advent of computer technology which has allowed for more sophisticated analysis of ANS effects. The heart beat should regularly change its rhythm; this heart rate variability has been found to be an important indicator of the status of the ANS [79, 80]. Heart rate variability can be determined through measurements of the electrocardiogram (ECG) of the heart; that is the EM field of the heart. The heart has the strongest normally occurring EM field in the body; it spreads across the whole body and can be measured anywhere on the surface [56]. It has been found to trigger

biological effects within the body, influencing and entraining other physiological systems [1, 21, 39, 43, 44, 61, 78]. As its rhythms change, it can alter rhythms and therefore functioning of other physiological systems such as the brain (as measured by electroencephalographic measurements-EEG), cardiovascular, hormonal and immune systems [1, 21, 39, 44]. It has been claimed that these EM field changes of the heart can create a kind of coherence in physiological activity called 'physiological coherence' which increases overall functioning [11, 39, 42, 44, 56]. It is thus possible that the ANS changes we observe as a result of SNT may be indicative of important global physiological changes.

In recent years the heart itself has been found to be a more independent organ than had previously been thought. It transmits far more information to the brain than it receives from the brain and has been shown to have its own kind of brain or complex regulatory mechanisms [1, 44, 57]. The heart has also been found to be able to carry memories that had always been assumed were stored in the cranial brain. In a remarkable parallel to the fourth century Daoist tale in the Lie Zi of how the switching of the hearts of two people transplanted the personalities and memories of both original heart owners, there are numerous stories from modern heart transplant patients with similar experiences [57]. There is growing evidence of how some heart transplant recipients start remembering things, develop similar habits, tastes, preferences to the person from whom the donated heart came [57]. In his explanations of these effects Pearsall explores the role of the EM field of the heart, which, as he points out, is far stronger than any other naturally occurring field in the body. It spreads across the whole body, extends into the space outside the body and is present from day 22 of foetal development till death. Clearly the EM field of the heart is biologically and energetically active.

Heart EM field effects: The EM field of the heart has also been found to be involved in certain effects, such as transmission of information between one person and another [38, 42, 45]. Researchers found that when one person touches another, specific changes can be observed in the person touched which imply that the heart EM field of the person touching triggers resonance effects in the EM field and, thus, activity of the heart of the person touched [38]. This resonance effect constitutes a transfer of information or energy from one person to the other that triggers other physiological changes. Since treatment by acupuncture necessarily involves touch of the patient by the practitioner, and the treatment triggers similar autonomic changes in the patient, it is not unreasonable to propose that these changes may be due, in part, to activation of similar mechanisms. These effects appear to be 'non-local' as they are not dependent on the site touched and can occur, to a lesser degree, with only proximity and not actual touch [38]. But rather than describe them as 'non-local' here I prefer to use the term 'systemic': effects that occur throughout the system regardless of where the input first arrives. It is also possible that the practitioner's intention to heal enhances these effects. Research has demonstrated that positive emotions such as compassion affect heart rate variability in a positive manner by inducing improvement

in sympathovagal balance [43] producing effects similar to the cardiac coherence found to be associated with 'physiological coherence' [38]. Since most therapists express, or try to express, similar positive emotions towards their patients, then it is possible that the production of effects in the practitioner due to their intention to heal may induce similar systemic effects in the patient, or at least enhance the production of those effects due to touch. The findings discussed here have a strong parallel to the idea stated in the *Zhen Jiu Da Cheng* of 1601: 'the mind (*xin*) of the physician and the mind (*xin*) of the patient should be level, in harmony, following the movements of the needle.' [37:38]. There is an explicit instruction that the practitioner make their '*xin*' (heart-mind) level with that of the patient.

