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The necessity of inheritance and innovation of classical acupuncture from the rising of dry needling从干针崛起看古典针灸传承与创新的必要性

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ABSTRACT

By reviewing the historical background and the current state of dry needling (DN), including the "Anti-DN Independence" movement by the acupuncture profession in the west, this paper emphasizes that DN is acupuncture, or more precisely, a "de-meridian" style of acupuncture. Clinical applications of DN and its modern studies have seen a tremendous growth spurt during the past two decades, which suggests that the meridian theory of traditional Chinese medicine (TCM) may not be the exclusive theory to guide acupuncture. Even certain high-quality DN trials may serve as good examples for acupuncture research, such as refining the stimulation targets in acupoints, recognizing the reflex properties of acupoints known as acu-reflex points (ARPs), or establishing standardized indicators of stimulus amount while objectively assessing the needling efficacy. Like any other therapies, DN has its shares of drawbacks or limitations, which reminds that while innovating classical acupuncture, it is still necessary to inherit the valuable experience of classic acupuncture and the rational core of meridian theory. This is crucial for enhancing the efficacy of clinical acupuncture intervention including DN to broaden the treatment scope and indications of acupuncture.

Dry needling (DN), aimed mostly at trigger points and originally used to treat myofascial pains [1–3], is in essence, a form of modern acupuncture [4–6]. During the past two decades, DN's rapid rise of popularity and usage in the west has garnered much attention and triggered deep self- reflections from within the acupuncture profession. On one hand, most licensed acupuncturists are opposed to non-acupuncturist DN practitioners' attempt at bypassing state or provincial regulations by claiming that DN is not acupuncture [7,8]. On the other hand, certain significant implications of DN for the proper inheritance and necessary innovation of classical acupuncture are beginning to unfold.

This paper briefly reviews the historical background and the current state of DN in the west including the "anti-DN independence" movement like that of "oppose practice acupuncture without license" [8] motto shouted out by the U.S. acupuncture profession, and reiterates that DN is merely a "de-meridian style of modern acupuncture [5]. Moreover, it presents and examines certain advantages or drawbacks of DN with in-depth discussions around the inspirations for future acupuncture trials or research, especially on how to make sense of the necessity in inheriting and innovating classical acupuncture.

1. A historical background and current state of DN in the west

Whenever revisiting the history of DN, it is obvious that one first need to go way back in time to the discovery of 'trigger point' in the early 19th century, then the recognition of myofascial pain [9–11] a bit later. The term myofascial trigger point (MTrP) was coined by Dr. Janet Travell (1901–1997) and Seymour Rinzler in the 1950s [11], reflecting their finding that hardened knots do exist and often refer pain to both muscles and overlying fascia [12]. The two-volume book *Myofascial Pain and Dysfunction: The Trigger Point Manual*, which Dr. Travell co-authored with David Simons [1,2] represents decades of keen observation and research on myofascial pain and MTrPs. As for the word DN, it is coined by Paulett JD in 1947 [13,14].

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For a long time, DN was originally called intramuscular manual stimulation, or intramuscular needling [1]. In the past two decades, when it was gradually incorporated into the scope of non-acupuncturist DN practitioners such physical therapists (PTs) and doctors of chiropractic (DCs), it was later renamed to trigger point DN or MTrP DN. In actuality, the stimulation method and needles currently used by non-acupuncturist DN practitioners are identical to acupuncture except that targets of DN are called trigger points instead of acupuncture points/acupoints [2].

Nowadays, many non-acupuncturists like PTs or DCs in the west have learnt DN and attempted to add it to their existing scopes of practice [15]. For this, there are mainly three reasons.

First, PTs and DCs' usual clientele, specialties and scope of practice mostly overlap with that of the licensed acupuncturist or acupuncture, which has become popular in the west over the recent decades. Of course, there is also the factor of clinical efficacy for acupuncture, sometimes they consider are far more superior than their traditional modalities (e.g. subluxation, manual therapy), which may be a factor in causing their own professions to regress somewhat. This is also exactly why more and more of these non-acupuncturists are studying to become licensed acupuncturists as well so they can try to integrate acupuncture into their practice. In reality, it was known long before the rise of DN that many DCs already used acupressure or electrical stimulation devices to treat patients in their clinics.

Second, DN is merely a "de-meridian" style of acupuncture [5]. It completely discards the underlying meridian theory and other traditional Chinese medicine (TCM) theories and only considers MTrPs as primary stimulation targets along with the local twitching response (LTR) as the sole indicators for a successful treatment. Moreover, it aims to eliminate the hard knots in the muscle or relieve any referred trigger pain so that its main indication is myofascial pain syndrome. This may be the reason why DN is generally easier to be accepted by western non-acupuncturists who are typically better-trained in anatomy and physiology. On the other hand, modern medicine is considered conventional in the west, so people in the west are generally familiar with the use of injectable needles, making it easier to accept DN in comparison to wet needling.

