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REVIEW ARTICLE

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# A History of Dry Needling

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## ABSTRACT

**Objectives:** To trace the development of the practice and theoretical basis of dry needling by means of an examination of the literature.

**Findings:** The term dry needling arose from the need to provide a contrast to the injection of a fluid through a hypodermic syringe [now sometimes referred to as wet needling]. Dry needling does not involve the injection of any substance, merely the insertion of a needle. The history of dry needling is inextricably bound up with the search for effective treatment of painful musculoskeletal disorders. In particular, it was the research into the use of injections, to both cause and relieve pain in muscular tissue, that led to the development of trigger point theory and then to the use of dry needling as a treatment.

**Conclusions:** A search of the literature reveals that the important clinical finding that simple dry needling of tender points could produce profound and long-lasting relief of musculoskeletal pain had been published in 1941 and again in 1947. This provoked little interest in the wider academic or clinical community until the focus on acupuncture in the 1970s and the publication of a scientific explanation of the nature of myofascial trigger points in the 1970s and 1980s. Since 2000, there has been a surge in academic interest in dry needling and its use has expanded into the allied health professions of physiotherapy, osteopathy, and chiropractic.

**KEYWORDS:** Dry needling, history, musculoskeletal pain, myofascial trigger points

## INTRODUCTION

Dry needling involves the insertion of needles into tender points in the body without the injection of any substance. It is used to treat painful musculoskeletal disorders. The more common approaches, which are best supported by research, target myofascial trigger points (1).

Although the history of trigger point theory has been detailed in several publications (2,3), no description of the development of dry needling was found in the literature. In order to provide a historical context for this emerging modality, a search of the literature was undertaken.

The major texts of trigger point theory and dry needling were consulted. The Pubmed, Embase, and Physical Therapy and Sports Medicine databases were searched using the search terms trigger point, myofascial trigger point, tender point, and dry needling. Items retrieved were sorted for relevance

and duplication. The reference lists of the texts and the key papers were also mined for additional references.

Papers were retrieved if they offered the possibility of an initial or early reference to a key concept, finding, or technique, or if they could provide a statement of contemporary knowledge.

## EARLY TENDER POINT/TRIGGER POINT THEORY

Dry needling and trigger point theory emerged from the use of injections of anesthetic to treat painful musculoskeletal conditions. Before examining the early development of dry needling, it is worth exploring the early research that led to trigger point theory.

While the presence of tight bands and tender nodules in muscles has long been recognized in many cultures, their significance in the production

of pain was not really articulated in the West until the twentieth century. In the late nineteenth and early twentieth centuries, a multitude of terms was used to describe pain arising from the muscles, which reflected the lack of coherent understanding. These included muscular rheumatism, fibrositis, rheumatic myalgia, non-articular rheumatism, and fibromyositis (3).

The credit for getting on the right track is usually given to John Kellgren (2,4,6). In the late 1930s, Kellgren was working in University College Hospital in London under the supervision of Sir Thomas Lewis. Lewis had experimentally determined that injecting a saline solution into muscular tissue could lead to pain being experienced some distance from the site of the injection.

Lewis encouraged Kellgren to explore this phenomenon and both researchers published their findings in consecutive articles in the *British Medical Journal* in February 1938 (7,8). Kellgren's paper contained several important observations that have been substantiated by subsequent research:

- Pain from muscles is often referred. The pattern is specific to the muscle.
- Tenderness could also be referred.
- Tenderness was not a useful diagnostic guide unless the patient winced when a tender point was palpated [now known as the jump sign or recognition of pain by patient].
- Some pain could be relieved by injecting procaine into acutely tender points which were often at some distance from the site of the pain.
- The relief obtained often far outlasted the effects of the anesthetic and in many cases could be considered permanent.

Kellgren was also the first to publish detailed illustrations of the pain referral patterns from specific muscles (9).