In recent years the heart itself has been found to be a more independent organ than had previously been thought

The unfolding evidence of the role of the EM field of the heart in various non-local effects and global physiological effects provides an interesting and very suggestive explanation of how changes in vitality may occur. Changes in the practitioner's heart EM field may trigger changes in the EM field of the patient (utilising the EM fields of the heart and brain), producing harmonisation of physiological functioning, or 'physiological coherence' in the patient. These effects may be observed as predictable autonomically mediated changes (heart rate, rhythm and force, breathing rate and rhythm, tonus of the arterial tree). If this improved physiological functioning occurs, it would be accompanied by an overall increase in vitality.

Intentional, mental focus, awareness, consciousness effects: The documented effects of mental focus and intention offer a third possible source of explanation for some of the effects that are observed in Toyohari treatments. In the practice of meridian therapy and Toyohari it is important that the person needling remain focused on the tip of the needle for the effects to develop correctly or sufficiently, [29, 71, 74]. In this style of needling, the patient may not feel very much (especially when the needle is not inserted) but it is essential that the practitioner feel the '*qi*' and respond to it appropriately [4, 71, 74]. Thus a clear mental focus on the part of the practitioner is a necessary part of the needling technique, with some quite specific discussions of this available in the literature [25, 35]. The practitioner has certain sensations and experiences while concentrating on and performing the needling that are essential features of the technique. The predictable ANS changes that are observed with correct application of SNT are dependent on the mental focus of the practitioner being guided by the experiences and sensations that occur in him while needling [4]. To master this

requires considerable training and practice. The training process in Toyohari uses feedback from pulse and heart changes repeated during many sessions to train both the mental focus and an understanding of the sensations and experiences of needling. After more than twenty years of study, practice, and teaching, my observation of this process is that the act of perception and simultaneous concentration on the needle tip seems to focus the effects to that location, i.e. the acu-point being needled. Do we have evidence of possible effects of mental focus, awareness, perception and intention?

Research from many laboratories has clearly documented that mental focus and intention can affect physical objects – generally called ‘mind-matter interactions’ [26, 52, 63] – and biological systems [2, 62, 68, 72], and that the effects can vary following the intention of the person who is focusing. These effects are very well documented and provide evidence of true ‘non-local’² effects of the mind [27]. The term ‘non-local’ comes from modern physics and includes effects that lie outside the normal ‘space-time’ continuum, meaning that they can act at a distance very rapidly or instantaneously and that they can act outside the normal flow of time [46:214].

These non-local effects are not confined to how one person can affect another; they also seem involved in how one person can sense changes in another person [53, 62, 64, 72]. One study showed how changes in the emotions and feelings of one person can be detected via the ‘gut feelings’ of another person, measured through the electro-gastrogram (EGG) [64], and that these effects do not occur via any known physical mechanisms (field-awareness). Another study showed how the bio-field of one person can be detected by another [53] (focal awareness). In the Toyohari needling it is essential that the practitioner be able to sense changes in the patient (focal and field awareness) so that the appropriate adjustments and modifications of the needle technique be made. This sensing may also involve ‘non-local’ mechanisms related to the mind, both focal and field type awareness.

a clear mental focus on the part of the practitioner is a necessary part of the needling technique

Given the robustness of the research into the effects of mental focus and intention [27], we can suggest that in a therapy like acupuncture it is likely that some of the same mechanisms could be triggered or utilised. This will be even more relevant in Toyohari, where well developed mental focus and acute perception are required. If these mechanisms or effects are activated, this could provide a third explanatory model in addition to the hypothesised