Third, DN education and training activities are extremely competitive and prevalent in the North America and the rest of the west, where non-acupuncturist healthcare practitioners typically need only 50 h or a full plate of weekend to learn the essentials of DN [7] to meet their minimum clinical practice needs. In states that have passed DN legislation, these non-acupuncturist practitioners can practice DN without the need to apply for an acupuncture license and thus not governed by strict needling regulations required for acupuncturists. This further caters to and promotes the market demand of DN for PTs and DCs.

In the United States, physical therapy is considered part of mainstream medicine and there seems to be a large clientele base for the DN practice. There are more and more PTs learning DN while the number of states that have officially added DN therapy into the PTs' scope of practice is ever growing. Up to now, the state number allowed DN has expanded to 38 of the 50, whereas there are only five states that strictly prohibit PTs to practice DN [16].

However, ever since exposing the attempts by certain DN proponents insisting DN is purely different from acupuncture, such notions have been ridiculed by an overwhelming majority of American TCM practitioners or acupuncturists. There is an ongoing debate in regard whether DN can be practiced legally without acupuncture license, especially among acupuncturists and PTs, as largely reflected in various types of DN legislation across the country. Also, a battle of public opinion opposing "illegal practice of acupuncture" and subsequent opposition of "the attempt of DN independence from acupuncture"(referred to as "anti-DN independence" movement) were launched since 2015 using different social media platforms. Several major TCM societies and associations in this country responded swiftly by immediately establishing a non-profit organization, American Alliance for Professional Acupuncture Safety (AAPAS), through advocacy, legal proceedings, research publication gathering, etc. From these perspectives, it has clearly uncovered and criticized the fraudulence attempts that proponents of DN sought to make DN independent from acupuncture so that non-acupuncturist DN practitioners could legally practice DN, bypassing the regulations of acupuncture [7].

Although DN does not use meridian theory as its underlying guiding principle and only emphasizes stimulation on MTrPs as targets, DN essentially utilizes the same filiform needles or needling methods as the classical acupuncture [4]. In this regard, DN does share similar traits with certain forms of modern acupuncture such as auricular or scalp acupuncture as well as Zhong-hua FU's subcutaneous needling (which some goes as far as calling it the new DN), that are invented under modern theories beyond the meridian theory. They are all considered as types of modern yet TCM-inspired acupuncture. Due to the same reason, it is totally incorrect to say that DN is not acupuncture simply because it does not use TCM meridian theory as the basis. Accordingly, all practitioners of DN in the United States should conform to various state acupuncture laws and regulations. That means they must first obtain qualified acupuncture training, pass state or national board exams and obtain an acupuncture license. Otherwise, they are considered "illegally practicing acupuncture without license".

However, in certain states, some compromises were reached so PTs could practice DN in a limited scope while increasing training hours of DN courses. On the other hand, some acupuncturists, who insist on mainstream acupuncture into conventional medicine, are learning various modern styles of acupuncture including MTrP acupuncture to treat myofascial pain syndrome. In response to this fluid situation, some PTs who practice DN also go through formal TCM education to obtain an acupuncture license, and begin to engage in dual training: training of MTrP acupuncture for acupuncturists and training of DN for PTs, whereas the continuing education is often around topics of "trigger point needling or acupuncture" instead of trigger point DN [3]. As one can see from the website of the Cleveland Clinic, not only do they have acupuncturists on staff, but also many non-acupuncturist DN practitioners include PTs and DCs besides medical acupuncturists or MDs [17].

2. DN: a "de-meridian" style of modern acupuncture

As the above mentioned, DN proponents in the west, nowadays frequently claim that DN is not acupuncture (de-acupuncture) as it does not use the meridian theory as a guide principle (de-meridian), and its non-acupuncturist practitioners do not need to receive the necessary training required by acupuncturists. In 2016, the authors published a pioneer paper [5] to refute this misconception, and clarified that "De-Meridian" is not "De-Acupuncture". DN is acupuncture, and at best, a form of modern acupuncture, namely, MTrP acupuncture.

So what exactly is the "de-meridian" notion of acupuncture? It has at least three kinds of manifestations [5–18]. First, it ignores the meridian theory while emphasizes locations and effects of acupoints or stimulation targets. Secondly, since no special structures beyond the known anatomical tissues can be found to prove the existence of the meridians, the meridians are merely functional connections or information pathways, and acupoints are the outputs or windows reflecting internal physiological or pathological information onto the body surface, or the terminals of inputting acupuncture treatment information on the body surface to generate effects. Thus, the stimulation targets of acupuncture need

