

# What Is Western Acupuncture and Dry Needling?

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What effects can you potentially expect and what complications of 'dry needling' and acupuncture might you expect?

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## Introduction

Dry needling (DN) is the use of needles within “altered or dysfunctional tissue in order to improve or restore function.”

Source: (Australian Society of Acupuncture Physiotherapists, 2007, p.3).

It has been described as involving “multiple advances of an acupuncture-type needle into the muscle in the region of a trigger point, aiming to reproduce the patient’s symptoms, visualise local twitch responses, and achieve relief of muscle tension and pain.”

Source: Huguenin (2004)

Investigations into the effects of DN have been based on the very old assertion that inserting a needle “somewhere in the region of the pain without introducing analgesic solutions” could “give frequent lasting relief.” (Steinbrocker in Huguenin, 2004, p.8).

While most DN is done in myofascial trigger points (TrPs), it may include the outer layer of the bone (periosteum) and soft tissues, or theoretically anywhere in the region of pain.



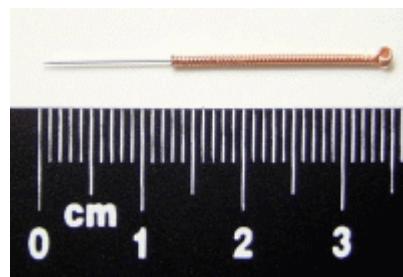
## The potential effects of dry needling

The potential effects of DN are mostly described in reference to TrPs, but are not limited to these descriptions. Western studies into acupuncture needling, with consideration of neurophysiology and anatomy, have produced descriptions of three different types of effect:

1. **local**,
2. **segmental (meaning effects in the area of the body receiving signals from by the same nerves as the tissue being needled) and**
3. **extra-segmental effects (meaning effects to parts of the body not receiving known signals from the same nerves).**

This really means we can use needling in one area to effect local tissue, tissue nearby and tissue seemingly not related! Amazing.

Dry needling produces these effects to different extents than acupuncture.



## What are Trigger points?

Trigger points:

- are described as “exquisite tenderness at a nodule in a palpable taut band (of muscle).”
- are “able to produce referred pain, either spontaneously or on digital compression.”

Source: Travell and Simons (cited in Huguenin, 2004)

*These are basically tender firm nodules.*

## What causes trigger points to become active?

They are potentially produced by an extraordinary amount of factors, including:

1. mental and/or emotional stress,
2. joint disease,
3. mechanical stress,
4. altered breathing patterns,
5. muscular strain,
6. nerve impingement,
7. direct trauma,
8. fatigue,
9. vitamin and mineral deficiencies,
10. sleep deprivation,
11. thyroid disease,
12. bacterial infection,
13. visceral disease and
14. viral infections”

Source: (McCutcheon & Montgomery, 2007).

Trigger points have been shown to display spontaneous electrical activity (SEA), due to tonically active motor endplates, meaning **the end of the nerve to the muscle continues to be electrically active.**

Thus, the use of dry needling within TrPs is aimed at mechanically disrupting and making inactive the nodules in these TrPs.

Source: (Simon, Travell and Simons, 1999).

Dry Needling does this by diminishing the SEA, if a local twitch response occurs.

## What is a twitch response?

A twitch response is a short burst of motor unit action potential in muscle when a needle is inserted.

## What are the effects of dry needling and acupuncture?

### Local effects:

If you want the simple answer, read on. If you want the scientific answer, read the next bit.

#### *The simple answer.*

1. The needling causes a local sharp pain at the skin (or if a blood vessel is pricked) and/or a dull ache when deeper in muscle.
2. Chemicals are released around the needle – this causes a little red reaction at times
3. Nerve proteins are released which have been shown to influence rebuilding in the local tissue.

#### *The scientific answer.*

McCutcheon & Montgomery (2007) summarised the local effects of insertion of a needle, describing it as causing many nociceptive, cellular and neuropeptide induced effects.

