

# Dry needling versus acupuncture: the ongoing debate

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Accepted 18 September 2015

## 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



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**To cite:** Zhou K, Ma Y, Brogan MS. *Acupunct Med* Published Online First: [please include Day Month Year] doi:10.1136/acupmed-2015-010911

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

128 However, DN and acupuncture clearly overlap to  
129 some extent in view of their common indication (mus-  
130 culoskeletal pain) and their use of solid filiform  
131 needles.<sup>3, 4</sup> Additionally, with the single exception of  
132 cases of pneumothorax due to inappropriate and/or  
133 unlawful practice, which is also reported in acupunc-  
134 ture practice,<sup>7-9</sup> no significant patient safety events  
135 have been reported in relation to the practice of DN.  
136 Thanks to accumulating evidence for its applicability,  
137 utility, and lack of side effects (which are minimal to  
138 none), the practice of DN is becoming increasingly  
139 popular among conventionally trained healthcare pro-  
140 viders around the world, especially among PTs in the  
141 USA.<sup>2-4</sup> DN is the de facto practice of PTs in many  
142 countries and states across the USA, yet it is unavail-  
143 able in others, which further convolutes the debate of  
144 who can and should practise DN.<sup>3</sup>

145 The other argument lies in the training of PTs in  
146 DN.<sup>6</sup> The practice of acupuncture by trained clini-  
147 cians requires enhanced experience. In most states and  
148 countries, the practice of acupuncture requires hun-  
149 dreds and often thousands of hours of acupuncture  
150 education in specialised educational programmes. In  
151 the USA, the practice of acupuncture requires state  
152 licensure, which is based on passing national level  
153 examinations and maintaining good professional  
154 records. The practice of acupuncture is governed by  
155 the acupuncture or medical board of the state educa-  
156 tion department in most states across the USA.

157 By contrast, current training of DN for PTs in the  
158 USA is done only through continuing education or  
159 certificate programmes, which are not strictly regu-  
160 lated and have few (if any) standards that need to be  
161 complied with.<sup>3, 6</sup> With these non-formal training pro-  
162 grammes in DN, acupuncturists argue that PTs' expo-  
163 sure, experience and skills in needling therapy are  
164 likely to be limited.<sup>6</sup> Additionally, evaluation systems  
165 for the practice of DN by PTs are currently unavail-  
166 able, and standards for healthcare governing adminis-  
167 trations and policymakers are not yet established.

## 169 DRY NEEDLING

### 170 History of DN

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

175 treatment of muscular pain. Although some PTs claim  
176 that DN was first developed in the 1940s by Janet  
177 Travell, little evidence exists to support this state-  
178 ment.<sup>4, 10</sup> In *Myofascial pain and dysfunction: the*  
179 *trigger point manual*, Travell and Simons<sup>11</sup> sum-  
180 marised the key elements of the DN technique as: (1)  
181 use of a needle of sufficient length to reach the con-  
182 traction knots in the trigger points without any prefer-  
183 ence for needle diameter (range 0.3–3.4 mm); and (2)  
184 use of an aseptic technique via careful cleansing with  
185 a suitable antiseptic (usually alcohol wipes). Travell  
186 and Simons<sup>11</sup> did not mention any specific type of  
187 needle used in DN when they proposed that it was as  
188 effective as local lidocaine injection in relieving  
189 trigger point pain; however, they did mention that  
190 'DN' would induce post-injection soreness, which  
191 might be more severe and last for a longer period of  
192 time than the injection of lidocaine. Thus, the needle  
193 that they were referring to is more likely to have been  
194 a hypodermic needle, rather than an acupuncture  
195 needle.