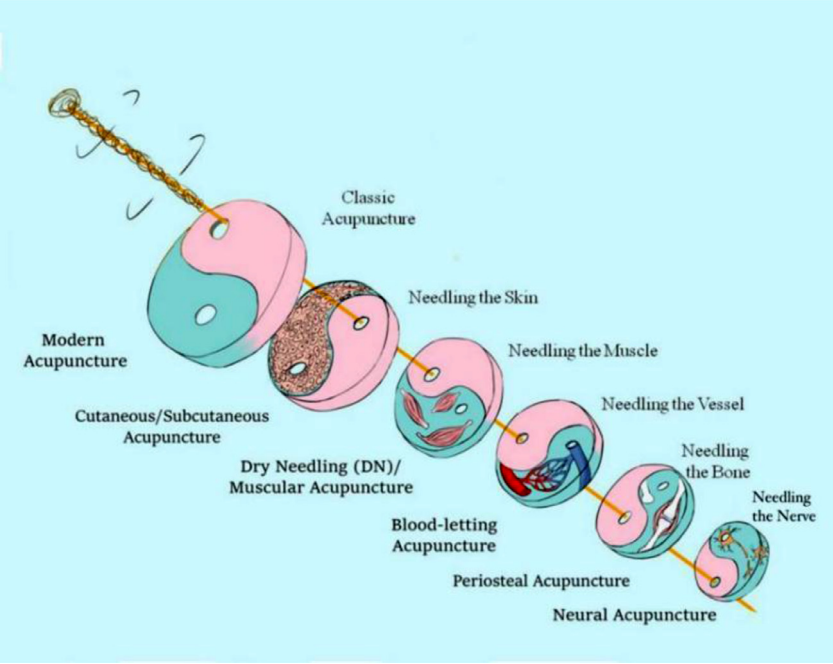

Fig. 1. Dry Needling: A form of modern acupuncture
Notes: This figure illustrated by Bonnie Xia JIN - used with permission from AAPAS www.OPAWL.us) [8].

not be confined to the positions of acupoints recorded in classical TCM publications [19,20]. Instead, one should pay attention to the presence of actual reflex zones or points for stimulation in the clinic, regardless of whether they are acupoints or located at or around the meridians. Third, it completely denies the existence or function of the meridians, and advocates that needling should abandon the meridians theory [21], while believing that acupuncture including DN remains effective as long as the stimulation target is determined based on anatomical and physiological knowledge.

Actually, according to these manifestations of the "de-meridian", there has been a similar trend in the modernization movement of classical acupuncture in China over the past few decades. However, that has never been considered as "de-acupuncture" [18]. The current prevailing of DN in the west seems to be similar to the third manifestation mentioned above, but DN proponents not only promote "de-meridian" but also "de-acupuncture", which is totally illegitimate and is the reason why it subjected to the widespread opposition of the global acupuncture profession.

In 2019, AAPAS launched a nationwide acupuncture safety education campaign called "Oppose Practice Acupuncture without License (OPAWL) contest" where the main theme was "DN=Acupuncture", which attracted many entries of acupuncturists who stand in unison in proclaiming that DN is acupuncture, or at best, a modern form of acupuncture using different nomenclature, and firmly oppose any filiform needling practice by practitioners without acupuncture license. One of the co- authors of this paper created Fig. 1 and submitted to the contest and was surprised to learn that she won a silver medal. Fig. 1 depicts a rotating acupuncture needle piercing an acupuncture point through multiple tissue layers of the body surface, which are symbolized by six three-dimensional *Taiji* diagrams.

Fig. 1 vividly illustrates that the filiform needle is the most commonly used stimulating tool in both classical and modern styles of acupuncture. The top *Taiji* piece (black fish in blue and white fish in pink) being stuck by the filiform needle represents classical acupuncture under the guidance of meridian theory (aimed at balancing the *yin* and *yang* states of the body). However, with the advancement of science and technology, the modern acupuncture theory has more details about the stimulating layers or targets within acupoints. These were termed as needling the skin, needling the muscle/tendon, needling the blood vessel, and needling the bone corresponding to the depth of related anatomical structures (the skin, the subcutaneous tissue, the muscle/tendon, the blood vessel, the periosteum and the nerve) in modern acupuncture (see the 2nd to 6th *Taiji* pieces in which the black fish is no longer the same as that in the first *Taiji* piece). The corresponding modern styles of acupuncture are the cutaneous/subcutaneous acupuncture, the DN/muscle acupuncture, the blood-letting acupuncture, the periosteal acupuncture, and the neural acupuncture. This picture clearly and concisely shows that DN is merely a style of modern acupuncture (the muscle acupuncture).

As we classified earlier [5], the stimulating targets of DN-MTrPs are actually *Ashi* points in the classical acupuncture. Both MTrPs and *Ashi* points can be detected at the body surface through touching or feeling by hands, but MTrPs are only distributed in the muscular level, while *Ashi* points can either be on the skin, subcutaneous tissue or in the muscles, sometimes even in the bone membrane [21]. When finger pressing or needling MTrPs or *Ashi* points, certain needling sensations, such as LTR or *deqi* (a needle-pulling sensation seen or felt by the acupuncturist like "fish swallowing bait") could be evoked, and propagated to the diseased region or along with the traveling course of meridian on the body surface. This is why the authors have insisted that MTrPs are just specific subsets of *Ashi* points, or more precisely, a type of somatic acureflex points (ARPs), which may explain why DN targeting MTrPs for myofascial pains could often attain good results.

