



# Dry needling versus acupuncture: the ongoing debate

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## ABSTRACT

Although Western medical acupuncture (WMA) is commonly practised in the UK, a particular approach called dry needling (DN) is becoming increasingly popular in other countries. The legitimacy of the use of DN by conventional non-physician healthcare professionals is questioned by acupuncturists. This article describes the ongoing debate over the practice of DN between physical therapists and acupuncturists, with a particular emphasis on the USA. DN and acupuncture share many similarities but may differ in certain aspects. Currently, little information is available from the literature regarding the relationship between the two needling techniques. Through reviewing their origins, theory, and practice, we found that DN and acupuncture overlap in terms of needling technique with solid filiform needles as well as some fundamental theories. Both WMA and DN are based on modern biomedical understandings of the human body, although DN arguably represents only one subcategory of WMA. The increasing volume of research into needling therapy explains its growing popularity in the musculoskeletal field including sports medicine. To resolve the debate over DN practice, we call for the establishment of a regulatory body to accredit DN courses and a formal, comprehensive educational component and training for healthcare professionals who are not physicians or acupuncturists. Because of the close relationship between DN and acupuncture, collaboration rather than dispute between acupuncturists and other healthcare professionals should be encouraged with respect to education, research, and practice for the benefit of patients with musculoskeletal conditions who require needling therapy.

## INTRODUCTION

Western medical acupuncture (WMA) is a therapeutic modality involving the insertion of solid filiform needles. It is a modern adaptation of traditional acupuncture (TA) using current biomedical understanding and research evidence.<sup>1</sup>

WMA is widely practised by conventionally trained healthcare providers including physicians, chiropractors, and physical therapists (PTs).<sup>1</sup> Although WMA is relatively commonplace in the UK and Sweden,<sup>1</sup> a particular approach called dry needling (DN), which is mainly practised by PTs, is becoming increasingly popular in other major western countries.<sup>2–4</sup> WMA, DN and TA are all needling procedures that involve penetration of the skin with solid filiform needles with therapeutic intent. DN is a technique that PTs and other healthcare professionals use to treat various painful conditions of the musculoskeletal system, usually myofascial pain syndrome,<sup>4</sup> whereas TA is a technique used by professional acupuncturists. Compared with DN, both TA and WMA have a broader range of indications including musculoskeletal pain, and gastrointestinal and neurological disorders.<sup>1–5</sup> Patients and healthcare professionals may be confused about the relationship between DN and acupuncture as they seem to share similarities and yet may differ in certain aspects. Currently, little information is available from the literature regarding the similarities and differences between these two needling techniques. In this article, we aim to: (1) explore the professional controversies surrounding the practice of DN; (2) review the origins, theory, and practice of DN and acupuncture; and (3) seek potential solutions in response to the ongoing debate.

## THE ONGOING DEBATE

The dispute about the legitimacy of DN practice by healthcare professionals who are not physicians or acupuncturists has been ongoing now for more than a decade, particularly in the USA. Here, we focus on the debate between acupuncturists and PTs regarding DN practice. Acupuncturists oppose the practice of

DN by PTs because they perceive DN to be a form of acupuncture, which they feel should not fall into the scope of practice of PTs and other practitioners, such as chiropractors. They also argue that, with minimal training, PTs are unlikely to be able to master the technique and thus may endanger patient safety and wellbeing.<sup>6</sup> In response, PTs claim that DN is not acupuncture<sup>3</sup> because, although both acupuncture and DN are needling techniques, DN is based on modern biomedical science rather than TA theories or terminology.<sup>3</sup>