196 Further evidence that the origin of DN involved the  
197 use of hypodermic needles for the treatment of myo-  
198 fascial pain is provided by findings of a review of DN  
199 history. The earliest reference to 'DN', as per Legge,<sup>10</sup>  
200 was in an article about low back pain in 1947 when  
201 Paulett<sup>12</sup> reported that 'DN' and injecting saline both  
202 relieved pain. In 1952, Travell and Rinzler<sup>13</sup> explored  
203 the origins of myofascial pain, and commented that  
204 effective treatment of myofascial pain might include  
205 DN. The needles used in these early publications  
206 related to DN were likely to have been hypodermic  
207 needles, as injection of saline or local anaesthetic was  
208 simultaneously mentioned and compared.<sup>11-13</sup>  
209 Nonetheless, the earliest available study directly iden-  
210 tified using the search term 'dry needling' in PubMed  
211 was authored in 1979 by Lewit,<sup>14</sup> who used acupunc-  
212 ture needles in DN practice. He found that DN pro-  
213 duced immediate, complete analgesia of the painful  
214 spot without hyperaesthesia for patients with myofas-  
215 cial pain. Based on these results, Lewit<sup>14</sup> reported that  
216 the therapeutic effects of needling in myofascial pain  
217 originated from the mechanical stimulation of the  
218 needling per se and was due to neither the anaesthetic  
219 nor the sclerosing solution. In 1980, Gunn *et al*<sup>15</sup>  
220 recommended the manipulation of acupuncture  
221 needles to produce a grabbing sensation in patients  
222 with trigger point pain. Gunn *et al*<sup>15</sup> reported that the  
223 techniques were inspired by TA and that DN had  
224 powerful therapeutic effects for patients with chronic  
225 low back pain. Development of DN was limited in the  
226 1980s and 1990s as indicated by the limited number  
227 of publications (<30) in the literature during this  
228 period.<sup>10</sup> However, since the 2000s, interest in DN  
229 has resurged as healthcare professionals, especially  
230 PTs, have begun to recognise the beneficial effects of  
231 DN on pain.<sup>2-4, 10</sup> Currently, DN is practised by many  
232 healthcare professionals in Europe, Australia, more

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

### 235 Theory of DN

236 The use of DN is based on an understanding of  
237 human anatomy and physiology regarding myofascial  
238 pain and trigger points.<sup>4</sup> Theories regarding DN  
239 involve various neurophysiological mechanisms,<sup>1 4</sup>  
240 which are indirectly supported by an expanding  
241 volume of clinical research. Between 1980 and April  
242 2015, almost 200 publications were retrievable by a  
243 PubMed search using the term 'dry needling'. The  
244 majority of this literature reports on the therapeutic  
245 effectiveness of DN using solid filiform needles for  
246 various types of musculoskeletal pain.<sup>16-18</sup> Within the  
247 available meta-analyses, one study reported that DN  
248 treatment of myofascial pain in the lower back  
249 appeared to be a useful addition to standard therapies,  
250 and another study found that DN was an effective  
251 intervention for upper-quarter myofascial pain,  
252 which decreased immediately after treatment and at  
253 follow-up at 4 weeks.<sup>18</sup> Since the most recent  
254 meta-analysis,<sup>18</sup> 20 new articles involving DN had  
255 been indexed in PubMed by April 2015. Almost all of  
256 them have reported that DN is effective for specific  
257 types of musculoskeletal pain.

### 258 DN procedure

259 In general, DN techniques can be divided into superficial  
260 and deep techniques.<sup>3 4</sup> In superficial DN,  
261 needles are inserted superficially (around 5–10 mm)  
262 into tissue above the underlying trigger points.<sup>4</sup> After  
263 retention for a short time (30 s to 3 min), the needle  
264 is removed and the pain is expected to be greatly  
265 relieved. If residual pain occurs, the procedure can be  
266 repeated another two to three times. Other superficial  
267 needling techniques exist too. For example, Fu's  
268 superficial needling involves insertion of needles at an  
269 angle of 20–30° without penetrating the muscle.<sup>4</sup> In  
270 the newly evolved wrist and ankle needling, the  
271 needles are inserted almost horizontally at the wrist  
272 and ankle within the connective tissue layer between  
273 the muscle and skin.<sup>4</sup> As the needle is inserted and  
274 manipulated in the superficial layer of the body, no  
275 muscle twitch is expected.<sup>4</sup> In deep DN, needles are  
276 inserted deep into the tissues directly toward the  
277 trigger points in order to reach them.<sup>4</sup> 'Sparrow  
278 pecking', whereby solid filiform needles are manipu-  
279 lated in and out of each trigger point to elicit a local  
280 twitch response, is commonly used with treatment  
281 regimens typically consisting of a course of three or  
282 more treatments, given once a week.<sup>17</sup> Although  
283 Dunning *et al*<sup>4</sup> states that needles (one or more) are  
284 left in situ for between 10 and 30 min, DN practice  
285 by PTs is typically 'fast-in and fast-out', often  
286 described as 'pistoning', and does not usually involve  
287 needle retention.<sup>2</sup> Most studies do not specify the  
288 angle of needle insertion, but the conventional  
289  
290