Thus, one should not shy away from the fact that various "de-meridian" styles of acupuncture, including DN, are based on modern anatomy and physiology and do play a positive role in advocating for the benefits of acupuncture while helping to clarifying its mechanisms.

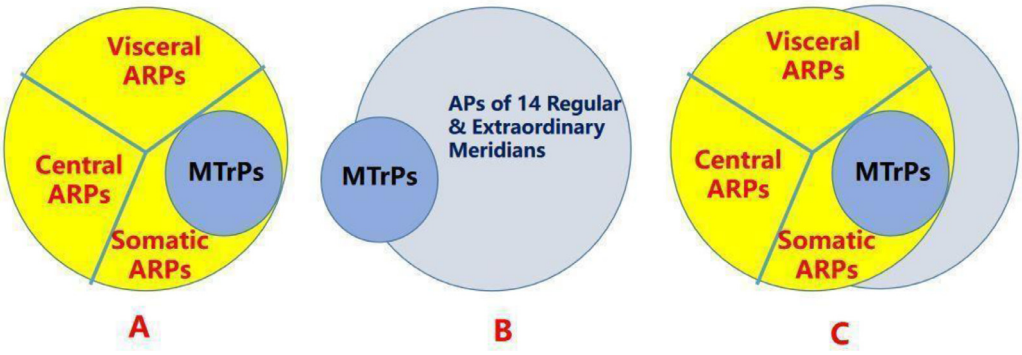

Fig. 2. The relation of acu-reflex points, myofascial trigger points and classical acupoints
Notes: A: The relation between the three types of ARPs (central, visceral and somatic) and MTrPs; B: The relation between MTrPs and APs of 14 regular meridians and extraordinary meridians; C: The relation of all the ARPs (yellow), MTrPs (blue) and classical APs(gray); MTrP: myofascial trigger point; ARP: acu-reflex points; AP: acupuncture point. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

3. Drawbacks or limitations of DN by using only MTrPs as stimulating targets

To gain insight into the necessity of inheritance and innovation of classical acupuncture from the rise of DN, we can first analyze the drawbacks or limitations of DN. Because DN refuses to inherit the meridian theory, it will miss the experience of thousands of years of classical acupuncture, limit its indications, and neglect a holistic notion in the clinic. The following are five drawbacks or limitations in its clinical application.

(1) The stimulation of DN only targets at the muscle level and neglects other layers of the body surface. In the treatment of myofascial pain, DN only selects MTrPs as the sole stimulation targets. However, local positive reflex points of myofascial pain can also be found in the skin, subcutaneous tissue and even the periosteum. Moreover, MTrPs are not the only manifestation of the reflex points for muscle disorders, other manifestations such as regional skin temperature changes also frequently occur. These positive reactions are very important to capture needling targets. Therefore, in the treatment of muscle disorders, the stimulation targets of DN should not be solely limited to the taut bands or hardened knots within the muscle layer. (2) The optimal stimulation targets for treating myofascial pain should not only be limited to the local affected area, but also those in the distal areas of the body. The reflex points of myofascial pain can frequently be found locally, including MTrPs, but also in the tissue structures of the distal or contralateral parts of the body. In other words, for myofascial pain, although performing DN on the MTrPs of the affected part can achieve good effects, it is not necessarily the most optimal needling way. There are at least four other needling options available: the resistance needling, the wrist-ankle needling, the nerve trunk (point) needling, and the *juci*/*miuci* (contralateral needling). Stimulating only local MTrPs is clear indication for DN to lack holistic view in the target selection process. (3) Oftentimes joint inflammations coexist with myofascial pain. When they do occur, it is necessary to find and stimulate ARPs of other tissues (such as joint cavity or ligament) beside the muscle. For example, various ARPs may appear near the acupoints located at joints, such as Xiyan(EX-LE5), Jianyu(LI15), Shaohai(HT3), Baliao (bilateral Shangliao[BL31], Ciliao[BL32], Zhongliao[BL33] and Xialiao[BL34]). The trigger point theory focuses only on MTrPs at the myofascial sites, not on ARPs within affected joints. This greatly limits the efficacy of DN in the treatment of various complex somatic pains. For example, for knee osteoarthritis coexisting with myofascial pain in the leg, direct insertion of the needle into the articular cavity through EX-LE5 is critical to attain great results, yet it is not a MTrP. (4) There is a vague understanding of the underlying mechanisms of MTrPs, and the improper distinction between latent and active MTrPs. For example, MTrPs can also come from non-muscle disorders (certain visceral disorders that have visceral-somatic reflexes, such as acute appendicitis). It is also difficult to distinguish between so-called latent and active, and perhaps a better and more proper distinction is to rename them as physiological and pathological because MTrPs can occur not only under diseased state/pathological conditions, but also under physiological conditions [19]. (5) The mechanism for generating LTR during DN stimulation is poorly understood. According to the MTrP theory, LTR is induced when the end-plate potential is released by DN, this is both inaccurate and incorrect. The commonly observed LTR during needling can be caused by three different mechanisms: the stretch reflex induced by stimulating the muscle spindle, the flexor reflex induced by pain stimulation, and the muscle contraction (an effect caused by directly stimulating the motor nerve trunk or the motor points) [19].