Another researcher in the United Kingdom, who variously called himself Gutstein, Gutstein-Good, and finally Good, was also heading in the same direction, also publishing detailed illustrations of the referral patterns of different muscles and beginning, like Kellgren, in 1938 (2).

While it is hard to determine the effects of Good's work, there is little doubt that Kellgren's paper stimulated a flurry of interest over the next few years in the United States, the United Kingdom, Europe, and Australia. Exploring the use of anesthetic injection into tender points produced several important findings.

Harman and Young (10) published a case series in the *Lancet*, reporting that tender points in thoracic musculature could simulate visceral pain which could be eliminated by injecting the points.

Working in the United States, Arthur Steindler (11) was perhaps the first to use the term "trigger points". He reported that many cases of sciatica seem to involve referral from musculo/tendinous/ligamentous structures rather than from irritation of the sciatic nerve. His use of the term "trigger point" was not confined to myofascial trigger points.

In Australia, Michael Kelly was stimulated by Kellgren's paper to try the anesthetic injection technique for treating somatic pain. He was enthusiastic about the results and found the injection technique suitable for use in general practice. He wrote a series of papers on the subject between 1941 and 1962, beginning with a letter to the *British Medical Journal* in 1941 (5).

In 1942, Janet Travell and colleagues (12) published the first paper in what would turn out to be a lifelong contribution to the subject. Their use of the term "trigger points" was restricted to tender points in muscles. Travell's name and that of her longtime collaborator, Dr David Simons, became the most closely associated with the concept of myofascial trigger points.

Several of these early researchers (5,6) noted the difficulty of finding the most relevant tender points and remarked that this contributed to inconsistent clinical results.

The earliest paper identified in which the term trigger point occurred either as an index term, keyword, or in the title of a paper was by Pugh and Christie (13). It reported that trigger points were more common in servicemen with a history of musculoskeletal pain [more than 30%] than in those without such a history [3%].

A myofascial trigger point is defined as a hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band. The spot is tender when pressed and can give rise to characteristic referred pain, motor dysfunction, and autonomic phenomena (4).

### **THE EMERGENCE OF DRY NEEDLING**

Dry needling did not emerge with any fanfare. It seems to have been an almost incidental development, arising out of the use of injection therapy to treat musculoskeletal pain. Its acceptance was perhaps bolstered a little by an awareness of the reported effects of acupuncture-type needling.

An important paper by Brav and Sigmond published in the United States in 1941 (14) made the claim that pain could be relieved by simple needling without the injection of any substance. It was a notable paper for several reasons. It was the

first paper found in the literature search that referred to this finding, which is central to the use of dry needling. Brav and Sigmond did not claim the observation as their own, however. The first line of the paper reads: “The origin of the local and regional injection treatment of low back pain and sciatica dates back to the earliest descriptions of acupuncture”. It goes on to reference Churchill’s publications on acupuncture which were published in 1821 and 1828.

The paper is a report of a clinical trial set up to explore several questions, principally the efficacy of anesthetic injection and the importance of the location of the injection. Sixty-two patients presenting with low back pain or sciatica and without underlying visceral disease were divided into three treatment groups. Each group received needling into the lumbar paraspinal musculature, close to but not into, the emerging spinal nerve. One group was injected with one percent novocaine, another with normal saline solution, and a third received the insertion of the hypodermic with no substance injected. The novocaine group received the best outcome and the “dry needling” [although it was not named as such] came in a close second which was described as a “startling” result.

Brav and Sigmond’s paper probably deserves wider recognition for its early and substantial findings. Only one paper was found which referenced it (15). That paper was, in turn, referenced by just one other (16) as the first mention of the finding that needling without injection could be effective.

The earliest mention of the term “dry needling” was by Paulett in the *Lancet* in 1947 (17). This paper reported on an investigation of 25 cases of low back pain with no evidence of organic disease. It is a revealing look at the nature of experimental investigation of the time with several lines of enquiry being enthusiastically pursued.