However, DN and acupuncture clearly overlap to some extent in view of their most common indication (musculoskeletal pain) and their use of solid filiform needles.<sup>3,4</sup> Additionally, with the single exception of cases of pneumothorax due to inappropriate and/or unlawful practice, which is also reported in acupuncture practice,<sup>7-9</sup> no significant patient safety events have been reported in relation to the practice of DN. Thanks to accumulating evidence for its applicability, utility, and lack of side effects (which are minimal to none), the practice of DN is becoming increasingly popular among conventionally trained healthcare providers around the world, especially among PTs in the USA.<sup>2-4</sup> DN is the de facto practice of PTs in many countries and states across the USA, yet it is unavailable in others, which further convolutes the debate of who can and should practise DN.<sup>3</sup>

The other argument lies in the training of PTs in DN.<sup>6</sup> The practice of acupuncture by trained clinicians requires enhanced experience. In most states and countries, the practice of acupuncture requires hundreds and often thousands of hours of acupuncture education in specialised educational programmes. In the USA, the practice of acupuncture requires state licensure, which is based on passing national level examinations and maintaining good professional records. The practice of acupuncture is governed by the acupuncture or medical board of the state education department in most states across the USA.

By contrast, current training of DN for PTs in the USA is done only through continuing education or certificate programmes, which are not strictly regulated and have few (if any) standards that need to be complied with.<sup>3,6</sup> With these non-formal training programmes in DN, acupuncturists argue that PTs' exposure, experience and skills in needling therapy are likely to be limited.<sup>6</sup> Additionally, evaluation systems for the practice of DN by PTs are currently unavailable, and standards for healthcare governing administrations and policymakers are not yet established.

## DRY NEEDLING

### History of DN

DN, subtypes of which include related techniques known as intramuscular stimulation or trigger point needling, refers to the use of either solid filiform needles or hollow-core hypodermic needles for the

treatment of muscular pain. Although some PTs claim that DN was first developed in the 1940s by Janet Travell, little evidence exists to support this statement.<sup>4,10</sup> In *Myofascial pain and dysfunction: the trigger point manual*, Travell and Simons<sup>11</sup> summarised the key elements of the DN technique as: (1) use of a needle of sufficient length to reach the contraction knots in the trigger points without any preference for needle diameter (range 0.3–3.4 mm); and (2) use of an aseptic technique via careful cleansing with a suitable antiseptic (usually alcohol wipes). Travell and Simons<sup>11</sup> did not mention any specific type of needle used in DN when they proposed that it was as effective as local lidocaine injection in relieving trigger point pain; however, they did mention that 'DN' would induce post-injection soreness, which might be more severe and last for a longer period of time than the injection of lidocaine. Thus, the needle that they were referring to is more likely to have been a hypodermic needle, rather than an acupuncture needle.

Further evidence that the origin of DN involved the use of hypodermic needles for the treatment of myofascial pain is provided by findings of a review of DN history. The earliest reference to 'DN', as per Legge,<sup>10</sup> was in an article about low back pain in 1947 when Paulett<sup>12</sup> reported that 'DN' and injecting saline both relieved pain. In 1952, Travell and Rinzler<sup>13</sup> explored the origins of myofascial pain, and commented that effective treatment of myofascial pain might include DN. The needles used in these early publications related to DN were likely to have been hypodermic needles, as injection of saline or local anaesthetic was simultaneously mentioned and compared.<sup>11-13</sup> Nonetheless, the earliest available study directly identified using the search term 'dry needling' in PubMed was authored in 1979 by Lewit,<sup>14</sup> who used acupuncture needles in DN practice. He found that DN produced immediate, complete analgesia of the painful spot without hyperaesthesia for patients with myofascial pain. Based on these results, Lewit<sup>14</sup> reported that the therapeutic effects of needling in myofascial pain originated from the mechanical stimulation of the needling per se and was due to neither the anaesthetic nor the sclerosing solution. In 1980, Gunn *et al*<sup>15</sup> recommended the manipulation of acupuncture needles to produce a grabbing sensation in patients with trigger point pain. Gunn *et al*<sup>15</sup> reported that the techniques were inspired by TA and that DN had powerful therapeutic effects for patients with chronic low back pain. Development of DN was limited in the 1980s and 1990s as indicated by the limited number of publications (<30) in the literature during this period.<sup>10</sup> However, since the 2000s, interest in DN has resurged as healthcare professionals, especially PTs, have begun to recognise the beneficial effects of DN on pain.<sup>2-4,10</sup> Currently, DN is practised by many healthcare professionals in Europe, Australia, more

than half of the states across the USA, and in many other countries.<sup>2-4 10</sup>