In short, the authors believe that needling MTrPs in muscles can be used to treat not only local myofascial pain but also other distal somatic or visceral diseases through nerve reflexes. Even for the local treatment of myofascial pain, it is possible to select and stimulate various positive ARPs across different layers of the body (skin, muscle, tendon, periosteum, joint, nerve trunk, etc.) as targets, not just MTrPs, under the guidance of a holistic view that is "body surface-body surface correlation" or "body surface-visceral correlation". The authors have long suggested that pathological ARPs, a set of spots or acupoints on or near the meridians that can induce specific local and systemic reflex responses, on the body surface can be divided into at least three categories: somatic, visceral, and central. MTrPs primarily belong to local somatic ARPs, while others are considered distal somatic ARPs (Fig. 2). For the treatment of somatic pain, there are often other and somewhat better options (including using distal somatic ARPs in addition to local somatic ARPs like MTrPs). The author's clinical experience has shown that many patients who first used MTrPs DN treatment but did not receive expected outcome, often received better results after distal or other somatic ARPs are found and stimulated.

4. Inspirations from DN on the inheritance and innovation of classical acupuncture

The rapid rise and popularity of DN in the west has provided two important inspirations for the development of acupuncture today. First, for the rapid integration of acupuncture into mainstream medicine, the principles of acupuncture therapy must be able to be comprehended in a modern context, and the whole process of acupuncture therapy, including the selection of the stimulation tar-

get, the control of the stimulation amount, and the correct assessment of the efficacy, must be able to scientifically guided. Secondly, the heritage of classical acupuncture techniques that have already had a thousand years of clinical experience should be inherited and not simply discarded. The latter point is evident from the analysis of the drawbacks or limitations of DN in the previous section. Especially important, although it has been recognized that the meridians are not special anatomical tubes, their core recognition of the "body surface-body surface correlation" or "body surface-visceral correlation" between the various parts of the body is rational and still of great value in guiding clinical acupuncture.

In recent years, there are more clinical studies involving DN than ever before, some of which are extreme high-quality studies for the acupuncture profession's reference. Here, let's take a randomized clinical trial of DN for neck pain by Martín- Sacristán et al. [22] (refers to Martín-Sacristán's trial) as an example to see the importance of inheritance and innovation in the development of acupuncture, though the sample size of the trial is relative small. Martín-Sacristán's trial was published in the *Scientific Reports*, 2022, compared the efficacy of deep dry needling (DDN) on active MTrPs versus latent- MTrPs versus non-MTrP locations, for pain reduction and cervical disability, in patients with chronic neck pain. The study had a sample of 65 patients who were divided into non-MTrP-DDN, active-MTrP-DDN and latent-MTrP-DDN groups, respectively via a randomized and double-blind design. Only one session of DN was administered for each group. Changes in the visual analog scale, patient pain reproduction, LTR frequency, pressure pain threshold and neck disability index were assessed before, during and after the intervention and at 1-month post-intervention.

4.1. Refining the stimulation targets of acupuncture

The first step in the application of acupuncture is to select stimulation targets: acupoints. Classical acupuncture views acupoints as fixed sites situated along the traveling courses of regular meridians on the body surface. Any spots that are considered offsite from these classical recognized locations are considered non- acupoints, not to mention the fact many of them are nowhere near the traveling courses of meridians, even those that are on the courses but slightly deviate from the fixed locations are not considered the original acupoints. Otherwise, *Compendium of Acupuncture and Moxibustion* by Ji-zhou YANG of the Ming Dynasty would not have forewarned that "rather missing acupoints than the meridians", and thousands of novel and extraordinary points would not have been discovered since that time. In the case of the Zusanli (ST36), for example, there are now some novel points in its vicinity, such as Erliban (0.5 *cun* superior to ST36), Wanli(0.5 *cun* inferior to ST36), and appendix point (1–2 *cun* inferior to ST36) [19].

Although the perception that acupoints have fixed locations has been repeatedly questioned or challenged by certain modern acupuncturists, such as Prof. Jia WEI 's distinction between "dynamic and static points" [23] and the authors own concept of ARPs and acu-reflex zones (ARZs) [19]. To date, most clinical trials of acupuncture distinguish acupoints and non-acupoints by whether they are in fixed locations of the meridians. Moreover, those trial designs rarely consider what layers of tissue structures that may be stimulated within the acupoint, and most trials only indicated the inserting depth of needle, which usually cannot specify what tissue punctured, especially in terms of their different needling effects. Even though some current studies begin to assess how different depths of needling may produce different effects (e.g. deep versus shallow needling). For example, when setting up a sham acupuncture control group, performing shallow needling on certain non-acupoints (those that are not on any meridians) are often considered sham acupuncture [24], however, further refining stimulation targets at different depths to account for the difference or impact of needling effects remains to be explored.