The part of the paper relevant to this discussion refers to attempts to eliminate pain by injection into the tender points. Paulett established that relief could be obtained not only from the injection of procaine but also by injecting saline and “even dry needling”. The needling method was described in detail. A relationship was reported between effective treatment and deep needling into the tender points that resulted in a jab of pain and a reflex spasm [local twitch response?] of the muscle. Subcutaneous needling or deep needling that was painless did not lead to a beneficial outcome.

In the United States, Janet Travell and Seymour Rinzler published a landmark paper on myofascial trigger points (18). It reaffirmed that a trigger point

was able to cause referred pain, pain that mimicked visceral conditions and autonomic phenomena. It suggested that the intense afferent stimulus from a trigger point was responsible for these phenomena and contained a series of illustrations showing the referral patterns from 38 muscles which provided a basis for reliable diagnosis and location of trigger points in those muscles.

This paper also included the brief and unreferenced statement that dry needling could be an effective method of treating myofascial trigger points [the only references provided were to previous papers by the authors themselves]. Several other authors have referenced this article as the earliest use of the term (19,20). It is entirely possible that Travell and Rinzler were aware of the papers by Brav and/or Paulett and based their comment on the findings made in those papers. An article by Steinbrocker, the only author found to have referenced Brav and Sigmond’s findings, was referenced in Travell and Rinzler’s 1942 paper (12).

By the 1960s, the concept of trigger points was established in the medical literature if not common in general practice. Although dry needling had been suggested as a treatment, the usual treatment was still the injection of anesthetic into the tender points.

Despite the early interest, the 1960s and early 1970s produced almost no important new insights into trigger point theory or dry needling. Only 21 papers published between 1960 and 1975 were found that included a reference to musculoskeletal trigger points. Three of these were reports of iatrogenic pneumothorax from injecting trigger points. The rest were case reports or reviews. No trials were reported. Writing in the *Journal of the American Osteopathic Association*, Mennell (21) remarks on the slow acceptance of trigger points as a cause of muscular pain. No articles are found when dry needling is used as a search term and no mentions of dry needling were found in any papers from this period.

### ACUPUNCTURE “ARRIVES” IN THE WEST

In the 1970s, China began opening up to the world. There was a surge of interest in acupuncture, particularly its use for anesthesia and in the treatment of painful conditions. A search using acupuncture as a search term produced 18 papers published in 1971 [a record up to that point], 99 in 1972, and 213 in 1973.

While most of the published articles were speculative discussions about the possible benefits of acupuncture for the treatment of pain, some clinical

trials were undertaken (19,22–24). Two studies were of particular relevance to the development of dry needling.

The trial carried out by Ghia et al. (22) is the first to compare needling at traditional acupuncture points versus tender points [dry needling]. It concluded that, as both were effective, the location of the needling perhaps did not matter so much. The important factor was the intensity of the stimulus which was considered to be crucial in producing the analgesic effect. Melzack (24) attempted to compare the locations of acupuncture points and trigger points and claimed a high degree of correlation.

### **DRY NEEDLING AND ACUPUNCTURE DIVERGE**

Chan Gunn, a United States based physician with an interest in treating pain, became interested in acupuncture in 1974 (25). Over the next few years, he explored the prevalence of tender points in several conditions (26,27) and concluded that most cases of chronic musculoskeletal pain were complicated by additional signs of radiculopathy (28). He developed an approach to dry needling that combined features of acupuncture [type of needles and needle techniques] with neurological and tender point models that he called intramuscular stimulation.

In 1979, Karel Lewit of Czechoslovakia published what is widely recognized as a landmark paper in the development of dry needling (20). “The Needle Effect in the Relief of Myofascial Pain” reported his results when needling tender points without injection. The study was a case series and included only cases of chronic pain. Lewit made several important observations in this paper which have had an impact on the development of dry needling:

- The effect of the technique depended on the intensity of the tenderness at the point and the accuracy of the needling.
- He clearly did not confine himself to myofascial trigger points in the narrower sense. Tender points in scars, ligaments, and periosteal insertions were all included in his study.
- He used acupuncture needles as well as hypodermic type needles in his treatments and found that the acupuncture needles were safer and produced less bleeding and bruising.
- He described the relief of pain resulting from dry needling as “The needle effect”.