electromagnetic effects on the points and channels and the heart EM field effects. Perhaps the focus of the mind (‘*xin*’ or heart-and-mind) focuses the effects of the needling itself or perhaps it acts through the *qi* related systems. Some evidence for this connection can be found. A study examining the effects of healing on the energy systems of the body, in particular on the acupuncture channels and points, found that the biggest electro-dermal DC potential changes occur at acu-points (compared to non-acu-point skin regions), and that these seem to correlate with the ‘felt sense’ of *qi* [73]. In other words the movement of *qi* seems to utilise or be focused through the acu-point and acu-channel systems rather than skin regions not occupied by the channel system and this correlates with the perception of that movement, the ‘felt sense’ of *qi*. This may be a highly significant finding because it is necessary that the practitioner be able to feel or sense the *qi* and its changes to be able to perform the needling methods correctly and trigger the expected changes in the patient. Instructors in the Toyohari system are explicit about the importance of retaining the feeling of the needle tip between the finger and thumb while it is held at the skin surface [84]. In other words, another possible aspect of the influence of intention and mental focus is the role of perception of sensations which may act as a trigger or object of mental focus. Focusing on the tip of the needle is enhanced by the actual feeling of something there; like the dial on a microscope it can create a sharper focus. The introduction of the possible role of the perception of influences or sensations associated with the needling applies equally for the patient as well as the practitioner. In the study by Syldona and Rein [73], they focused on the ‘felt sense’ of *qi* as experienced by the practitioner and noted important changes. The effects of patient mental focus and awareness will also be enhanced or focused more if the patient experiences certain sensations. In some styles of acupuncture (see below), the emphasis is placed more on what the patient feels rather than what the practitioner feels. Thus some of the same effects described above may occur, but generated from a different locus.

Is there evidence for the role of the heart in mental or intentional effects that can lend support to the traditional East Asian medicine (TEAM) notion of ‘*xin*’ as ‘heart-and-mind’? This is an interesting question since evidence of this role would lend considerable support to the traditional notion of the mind and heart as being an interactive functional unit, the ‘heart-and-mind’, and would tie together some of the different lines of research discussed above. The heart has been shown to respond to mental and emotional stimuli. The focusing of positive emotions such as compassion in the region of the heart can trigger changes of cardiac behavior such as the coherence discussed above, while focusing negative emotions triggers non-coherent behaviour [38, 39, 44, 45]. Recent studies have shown the heart to be involved in ‘intuition’: i.e. how the body knows something before that thing occurs [40, 41]. Here researchers found that emotional responses detected in the EM field of the heart (ECG) occur before exposure to the emotionally stimulating object [40, 41]. This clearly suggests involvement of the heart in what is called ‘intuition’. In acupuncture, the diagnostic

Table 1 – Three levels of effect

Observed effects SNT	Components of SNT	Historical (TEAM) explanations	Modern explanations
1 Changes in various positions of the radial pulses	Actions on the point and its channel [local]	Treatment affects one channel, triggering changes in other channels, and thus the whole channel system (channel theory, <i>yin-yang</i> and 5 phase regulation)	Possibly takes advantage of electrical properties of the needle, acupoints, channels and body tissues to trigger electrical changes. Various theories exist about the biological roles of small bio-electrical fields, bio-electrical conductance and their regulatory influences
2 Changes in the overall pulse quality + breathing	Actions on the vitality of the patient [systemic]	Enhancing of vitality acting through the core of the body's energy systems, the 'moving <i>qi</i> between the kidneys'	Interaction of (heart) EM fields of the practitioner and patient triggering autonomously mediated changes in the patient that lead to enhanced physiological efficiency and coherence (vitality)
3 Mental focus, intention effects and perceptual effects (both in the practitioner and the patient)	Influence of mental focus, intention and receptive awareness [non-local]	Importance of focusing on the tip of the needle and remaining aware of <i>qi</i> movements. These are described by modern and historical practitioners as essential to treatment success	Mental focus and intention can trigger mind-matter (MM) effects. Focus on the needle tip and feeling the tip and accompanying changes may enhance the direct MM effects or enhance the effects of 1 and 2. Positive emotions such as compassion trigger ANS changes with increased cardiac coherence

and treatment process itself often involves the reading and interpretation of subtle information via processes not unlike 'intuition' [4, 66]. It is thus possible that some of the non-local effects of SNT could be explained in part by looking at how the EM field of the heart plays a role in the transfer of intuitive or precognitive information.