Considering Martín-Sacristán's trial again, one can see that it has a very clear and refined classification of stimulation targets: active MTrPs, latent MTrPs, or non- MTrP sites. Active MTrPs are those that cause spontaneous pain or specific pain during movement, stretching or compression. Latent MTrPs are usually asymptomatic, but they produce pain or discomfort when they are compressed. In this trial, selected non-MTrP sites were asymptomatic of any type and were at least 2 cm away from other latent MTrPs selected in the upper trapezius muscle.

As classical acupuncture is often difficult to know which part or layer of anatomic tissues were needled, their stimulation targets are generally more complex than those of DN, which mostly target the MTrPs in the muscles. For example, when needling acupoints at muscular areas, the tissues of the body surface that can be stimulated by the needle tip or body has at least six levels from outside in: skin > subcutaneous tissue > muscle or tendon (including deep fascia) > nerve trunk or its branches > blood vessels > periosteum. Because the morphological basis of needling sensation is the receptors and nerves innervating acupoints, the anatomical levels of and receptors within acupoints should be familiar. The efficacy of acupuncture and its repeatability would not be ensured unless the selection and determination of the stimulation target, mode, amount, and corresponding effects could be considered from different tissue levels within acupoints.

4.2. Recognizing the essence of acupoints

A large number of forms or techniques of modern acupuncture (including DN) have demonstrated that the selection of tender points or sensitive points (which the authors call ARPs) is a key to improve the efficacy of acupuncture, and most ARPs appear in the locations of regular meridians while some may appear at extraordinary points, so they generally overlap. The same is true for the relationship between acupoints and MTrPs, which are local somatic ARPs, their distribution partially overlaps. Melzack et al. found a remarkably high degree (71%) of overlapping between MTrPs and acupoints [25], while Dorsher P. found 92% of the 255 MTrPs overlap with acupoints [26].

In other words, at least 70% to 90% of acupoints may show positive manifestations of MTrPs. The criteria to determine so-called active MTrPs in Martín- Sacristán's trial must have any two of these positive manifestations: a palpable hardened nodule (taut band), a hypersensitive site on pressure, referred pain and the reproduction of any of the symptoms experienced by the patient with perceived pain. On the other hand, ARPs encompass all MTrPs of DN and *Ashi* points in classical acupuncture. In a review article [27], Hong CZ correlated the tender points with *Ashi* points and also correlated LTR to *deqi* based on the work of Melzack et al. Indeed, Fig. 2 vividly illustrates the relationships among ARPs, MTrPs and acupoints (APs).

Martín-Sacristán's trial compared the effects for pain relief and cervical mobility in the patients of chronic cervical disorders receiving one-time DDN across several groups of MTrPs: active-MTrPs, latent-MTrPs and non-MTrPs on the trapezius muscle. The results showed that the stimulation of active MTrPs with positive manifestations had the more optimal effect. It was found that although the pain intensity, neck disability index and pressure pain threshold were equally improved for all three groups instantaneously post-treatment. However, at 1-week and 1-month post-treatment, the active-MTrP group showed greater improvement in pain reduction compared to latent-MTrP group or non-MTrP group.

This result of the trail once again provides solid evidence for the first formula of acu-reflex point acupuncture (rather miss the meridians and acupoints than miss the reflex phenomena) pro-

posed in the authors' 2007 book *Contemporary Medical Acupuncture: A Systems Approach* [20]. In other words, as long as an ARP is found and stimulated, no matter if it is lodged at or near the classical meridians, it will take effect, and may even be better than stimulating a non-ARP acupoint in the long run [19].

In short, DN, which primarily takes MTrPs (a form of somatic ARPs or acupoints) as the targets of stimulation, hints that acupoints are essentially the terminals at the body surface that are reflexively connected to the internals of the body. In other words, the basic property of acupoints seems connecting the internals and the externals of the body by reflexes from the perspective of systems medicine [28].

4.3. Establishing indicators of stimulus amount and objective assessment of efficacy

Paging through most of the current clinical studies of acupuncture, one can observe an interesting fact that except for electroacupuncture, which has a strict control protocol of various stimulation parameters, studies involving manual acupuncture often lack quantitative norms. At most, there are only a few general provisions on stimulation duration, needle-retention duration, treatment frequency, and a general classification of the manipulation strengths (light, mild or strong). The classical reinforcing and reducing needle manipulation technique, can only add another layer of mystery to the stimulus amount of acupuncture unless the true definition of reinforcing and reducing is revealed. There is also a lack of detailed description of the stimulation response under the needle, which is one of the most important indicators of the stimulus amount. At most, many studies only simply refer to needling sensation as *deqi* or present a few texts on the nature of needling sensations felt by the subjects. Moreover, the assessment of therapeutic efficacy is mostly completed by acupuncturists themselves.