### Theory of DN

The use of DN is based on an understanding of human anatomy and physiology regarding myofascial pain and trigger points.<sup>4</sup> Theories regarding DN involve various neurophysiological mechanisms,<sup>1 4</sup> which are indirectly supported by an expanding volume of clinical research. Between 1980 and April 2015, almost 200 publications were retrievable by a PubMed search using the term 'dry needling'. The majority of this literature reports on the therapeutic effectiveness of DN using solid filiform needles for various types of musculoskeletal pain.<sup>16-18</sup> Within the available meta-analyses, one study reported that DN treatment of myofascial pain in the lower back appeared to be a useful addition to standard therapies,<sup>17</sup> and another study found that DN was an effective intervention for upper-quarter myofascial pain, which decreased immediately after treatment and at follow-up at 4 weeks.<sup>18</sup> Since the most recent meta-analysis,<sup>18</sup> 20 new articles involving DN had been indexed in PubMed by April 2015. Almost all of them have reported that DN is effective for specific types of musculoskeletal pain.

### DN procedure

In general, DN techniques can be divided into superficial and deep techniques.<sup>3 4</sup> In superficial DN, needles are inserted superficially (around 5–10 mm) into tissue above the underlying trigger points.<sup>4</sup> After retention for a short time (30 s to 3 min), the needle is removed and the pain is expected to be greatly relieved. If residual pain occurs, the procedure can be repeated another two to three times. Other superficial needling techniques exist too. For example, Fu's superficial needling involves insertion of needles at an angle of 20–30° without penetrating the muscle.<sup>4</sup> In the newly evolved wrist and ankle needling, the needles are inserted almost horizontally at the wrist and ankle within the connective tissue layer between the muscle and skin.<sup>4</sup> As the needle is inserted and manipulated in the superficial layer of the body, no muscle twitch is expected.<sup>4</sup> In deep DN, needles are inserted deep into the tissues directly toward the trigger points in order to reach them.<sup>4</sup> 'Sparrow pecking', whereby solid filiform needles are manipulated in and out of each trigger point to elicit a local twitch response, is commonly used with treatment regimens typically consisting of a course of three or more treatments, given once a week.<sup>17</sup> Although Dunning *et al*<sup>4</sup> states that needles (one or more) are left in situ for between 10 and 30 min, DN practice by PTs is typically 'fast-in and fast-out', often described as 'pistoning', and does not usually involve needle retention.<sup>2</sup> Most studies do not specify the angle of needle insertion, but the conventional

needling technique usually involves perpendicular penetration of the skin.<sup>17</sup>

## ACUPUNCTURE

### History of acupuncture

DN has been intertwined with acupuncture since its inception. Meta-analyses of acupuncture or DN for myofascial pain have included studies in both fields in order to decrease bias and strengthen the validity of the results.<sup>16-18</sup> Results of research into the effects of needling can often be applied to both DN and acupuncture. The term acupuncture originally referred to the ancient healing technique originating from China 2000 years ago, which has been widely practised all over the world as a professional practice in the field of complementary and alternative medicine. TA involves the stimulation of specific points on the body, based upon the theoretical 'meridian' concept, via penetration by solid filiform needles.<sup>5</sup> Original acupuncture instruments were made from so-called bian stones. With the introduction and application of iron instruments, bian stone needles were replaced by medical needles made of metal. Acupuncture theories and techniques have been expanded and optimised by the contribution of acupuncturists of the various time periods throughout history. Since the inception of Chinese culture, acupuncture has been used as one of the major tools for the restoration and maintenance of health in China.<sup>5</sup>