A year later, in 1980, Gunn published the results of the first clinical trial of dry needling of motor points [not trigger points] for the treatment of low back pain (29).

Both Lewit and Gunn were clearly influenced by acupuncture. Gunn was president of the American

Society of Acupuncture. Lewit freely admits to having borrowed the needles of acupuncture to perform his needling.

The poor separation between the concepts of dry needling and acupuncture in the 1970s and 1980s is evidenced by the fact that two randomized trials that included dry needling as one of the interventions do not appear when “dry needling” is used as a search term. First, MacDonald et al. (30) showed that superficial dry needling of trigger points was superior to placebo but he called the treatment acupuncture.

Second, Garvey et al. (31) showed that a session of dry needling produced a similar degree of short-term global improvement as did two other injection regimes and cooling spray plus acupressure.

In 1989, Gunn published a manual of his intramuscular stimulation system of dry needling. The book *Treating Myofascial Pain* (25) was the first manual of dry needling with a good description and illustration of techniques for specific conditions. Gunn’s unique take on dry needling treatment was that the treatment of the shortened muscles should be combined with the treatment of the relevant spinal segments because the local muscular condition had been precipitated by a radiculopathy or neuropathy at the spinal segmental level. A second edition, *Treatment of Chronic Pain* (28), was released in 1996.

Also in 1989, Peter Baldry, a United Kingdom-based physician with an interest in acupuncture, published *Acupuncture, Trigger Points and Musculoskeletal Pain* (32). This was a well-illustrated and well-referenced manual that was substantially about dry needling. Importantly, he made some attempt to reconcile trigger point theory with traditional Chinese acupuncture theory and he did not confine his use of dry needling to myofascial trigger points. A second edition, *Myofascial Pain and Fibromyalgia Syndromes* (2), was released in 2001. This contained a lot more about the science of pain and myofascial trigger points and a lot less acupuncture than the first edition.

The change of emphasis found in Peter Baldry’s updated text (2) was characteristic of way dry needling was used by the turn of the century. Even though the use of acupuncture needles had become the norm in dry needling, the theory and techniques that dry needling relied on were very different to those used in acupuncture practice (1). Dry needling had become much more closely associated with trigger point theory (33) and with the manual therapy professions rather than the acupuncture profession (1).

### TWENTY-FIRST CENTURY DEVELOPMENTS

Only moderate interest was shown in dry needling during the 1980s and 1990s. Less than 30 published papers that included some discussion of dry needling of tender points were found that were published between 1980 and 1999. The situation rapidly changed after 2000 with around 100 such papers written between 2000 and 2013.

The surge in interest in dry needling since 2000 was not just reflected in the academic literature. The increased interest has been worldwide (1,34) and involves the medical, physiotherapy, chiropractic, and osteopathic professions (33). Dry needling courses have become popular in Europe, North America, and Australia. They can also be found in Africa and the Middle East. There are several plausible reasons that, when taken together, can explain the rapid adoption of the modality. These include the following:

- The emergence of dry needling using acupuncture needles. While the use of hypodermic syringes tends to be highly regulated, the use of acupuncture needles is much less so. Physiotherapists, osteopaths, chiropractors and even massage therapists became free, in many jurisdictions all over the world, to add this therapy to their practices.
- The basics of dry needling can be taught quite quickly (33). Many current courses introduce the basic material via an on-line component followed by just 1 or 2 d of practical instruction.
- The publication of Travell and Simons' hefty *Trigger Point Manuals* in 1983 [Volume 1: The Upper Body] (3) and 1993 [Volume 2: The Lower Body] (35) provided a wealth of clinically useful material. Although they did not recommend dry needling as the main form of therapy, they did contain a guide to the diagnosis and location of myofascial trigger points.
- The publication of Gunn's (25,28) and Baldry's (2,32) manuals provided treatment and diagnostic instruction for dry needling treatment.
- The science supporting the importance of myofascial trigger points as a potent source of pain has been shown to be fairly robust (4,36). Researchers such as Simons, Gerwin, Shah, and Hong have gone a long way towards explaining the physiological and biochemical basis of trigger points. There is a growing evidence base supporting the use of dry needling for myofascial trigger points (1,34,37).
- The clinical experience of using dry needling can be very satisfying for both practitioner and patient. Although it can be a bit hit and miss, a successful dry needling treatment of a severe and chronic tender point can produce dramatic results.

Twenty-four randomized controlled trials were found that included dry needling as a treatment and

there have been several systemic reviews of the literature (38–44) that have included some sort of dry needling in their terms of reference. While the findings of these reviews have been generally supportive of the efficacy of dry needling for painful musculoskeletal conditions, the evidence remains far from conclusive.

Several styles of dry needling have been described and tend to be simply classified according to depth of insertion (1,16,33). Superficial dry needling involves insertion that does not reach the trigger point and is often just millimeters deep. Baldry's superficial technique is a good example (43).

Deep needling, in contrast, aims to penetrate the trigger point or tender point. It is generally agreed that, with deep needling, a local twitch response is desirable (17,44–46). This is usually accompanied by a characteristic sensation.

### UNRESOLVED ISSUES

Despite the increased attention, there is little consensus about the use of dry needling other than as treatment for painful musculoskeletal disorder through the needling of tender points.

Some researchers and practitioners restrict the use of dry needling to the deactivation of myofascial trigger points (34,37,47,48). There is no doubt that the science is more robust in support of this use. About 70% of the articles found with significant reference to dry needling were restricted to a discussion of dry needling as a treatment for myofascial trigger points. It is likely that this is a reflection of its clinical use.

Other practitioners support a broader scope of use for dry needling. The earlier practitioners of dry needling included the needling of tender points in tendons, ligaments, and scar tissue as suitable targets (8,11,14,20).

In the more recent literature, there is an increased interest in dry needling for tendon problems (40,49–51). Travell and Simons (4) recognized that the taut bands produced by active and latent trigger points placed extra strain on tendon insertions which resulted in an enthesopathy or an attachment trigger point. As these are considered secondary to the central trigger point, they should resolve if the central point is resolved (52). Direct needling of the enthesopathy is only mentioned briefly.

The lack of consensus about what Lewit (20) termed "the needle effect" is interesting. The authors that subscribe to the concept that the role of dry needling is to de-activate myofascial trigger points

tend to focus on its ability to affect the dysfunctional endplate and the taut bands that result (16,34,37). It is likely, however, that the “needle effect” has a broader application and, while some will choose to stay within the confines of the robust evidence base, others will continue to extend the scope of practice and include ligamentous, scar, fascia, and possibly articular tissues as suitable targets for dry needling practice.

### CONCLUSIONS

It is clear from this review that the modality of dry needling emerged from the exploration of the role of tender or trigger points as a cause of muscular pain. The earliest mentions of dry needling in the literature were made in the 1940s (14,17) by researchers who have been insufficiently recognized for their pioneering contribution.

The roots of dry needling, and the theory on which it is based, are quite distinct from the practice of acupuncture. However, without the interest in acupuncture in the mid-1970s and the introduction of acupuncture needles into contemporary practice, it is likely that dry needling would never have become an established modality.

Once established dry needling was taken up enthusiastically by doctors, physical therapists, and other manual therapists all over the world. While not the exclusive domain of any one discipline (1), dry needling is a “cheap, easy to learn, low risk, and minimally invasive” (33) form of therapy that can be combined well with other modalities.

### DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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