In Martín-Sacristán's trial, there are some good designs in these aspects. Not only does the study have a clear and refined classification protocol for all the stimulation targets, but also has an objective description of the stimulation response to MTrPs, which is LTR. Precise needling of the MTrPs induced a brief contraction followed by relaxation of the muscle fibers, which is exactly what LTR is, an equivalence of *deqi* from classical acupuncture. The LTR number induced was evaluated as a clear quantitative indicator by the DN practitioner who provided up to 12 treatments (ins and outs) (n/12) at a frequency of 1 Hz in the MTrP or the non-MTrP.

This study also quantified the pressure pain test on MTrPs. Pressure pain is defined as the minimum pressure that induces pain or discomfort with a 1 cm^2 rubber disk. Pressure is applied at a rate of 1 kg/s. Three consecutive tests were practiced on the active, latent and non MTrP of the upper trapezius muscle at 30 s intervals before and immediately after the intervention.

The random, double-blind design of this trial was so strict that not only did patients not know which of the three intervention groups they were randomly categorized, even the DN practitioner did not know (actually, it is nearly impossible completely blind all parties for any needling procedure), that is, the evaluator therapist marked on the skin of each participant the place where the DN practitioner not knowing which group each of the participants belonged to. The assessment of efficacy was also completed independently by a third party other than the evaluator therapist, to avoid personal bias in the therapist's assessment of his or her own methodology. Such a scientific research design, regardless of its outcome, makes its entire operation easily repeatable by peers and critics.

Presently, most current clinical trials of acupuncture are often difficult to be replicated by peers or critics due to a lack of concrete descriptions on stimulation targets in the selected acupoints, along with an unclear indicator for the stimulus amount. Certainly, certain modern styles of acupuncture have begun to focus on indicators of needling dose and reactions under the needle, such as the *Xingnao Kaiqiao* (resuscitating the brain and opening the orifices) needling method requiring the muscle or limb to jerk when the nerve trunk innervating the muscle or limb is needled [29], as well as having an electric shock sensation in the nasal cavity when *Xinwu point* (sphenopalatine ganglion) is stimulated [30]. However, in clinical studies of acupuncture, there are many designs in need of further improvement. For example, when needling ST36, the needling sensations that propagate to the foot or the abdomen (*qi* arriving at the affected site) should be an indicator of an appropriate amount of stimulation; same can be said for the occurrence of the flush (erythema) around the needling site has been used as an index during cutaneous acupuncture, and so on [19]. In the assessment of efficacy, it is important to get rid of possible misjudgments that may be caused by researchers' own preferences or ways of doing things. Letting a third party do the assessment independently is the best.

4.4. The meridian theory is not the only and absolute theory to guide acupuncture

The effectiveness of DN also suggests that the importance of meridian theory in guiding acupuncture should be properly valued. There is no dispute that the meridian theory is a time-tested guide with great significance for clinical acupuncture because the essence of the meridian is "body surface-body surface correlation" and "body surface-viscera correlation". It has accumulated a wealth of experience in this regard, and inheriting the meridian theory is conducive to improving the efficacy of acupuncture. However, DN is similar to other novel needling therapies created in modern times, such as scalp acupuncture, wrist/ankle acupuncture, and nerve trunk acupuncture, where most of them are also effective without the guidance of the meridian theory. This suggests that the meridian theory is not the only and absolute theory to guide clinical acupuncture.

Since no specific structures beyond the tissues recognized by anatomy have been found to exist at acupoints, and all needling effects can be cut off once the afferent of acupuncture is blocked, it is now generally accepted that the basis of acupuncture therapy is the reflex arc [19]. The response to acupuncture stimulation is the reflective effect caused by stimulating the locally existing receptors and the corresponding nerve (afferent or efferent) branches. The so-called meridians are nothing more than a plain expression of the pathways of information exchange between different body parts or between the internal organs and the body surface under ancient circumstances [19].

Various forms of modern acupuncture, through the anatomical and physiological studies on the receptors of stimulation targets at the body surface, the afferent, the centers, and the effector, can often yield an efficacy that is comparable or even better than that of classical acupuncture, and may even have a better reproducibility of efficacy because it knows what it is. This is the basis for the rise and development of various "de-meridian" modern styles of acupuncture, including DN.

4.5. The theory and experience of classical acupuncture must be inherited, and not discarded

Inheriting the theory and experience of classical acupuncture that have been undergone over several centuries is of great significance to improve the efficacy of acupuncture. Its role includes at least two aspects: first, broadening the idea of acupoint selection; second, choose more stimulation means or methods, which can either be used alone or in combination. As DN does not consider itself a style of acupuncture and is completely cut off and de-

tached from the millennium-old classical acupuncture, it not only lacks holistic treatment thinking, but also its stimulation target is limited to the affected muscles, as well as having only a very narrow scope of indications: the myofascial pain.