- The nociceptive effects range from local sharp pain (via A $\delta$  neurons) with superficial penetration to poorly localised aching pain with deeper penetration (via C fibres).
- The cellular effects include the release of histamine-like substances, adreno-corticotropic hormone (ACTH), bradykinin, serotonin and proteolytic enzymes around the needle (Rosenthal & Sonnenstein cited in Karavis, 1997).
- Potent neuropeptides Substance P and Calcitonin Gene Related Peptide (CGRP), released from A $\delta$  and C neurons decrease local immune responses.
  - This has been shown as a **decrease in inflammatory markers** with CGRP administered to injured rat skin (Gherardini et al, 1998).
  - This is in contrast to a demonstrated **vasodilation** (via Substance P and CGRP) and **increases in neurogenic inflammation** (Dimitrijevic, 1999), lasting 24-36 hours (Brain, 1997) and **also contradicts other animal models** showing Substance P can stimulate neutrophil accumulation (Baluk et al, cited in Brain, 1997).

## **Segmental effects:**

### *The simple answer.*

When the area being needled sends its signals (via nerves) through the spinal cord towards the brain, these signals may be blocked or amplified (depending on different needling techniques) from passing on their messages. In effect, the needling can act as an anaesthetic or an irritant.

### *The scientific answer.*

Afferent inputs from the area being needled converge on the dorsal horn of the spinal cord at the segment corresponding to dermatomes and myotomes being needled. These inputs can be modulated via the convergence of excitatory and inhibitory inputs. Stalk cells located at the border of laminae I and II in the dorsal horn are activated. These release enkephalins onto Substantia Gelatinosa (SG) cells, thus inhibiting their output. This potentially decreases further transmission of the afferent inputs to Wide Dynamic Range (WDR) neurons and pathways to higher levels (McCutcheon & Montgomery, 2007).

## **Extra-segmental effects:**

### *The simple answer.*

The central nervous system includes the spinal cord, brain stem and brain. When a needle is inserted, the areas of the brain receiving the signal then send hormones back down the nerves within the spinal cord. These hormones actually block pain. Also, some hormones are released into the blood to stimulate other anti-inflammatory hormones.

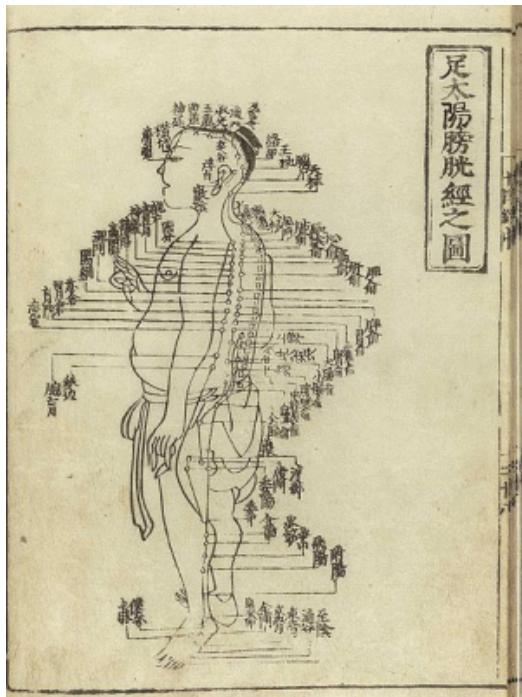
A strong intense sensation due to needling can also affect the part of the body responsible for blood flow and sweating, so at times many people feel rushes of warmth and/or cold, as well as break into a sweat. In about 3% of cases, people feel light headed and nauseous.