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

## ACUPUNCTURE

### History of acupuncture

293 DN has been intertwined with acupuncture since its  
294 inception. Meta-analyses of acupuncture or DN for  
295 myofascial pain have included studies in both fields in  
296 order to decrease bias and strengthen the validity of  
297 the results.<sup>16-18</sup> Results of research into the effects of  
298 needling can often be applied to both DN and acu-  
299 puncture. The term acupuncture originally referred to  
300 the ancient healing technique originating from China  
301 2000 years ago, which has been widely practised all  
302 over the world as a professional practice in the field  
303 of complementary and alternative medicine. TA  
304 involves the stimulation of specific points on the body,  
305 based upon the theoretical 'meridian' concept, via  
306 penetration by solid filiform needles.<sup>5</sup> Original acu-  
307 puncture instruments were made so-called bian stones.  
308 With the introduction and application of iron instru-  
309 ments, bian stone needles were replaced by medical  
310 needles made of metal. Acupuncture theories and  
311 techniques have been expanded and optimised by the  
312 contribution of acupuncturists of the various time  
313 periods throughout history. Since the inception of  
314 Chinese culture, acupuncture has been used as one of  
315 the major tools for the restoration and maintenance  
316 of health in China.<sup>5</sup>

317 Acupuncture likely emerged in the USA in the late  
318 1800s when large numbers of Chinese workers  
319 migrated to the west coast to build railways; however,  
320 it made its official debut in 1971 when journalist J  
321 Reston<sup>19</sup> published an article in the New York Times  
322 describing his personal experience with acupuncture,  
323 followed by the visit of US President Nixon to China in  
324 1972. In the UK, physicians were reported to have been  
325 needling tender points to relieve musculoskeletal pain in  
326 the 1800s, and interest in acupuncture surged in the  
327 1970s.<sup>1</sup> Ever since then, acupuncture has become more  
328 and more popular in major western countries.<sup>1 20</sup> Due  
329 to its growing popularity and an accumulation of  
330 research evidence, acupuncture, particularly WMA, has  
331 been widely integrated into the practice of conventional  
332 healthcare in major western countries.<sup>20</sup>

### Theories of acupuncture

333 Classical theories and principles of point selection in  
334 TA are based on historical concepts of balancing Yin  
335 and Yang and dredging 'meridians'. Such theories are  
336 used to differentiate TA from WMA. Nowadays, both  
337 classical theory and modern biomedical sciences are  
338 included in the education of acupuncturists in China  
339 and around the world. Besides TA, the contemporary  
340 version, WMA, which is based on the understanding  
341 of human anatomy, physiology, and pathology, is also  
342 widely practised, especially among physicians and  
343 other healthcare professionals.<sup>1 15</sup> One example of  
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349 WMA is peripheral neuromodulation, in which practi- 407  
 350 tioners stimulate somatic nerves in order to influence 408  
 351 autonomic nerves (via somatovisceral reflexes).<sup>21 22</sup> 409

352 A special category of acupuncture points are the *ah* 410  
 353 *shi* (translated as 'ouch') points, which include acu- 411  
 354 puncture points that are tender to touch or pressure, 412  
 355 with a similar definition to trigger points. Dorsher<sup>23</sup> 413  
 356 reported that the distribution of trigger points has a 414  
 357 95% overlap with acupuncture points in the treatment 415  
 358 of pain disorders. Thus, in pain conditions, trigger 416  
 359 points may represent similar (if not the same) physio- 417  
 360 logical phenomena as acupuncture points.<sup>23</sup> 418  
 361

### 362 Acupuncture procedure

363 Acupuncture involves many different techniques with 420  
 364 various types and lengths of needles depending on the 421  
 365 condition and the acupuncture point location. The 422  
 366 commonly used procedure for musculoskeletal pain 423  
 367 involves *ah shi* points with treatment protocols similar 424  
 368 to DN but with needle retention. Traditionally, acu- 425  
 369 puncture point selection and treatment is based on 426  
 370 'syndrome differentiation', which incorporates inspec- 427  
 371 tion (including the tongue), palpation (including the 428  
 372 pulse), and systematic inquiry. This is the process that 429  
 373 many acupuncturists and Traditional Chinese 430  
 374 Medicine practitioners use to generate a traditional 431  
 375 diagnosis, treatment principle and plan.<sup>24</sup> 432  
 376 Acupuncturists usually emphasise *de qi* sensations 433  
 377 during treatments.<sup>25</sup> *De qi* refers to a composite of 434  
 378 sensations including local muscle twitches and propa- 435  
 379 gation of sensation upon needling.<sup>25</sup> Historically, *de qi* 436  
 380 sensation has been considered to be the foundation 437  
 381 for the therapeutic effectiveness of acupuncture for 438  
 382 pain,<sup>25</sup> and this is supported by research demonstrat- 439  
 383 ing that the stimulation of A-delta afferent nerves that 440  
 384 is associated with the *de qi* sensation<sup>26</sup> is important in 441  
 385 mediating the clinical effects of acupuncture.<sup>27</sup> 442