We can re-examine Martín-Sacristán's trial as an example. According to the DN experience in the treatment of myofascial pain syndrome, the selected stimulation target in this trial is only on the trapezius muscle. Of course, this is based on the suggestion that MTrPs could be responsible for the development of pain in patients with mechanical neck pain. Moreover, some studies have observed that the prevalence of MTrPs in patients with myofascial pain was 93.75% for the upper trapezius muscle, the most prevalent muscle to observe MTrPs [31]. The trial found that the active MTRP group had an increase in pain first immediately after the DN treatment, and it was only at 1-week post-treatment that this same group had the greatest pain reduction. In the clinic of acupuncture, such a post-needling reaction is a common phenomenon of microtrauma caused by local needling in the affected part. Bleeding was reported to be the most common minor adverse effect presented in 16% of DN procedures [32].

According to the accumulated experience of clinical acupuncture in the treatment of neck pain for the past few centuries, there are many distal acupoints (including acupoints on non-muscles) that can be selected, such as Xuanzhong (GB39) in the lateral area of the leg and Waiguan (TE5) on the lateral side of the forearm [19]. Such distal acupoints for neck pain are not only to avoid the instantaneous increase of post-needling pain in the affected area, but also to achieve significant long-term curative effects. In 2011, in order to expand the idea of selecting acupoints in treating neck pain, some researchers checked the relevant contents of acupuncture treatises of neck pain in 12 ancient textbooks [33]. By sorting the acupoints according to the 14 meridians, they found that the most common acupoints for neck pain in ancient times were at the foot *taiyang* bladder meridian, having a total of 14 acupoints. Other common meridians include the foot *shaoyang* gallbladder meridian (13 acupoints), the hand *taiyang* small intestine meridian (10 points), governor vessel (9 acupoints) and the hand *shaoyang san jiao* meridian (6 acupoints). There are two acupoints in conventional vessel, and only one acupoint in each of the remaining seven meridians. It is concluded that the acupoints for neck pain are mainly located in the *taiyang, shaoyang* meridians and governor vessel, but are related to all the 14 meridians.

Most of these acupoints are located far from the neck region, so usually are not targets of DN stimulation, but classical acupuncture may select them following the principle of "selecting acupoints along the meridians"(Wherever the meridians pass, indications are present). In fact, in modern acupuncture clinics, even if certain practitioners are not quite familiar with the meridian theory, the experience of using these distal acupoints to treat neck pain is still helpful in treating neck pain.

In addition to those hidden beneath the meridian theory, there are also valuable experiences can be gained by studying contralateral needling theories or five-body needling methods, which are excellent treatment modalities stand-alone and are great ideas for treating myofascial pain syndrome, the main indication of DN. Nowadays, in the west, non-acupuncturist DN practitioners often claim DN is a new technique and not acupuncture, in essence, trying to disassociate the needling with the rich acupuncture experience.

In addition, DN therapy defines its indications merely as myofascial pain, which also reflects its shallow understanding of the needling effect at MTrPs of the muscles. In classical acupuncture, the acupoints that can result in *deqi* (i.e., LTR in DN) are mostly located in the muscle. Stimulating them not only can treat local or distal somatic pain, but also can treat related visceral and central diseases. Therefore, as long as non-acupuncturist DN practitioners re-recognize that DN is a part of acupuncture, and the MTrPs are just acupoints in muscles, as well as learn more from the millennium-old classical acupuncture, its curative effect will be further improved, and its indications will be greatly broadened.

All in all, the rise and popularity of DN in the west during the past two decades is a significant manifestation for the global acupuncture fever. Although DN proponents tried to make it independent from acupuncture so that non-acupuncturist DN practitioners could get around regulations of acupuncture laws, DN, after all, remains a form of modern acupuncture, with a "de-meridian" characteristic. Not only was it inspired by acupuncture, but the operations of DN and the explanation of its mechanism mostly followed the methods and research results of acupuncture.

However, ever since its inception, DN has stood tall at the gate of modern physiological anatomy for its recognition of stimulation targets and stimulation methods, which makes its scientific research and clinical advocacy seem credible. This can be seen as an important inspiration for the development of acupuncture or its global fever, that is, the scientific interpretation of the principles of acupuncture must be imperative. The authors believe the development of acupuncture is totally inseparable from its theoretical and technical innovations. On the other hand, DN do have a series of drawbacks or limitations that suggest that in order to innovate novel concepts in acupuncture, one shall first properly inherit and learn from the valuable experience accumulated in the millennium-old development of classical acupuncture, including the rational core of meridian theory. In other words, the motto of a revitalizing modern or contemporary acupuncture development should be to appreciate and inherit the lost teachings of the ancient sages or books, but always be open minded to learn new skills of today and forge ahead a new path to a better, healthier tomorrow.

Ethical statement

Not applicable.

Data availability

Not applicable.

Declaration of Competing Interest

The author has no competing interests to declare.

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