I have developed a number of possible explanations of the effects of SNT, which are summarised in Table 1. It may also be that the local and non-local effects are dependent on each other. Perhaps the local effects of needling coupled with the heart EM field mediated effects of touch trigger changes in heart rate and rhythm. These may then make the fields of the heart more conducive or receptive to the heart rate variability changes produced by the actions of the heart EM field of the practitioner, or by effects of consciousness and mental concentration of the practitioner. This may help explain why the SNT needling in Toyohari so consistently produces the changes described [83]. It also accounts for some of the dynamic interactional aspects of SNT needling [4]. A comprehensive research strategy is being developed by the author to begin investigation of whether and to what extent these mechanisms play a role in the effects of SNT in Toyohari treatments [5].

If this model is valid, it should be transferable to other forms of acupuncture as an explanation of what may be happening. A brief look at the common Chinese TCM needling methods illustrates this. The same primary mechanisms will probably be at work. There will be similar local and whole body changes, but in different degrees and coupled with additional mechanisms that result from the different needle manipulation methods of TCM.

Comparison with TCM needling

In TCM needling the needle is inserted and then manipulated, using twisting methods and lifting-thrusting methods [13]. The insertion and manipulation of the needle is performed in order to elicit '*de*

qi' which gives characteristic sensations that the patient might experience such as 'soreness, aching, distension, heaviness, numbness or tingling' [13:12] or 'sharp, pulling, electric, tingling, heavy, pulsing, spreading, pricking, aching or hot' [81]. While it is described how the practitioner may feel a physical reaction to the manipulations of the needle, such as a needle grab [13, 59], it is clear that the primary locus of awareness of what the needling is doing resides in the patient rather than the practitioner. Thus the influence and nature of consciousness effects above will probably be different because the focus itself is different. Additionally, since the body often perceives the sensations of the needling as uncomfortable this provokes some analgesic mechanisms such as CNS mediated endorphin effects [59], homo-segmental effects [48] and hetero-segmental effects [33]. These effects will probably interact with the consciousness effects that are triggered in the patient, modifying them further.

Also, since the needle is inserted and manipulated it will trigger more physical stimulus responses than the Toyohari needling described above. There will be electrical effects due to the current of injury [59] and stimulation of various underlying structures such as connective tissue [22, 30, 31, 32], sensory nerves [59] and so on. Thus the local electrical effects will be different than in Toyohari needling where the needle is not inserted. Further, Manaka suggested that the amplitude of the needle stimulus and signals that it triggers, such as release of endorphin to block the discomfort of the needling, may override or obscure the action of some of the more subtle electrical effects [36]. While the effects of touch and positive emotions such as compassion [38, 45] should be similar they are likely to manifest differently since they will probably be modulated by the additional effects described above.

Thus the TCM method of applying SNT can be modelled using the same approach but will require modifications to account for the shift of locus of awareness (more in the patient than in the

practitioner) since the needling provokes such strong sensory stimulation. Further modifications will be necessary since the needling produces a range of additional physiological mechanisms probably not activated in Toyohari SNT needling.

Implications of the observed effects of supplementation and their proposed models

There is a tendency to limit the thinking of what treatment by acupuncture is doing. In TCM for example, when Lu 9 is supplemented the practitioner intends to correct the vacuity of the lung channel or lung *qi* vacuity. The dynamical adjustment within the channel system that results from this is not usually taught or discussed. Additionally, very few practitioners explicitly discuss how SNT is used to improve the vitality of the patient regardless of the diagnostic pattern identified and treated. When practitioners think only about the local effect on the channel treated they may be missing important changes that can result. To borrow an ecological model, 'think global, act local'. If the practitioner is not aware of these possible changes the tendency will be not to look for them and thus they may not be noticed. Further, skill training that would be helpful for enhancing these locally mediated global effects and systemic changes in vitality will be lacking or not so well defined. Thus when these changes are not well articulated or explored the practitioner may end up providing treatments that have less of these effects and thus are potentially less effective in helping their patients. The last explanation of the non-locally mediated global effects involves what is often called 'intention'. It should be self-evident that if the concept is not thought about, then the intention to do it will be less or absent.