Acupuncture likely emerged in the USA in the late 1800s when large numbers of Chinese workers migrated to the west coast to build railways; however, it made its official debut in 1971 when journalist J Reston<sup>19</sup> published an article in the New York Times describing his personal experience with acupuncture, followed by the visit of US President Nixon to China in 1972. In the UK, physicians were reported to have been needling tender points to relieve musculoskeletal pain in the 1800s, and interest in acupuncture surged in the 1970s.<sup>1</sup> Ever since then, acupuncture has become more and more popular in major western countries.<sup>1 20</sup> Due to its growing popularity and an accumulation of research evidence, acupuncture, particularly WMA, has been widely integrated into the practice of conventional healthcare in major western countries.<sup>20</sup>

### Theories of acupuncture

Classical theories and principles of point selection in TA are based on historical concepts of balancing Yin and Yang and dredging 'meridians'. Such theories are used to differentiate TA from WMA. Nowadays, both classical theory and modern biomedical sciences are included in the education of acupuncturists in China and around the world. Besides TA, the contemporary version, WMA, which is based on the understanding of human anatomy, physiology, and pathology, is also widely practised, especially among physicians and other healthcare professionals.<sup>1 15</sup> One example of

WMA is peripheral neuromodulation, in which practitioners stimulate somatic nerves in order to influence autonomic nerves (via somatovisceral reflexes).<sup>21 22</sup>

A special category of acupuncture points are the *ah shi* (translated as 'ouch') points, which include acupuncture points that are tender to touch or pressure, with a similar definition to trigger points. Dorsher<sup>23</sup> reported that the distribution of trigger points has a 95% overlap with acupuncture points in the treatment of pain disorders. Thus, in pain conditions, trigger points may represent similar (if not the same) physiological phenomena as acupuncture points.<sup>23</sup>

#### Acupuncture procedure

Acupuncture involves many different techniques with various types and lengths of needles depending on the condition and the acupuncture point location. The commonly used procedure for musculoskeletal pain involves *ah shi* points with treatment protocols similar to DN but with needle retention. Traditionally, acupuncture point selection and treatment is based on 'syndrome differentiation', which incorporates inspection (including the tongue), palpation (including the pulse), and systematic inquiry. This is the process that many acupuncturists and Traditional Chinese Medicine practitioners use to generate a traditional diagnosis, treatment principle and plan.<sup>24</sup> Acupuncturists usually emphasise *de qi* sensations during treatments.<sup>25</sup> *De qi* refers to a composite of sensations including local muscle twitches and propagation of sensation upon needling.<sup>25</sup> Historically, *de qi* sensation has been considered to be the foundation for the therapeutic effectiveness of acupuncture for pain,<sup>25</sup> and this is supported by research demonstrating that the stimulation of A-delta afferent nerves that is associated with the *de qi* sensation<sup>26</sup> is important in mediating the clinical effects of acupuncture.<sup>27</sup>

Most acupuncture procedures last 30–45 min and involve a perpendicular needle insertion. It is worth noting that during the same time period that DN was developing in the western world, Professor Dinghou Lu and colleagues at Beijing Sports University strongly advocated needling at tender (*ah shi*) points using an oblique angle, as this gave better therapeutic effects in myofascial pain compared with vertical needle insertion.<sup>28</sup>