386 Most acupuncture procedures last 30–45 min and 443  
 387 involve a perpendicular needle insertion. It is worth 444  
 388 noting that during the same time period that DN was 445  
 389 developing in the western world, Professor Dinghou 446  
 390 Lu and colleagues at Beijing Sports University strongly 447  
 391 advocated needling at tender (*ah shi*) points using an 448  
 392 oblique angle, as this gave better therapeutic effects in 449  
 393 myofascial pain compared with vertical needle 450  
 394 insertion.<sup>28</sup> 451  
 395

### 396 NEEDLING EFFECTS IN THE MUSCULOSKELETAL 452 397 SYSTEM: THERAPEUTIC MECHANISMS 453

398 During the past two decades, tremendous progress has 454  
 399 been made investigating the mechanisms of action 455  
 400 underlying the effects of needling on the musculoskel- 456  
 401 etal and nervous systems. Besides the widely recog- 457  
 402 nised gate control theory and regulation of the 458  
 403 endogenous opioid system,<sup>1</sup> two other major findings 459  
 404 worth noting are the regulation of the purinergic sig- 460  
 405 nalling system and stretch-like needling effects in the 461  
 406 musculoskeletal system.<sup>29–31</sup> Researchers in China and

the USA have demonstrated that acupuncture induces 407  
 an immediate local increase in adenosine (part of the 408  
 purinergic signalling pathway) in both humans and 409  
 animals.<sup>29 30</sup> Adenosine has not only been found to 410  
 be involved in pain modulation, but is also a vital 411  
 source for energy for muscles.<sup>32</sup> Interestingly, besides 412  
 pain relief, needling of muscle has been found to 413  
 increase muscle strength and improve the range of 414  
 movement at joints.<sup>33–35</sup> These effects of needling are 415  
 suggested to be similar to those of stretch in physical 416  
 exercise. Langevin *et al*<sup>31</sup> reported that acupuncture 417  
 functions like physical stretch, activating fibroblasts 418  
 that trigger signal transduction pathways at the 419  
 molecular level. Fibroblasts not only produce proteins 420  
 that make up the extracellular matrix, but also trans- 421  
 form into myofibroblasts to repair injury via produc- 422  
 tion of collagen and  $\alpha$  smooth muscle actin protein.<sup>36</sup> 423

424 Findings from research studies on the mechanisms 425  
 of action underlying the effects of needling not only 426  
 explain why needling per se is effective for musculo- 427  
 skeletal pain treatment,<sup>29–35</sup> but also explain the 428  
 growing use of DN in the musculoskeletal field 429  
 including sports medicine. Needling may thus 430  
 improve muscle performance, although large, high 431  
 quality research studies are needed to determine the 432  
 optimal parameters of needling, including location 433  
 and direction of needle insertion, duration of needle 434  
 retention, the requirement for a local twitch response 435  
 or *de qi* sensation, the frequency of treatments, and its 436  
 use as a preventive measure versus treatment. As con- 437  
 ventionally trained healthcare professionals are usually 438  
 well equipped with profound knowledge about the 439  
 musculoskeletal system, and acupuncturists are usually 440  
 well trained in needling procedures, collaborations 441  
 between these professionals may help optimise the use 442  
 of needling therapy in musculoskeletal conditions. 443

### 444 DN VERSUS ACUPUNCTURE: A POTENTIAL 444 445 SOLUTION 445

446 Questions surrounding the practice of DN and its rela- 447  
 448 tionship with acupuncture exist among patients and 448  
 449 clinicians. Acupuncture overlaps with DN with 449  
 450 respect to needling instruments, technique, and its 450  
 451 widespread use in disorders of the musculoskeletal 451  
 452 system. Additionally, both WMA and DN are based 452  
 453 on modern biomedical understandings of the human 453  
 454 body. Acupuncture points (including *ah shi* points) 454  
 455 and trigger points overlap significantly in the treat- 455  
 456 ment of pain; localised muscle twitches in DN and *de* 456  
 457 *qi* sensations in acupuncture, respectively, are used as 457  
 458 prognostic criteria to predict the effectiveness of need- 458  
 459 ling. As stated by White and colleagues in the defin- 459  
 460 ition of WMA,<sup>1</sup> variations include subcutaneous 460  
 461 needling over tender muscle trigger points. Thus, DN 461  
 should be recognised as a subcategory of WMA.

462 As physicians are well trained in needling proce- 462  
 463 dures, pathophysiology and the management of 463  
 464 common disorders, their practice of WMA (including 464

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.

**Contributors** KZ conceived the idea and drafted the article. MSB provided constructive guidance and feedback. YM co-authored a portion of the article.

**Competing interests** None declared.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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