One limitation of the models described here is that they have only focused on the '*bu fa*' or supplementation technique. Traditionally acupuncture has also employed other methods such as the '*xie fa*' (瀉法) or draining techniques. These methods also need to be described and models developed in the framework of the above discussions to account for these. Efforts to do this will have to wait until another time.

It is not clear to what extent the effects discussed above will be triggered in different styles of acupuncture treatment. The changes that are observed when SNT is applied in Japanese meridian therapy, especially in the Toyohari system where they are explicitly articulated and technically focused on, may occur more or less in other styles of acupuncture treatment as well. It is necessary to examine different styles of SNT needling to see what kind of global changes are triggered, the extent to which they are triggered, when triggered how long they last and what the physiological and clinical effects of these changes are. This has not yet been studied in scientific investigations of acupuncture.

Another limitation is that the model has focused primarily on the electrical properties of the channel system and the potential role of

EM fields in explaining observed effects of needling. Other channel based mechanisms may also be involved. For example, research has shown involvement of EM radiation in the form of bio-photons that seem to be related to acupuncture [23, 67]. This may also play an important role in explaining some of the observed effects of SNT but it is too early to say to what extent this is related to and can explain those effects. These additional effects will probably vary from one style of practice to another.

In clinical studies of acupuncture, 'intentional effects' have been treated as though they were only 'placebo effects'. This is a highly questionable practice as it treats an important part of the treatment as though it were only an accidental by-product resulting from patient beliefs. Clinical research methods for acupuncture trials need to be re-examined and reconstituted. Perhaps the approach suggested by Hyland would be helpful [24]. Physiological studies of acupuncture have also tended not to focus on the global regulatory effects of treatment. Methods need to be developed to start doing this. If the observed effects of clinical practice and the theories behind them continue to be ignored by researchers, research findings will continue to be of questionable value for understanding or informing the clinical practice of acupuncture. On the other hand, if research is implemented to explore these potential effects it could contribute to both the practice and effectiveness of acupuncture.

Final thoughts

In this two-part paper I began with the question: what is happening when we apply the supplementation needle technique (SNT)? To answer this question I started with a phenomenological approach; describing what we observe when SNT is applied. I then analysed these observations from a TEAM perspective and found three different but complementary TEAM explanations of these observations. I then posited various possible western-based scientific explanations for these three TEAM explanations, putting forward data and models that have emerged from scientific studies as evidence. Thus I have suggested that there may be three interacting levels of effect occurring when SNT is applied. The first is a complex set of changes that occur at a local level that have to do with the acupuncture point and channel being worked on, the nature of the needle and technique used, and the touch and skill of the practitioner applying that technique. This complex set of changes I described as locally mediated. I postulated traditional explanations of how the effects transmit from that point throughout the body, citing *yin-yang* and five-phase interactive regulatory dynamics as the explanation of this. I also posited possible electro-dynamical explanations of them. The second level involves some kind of change in the total *qi* 'field' (vitality) of the patient. I postulated that the traditional explanation of the 'moving *qi* between the kidneys' supports this idea and that it seems to suggest a kind of whole body field effect. I described this as a kind of systemically mediated effect since it can occur regardless of where the treatment is

applied on the patient and works through the whole rather than any of its constituent parts. I then discussed the role of the electromagnetic field of the heart to help explain this and suggested a kind of transmission between the practitioner and the patient that was mediated through resonance or entrainment between the heart EM fields. This is a model supported by various experimental findings and involvement of the autonomic nervous system. The third level involves the impact of 'mental focus', 'intention' or 'awareness', which can also be non-local in the sense that they are not necessarily constrained by the normal rules of time and space [46:214]. I discussed and documented the role of mental focus in the effects of consciousness in the world, and suggested that similar effects probably occur during the treatment because of the mental focus required. I also discussed the role of perception in creating the focus that might help concentrate or focus the 'qi' during the treatment. The 'felt sense' of qi on the part of the practitioner and/or patient probably plays a role in the overall effect of treatment.