#### NEEDLING EFFECTS IN THE MUSCULOSKELETAL SYSTEM: THERAPEUTIC MECHANISMS

During the past two decades, tremendous progress has been made investigating the mechanisms of action underlying the effects of needling on the musculoskeletal and nervous systems. Besides the widely recognised gate control theory and regulation of the endogenous opioid system,<sup>1</sup> two other major findings worth noting are the regulation of the purinergic signalling system and stretch-like needling effects in the musculoskeletal system.<sup>29–31</sup> Researchers in China and

the USA have demonstrated that acupuncture induces an immediate local increase in adenosine (part of the purinergic signalling pathway) in both humans and animals.<sup>29 30</sup> Adenosine has not only been found to be involved in pain modulation, but is also a vital source for energy for muscles.<sup>32</sup> Interestingly, besides pain relief, needling of muscle has been found to increase muscle strength and improve the range of movement at joints.<sup>33–35</sup> These effects of needling are suggested to be similar to those of stretch in physical exercise. Langevin *et al*<sup>31</sup> reported that acupuncture functions like physical stretch, activating fibroblasts that trigger signal transduction pathways at the molecular level. Fibroblasts not only produce proteins that make up the extracellular matrix, but also transform into myofibroblasts to repair injury via production of collagen and  $\alpha$  smooth muscle actin protein.<sup>36</sup>

Findings from research studies on the mechanisms of action underlying the effects of needling not only explain why needling per se is effective for musculoskeletal pain treatment,<sup>29–35</sup> but also account for the growing use of DN in the musculoskeletal field including sports medicine. Needling may thus improve muscle performance, although large, high quality research studies are needed to determine the optimal parameters of needling, including location and direction of needle insertion, duration of needle retention, the requirement for a local twitch response or *de qi* sensation, the frequency of treatments, and its potential role as a preventive measure. As conventionally trained healthcare professionals are usually well equipped with profound knowledge about the musculoskeletal system, and acupuncturists are usually well trained in needling procedures, collaborations between these professionals may help optimise the use of needling therapy in musculoskeletal conditions.

#### DN VERSUS ACUPUNCTURE: A POTENTIAL SOLUTION

Questions surrounding the practice of DN and its relationship with acupuncture exist among patients and clinicians. Acupuncture overlaps with DN with respect to needling instruments, technique, and its widespread use in disorders of the musculoskeletal system. Additionally, both WMA and DN are based on modern biomedical understandings of the human body. Acupuncture points (including *ah shi* points) and trigger points overlap significantly in the treatment of pain; localised muscle twitches in DN and *de qi* sensations in acupuncture, respectively, are used as prognostic criteria to predict the effectiveness of needling. As stated by White and colleagues in the definition of WMA,<sup>1</sup> variations include subcutaneous needling over tender muscle trigger points. Thus, DN should be recognised as a subcategory of WMA.

As physicians are well trained in needling procedures, pathophysiology and the management of common disorders, their practice of WMA (including

DN) can generally be considered safe. However, a dispute exists regarding the practice of DN by healthcare professionals who are not physicians or acupuncturists and may lack the necessary training. For the interests of patients, greater effort should be paid to identifying solutions to the dispute rather than questioning the legitimacy of DN practice by other healthcare professions.

Although needling therapy has been proven to be safe in general, healthcare professionals who are not physicians or acupuncturists need to develop their competence in order to provide skilled and proficient treatment and to prevent possible adverse events related to needling. Besides the establishment of a regulatory body to accredit DN courses, so that standards are set to guarantee patient safety and optimal outcomes, needling practice per se and the use of DN to treat patients should require formal and comprehensive education and training, which should include the essential biomedical education and training in needling skills needed to practise DN safely. This will add credence and strengthen the capability of these healthcare professionals in the practice of DN for the treatment of musculoskeletal disorders.

## CONCLUSION

DN and acupuncture overlap with respect to needling techniques using solid filiform needles as well as some fundamental theories. DN should be recognised as one subcategory of WMA. The establishment of a regulatory body to accredit DN courses and a formal and comprehensive education and training programme are needed to support its practise by healthcare professionals who are not physicians or acupuncturists. Because of the close relationship between DN and acupuncture, collaboration rather than dispute between acupuncturists and other healthcare professionals should be encouraged with respect to education, research, and the practice of needling for the benefit of patients with musculoskeletal pain who require needling therapy.

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