Research on acupuncture has typically taken two forms – a) studies to identify the physiological mechanisms involved that can explain observed or measured effects, such as the release of endorphins to block pain, and b) the testing of the efficacy of those mechanisms in randomised controlled trials, especially trying to control for placebo in sham studies. However, the explanations put forward in this paper and the supporting data accompanying them raise important questions about the suitability of these two research approaches. Western research methods in human physiology and in clinical research are based on a number of assumptions that make it inherently difficult to investigate the models proposed here. The first is that Western scientific approaches are still encumbered with 'Cartesian dualism' [15]: the notion that the mind and body are separate and even that the mind is merely a derived property of the body, which, as such, can exert no influence except through the body it occupies. The evidence referenced above clearly challenges the basic science assumption of the non-involvement of consciousness in physiological and clinical studies. In practical terms, clinical research of a treatment substance or instrument tries to isolate the effects of the active ingredients or mechanisms and tends to lump various mental effects together as simply placebo. However, not only does the evidence presented above challenge this, but publications on placebo challenge this [19, 20, 28, 58] and the whole topic of placebo has become muddled and confused, especially in the area of clinical research of medical devices or procedures [6]. Second, Western approaches to researching acupuncture have of necessity tended to follow a reductionist approach – isolate the mechanism. The complex interactions proposed here of bodily, energetic, and mental effects does not allow the use of only a reductionist approach if they are to be investigated. The multi-faceted nature of the therapy also means that this is a complex intervention, requiring the development of research approaches and methods appropriate to the treatment method [47, 82].

We should not use research approaches that are not suitable to the subject under study. Thus a new approach and a new model is necessary if we are to investigate and test the models here [47, 82]. This model must be able to avoid or solve the limitations of the reductionist approach, avoid or solve the mind-body conflicts of Cartesian dualism and allow a more holistic or integrated approach to the investigations [15]. This is not to say that the research methods and technologies that are currently in use cannot be applied, but rather that they need to be used in context and placed or embedded within a larger model that permits their use whilst avoiding or solving their inherent limitations. The model should also not impose cultural chauvinism, such that if we accept the TEAM explanations we must reject the scientific or western explanations, and vice versa. Rather the model should be large enough to allow both approaches to co-exist as complementary explanations. I have argued elsewhere that the models and methods of TEAM are more about problem solving rather than reality descriptors [9]. They should thus not be treated as alternatives to more scientific descriptions, which attempt to be reality descriptors. The two approaches are inherently complementary and not alternative. I have been working on this area for over twenty years. While the current paper has introduced these themes, the second paper introduces a model that attempts to avoid or solve these philosophical, methodological and cross-cultural problems [7]. The development of a research approach built around this model is the theme of the third paper [8]. The model will not only be useful for improving studies of SNT and more generally acupuncture and TEAM, but, if they are brought into discussions of how to train an acupuncturist and how to practise acupuncture, perhaps they can increase the effectiveness of acupuncture as well.

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- 1 See the discussion of the term 'non-local' in the next footnote.
- 2 The term 'non-local' is a concept used in modern physics. Quantum theory has allowed for and it has been proven that particles that interact at one time can influence each other instantly even over vast distances. Einstein called these 'spooky actions at a distance'; these are 'non-local' effects. Recent evidence in physics suggests that everything is simultaneously connected 'non-locally' [18, 46]. Significant amounts of evidence have emerged in psychic and consciousness research demonstrating the 'non-local' nature and effects of consciousness [27, 46], suggesting that the mind and mental effects may play an important role in how 'non-local' effects may affect the body. The 'non-local' effects of the mind shown in these studies parallel ideas articulated in, for example, the *Nei Ye* of the third century BC where with the right contemplative practices one's mind starts to gain access to information throughout the cosmos, potentially to affect things at a distance [65].

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