### *The scientific answer.*

McCutcheon & Montgomery (2007) summarise the extra-segmental effects well. Following on from spinal cord convergence mentioned above, transmission of the signal continues to higher levels of the central nervous system (CNS). Descending pathways are activated releasing noradrenaline and serotonin throughout the dorsal horn, inhibiting SG

cells 1-2 levels above and below the spinal segment. The serotonergic pathway effect is seen only after 20-25 minutes, whilst the noradrenergic pathway effect is “rapidly recruited within 3 minutes during high frequency electroacupuncture” (McCutcheon & Montgomery, 2007). It is not clear whether this time frame exists for non-electro acupuncture. C fibres activate a descending pathway, which is opioidergic in nature, to widely inhibit WDR cells in the dorsal horn. This is known as Diffuse Noxious Inhibitory Control (DNIC), and is “activated within 1-10 minutes, lasting for several minutes after the painful stimulus has ceased” (McCutcheon & Montgomery, 2007).

Lundberg (cited in Bradnam, 2003) proposes another extra-segmental effect - neuro-hormonal - whereby beta-endorphin and ACTH are thought to be released into the bloodstream. This potentially increases the production and release of cortisol, a natural anti-inflammatory hormone. The authors’ opinion is clarified by suggesting time and intensity parameters of needling may modify any effect, as will T-lymphocyte and natural killer (NK) cells levels. Bradnam states research is required to investigate such opinions. The reader is now advised to note the language used, as it appears very hypothetical and with little evidence at this time.



Acupuncture chart from Hua Shou ([fl.](#) 1340s, [Ming Dynasty](#)). This image from *Shi si jing fa hui* (*Expression of the Fourteen Meridians*). ([Tokyo](#) : Suharaya Heisuke kanko, Kyoho gan 1716).

Sato et al (cited in Bradnam, 2003) also state that research exists showing the autonomic nervous system (ANS) is altered by acupuncturing of “strong points”. Traditional Chinese Acupuncture (TCA) has known strong points for affecting certain organs/tissues. Western acupuncture has reasoned that stimulation of such a strong point (within a spinal segment known to also innervate the organ/tissue) can alter sympathetic outflow to the target organ/tissue. Bradnam (2003) summarises that such activation of the ANS is not point specific, being more related to intensity and duration of stimulation, with ascending pathways passing through the hypothalamus, the central control point for the ANS.

## **What are the potential complications of Dry Needling?**

McCutcheon & Montgomery (2007) again summarise these well, and potential complications include:

- Bleeding, which can occur in all patients, but should be monitored in patients with naturally occurring hemorrhagic diseases and those on anti-coagulant medication, using smaller needles and light stimulation if needling is indicated. The femoral artery is an example of a potential complication site, when dry needling iliacus.
- Collapsed lung (Pneumothorax), particularly over upper trapezius and any thoracic site, with indications to needle away from lung tissue and/or over bone/cartilage.
- Pain and swelling, due to local effects (see above);
- Infection, particularly in those patients with blood borne diseases, bleeding disorders, acute immune disorders (eg acute rheumatoid arthritis), cancer (increased immunological risks) and incompetent heart valve or valve replacements;
- Allergic reaction to metals;
- Aggravation of unstable epilepsy, particularly with strong trigger points;
- Abortion of foetus, particularly with strongly reacting points such as in the upper trapezius.

## **What are the differences between Dry Needling and Acupuncture?**

Dry needling and acupuncture are both specialised forms of sensory stimulation induced by puncturing the skin with a needle, with approximately 70% of TrPs coinciding with acu points.

Source: (Karavis, 1997).

Despite this, several differences exist between DN and acupuncture. The main ones include the following:

- Dry needling aims to reproduce the patients' symptoms via induction of a local twitch response, whereas acupuncture aims to produce pain relief (analgesia) via activation of the neural system at one or more of three different levels – local, segmental, and extra-segmental.
- Needles remain in the skin longer during acupuncture, as the desired extra-segmental effects take longer to occur than the twitch response of DN;
- It is common for multiple needles to be used in acupuncture, whereas DN involves immediate stimulation of one needle, before its removal. On occasion, DN will be followed by acupuncture-reasoned needling;
- The strong pain that often follows DN tends to override any segmental and extra-segmental analgesic effect of needling.

## **What next?**

If you're suffering from muscle pain or persistent pain of any sort, call BodyFitNT NOW to make an appointment with Greg Dea, Sports Physiotherapist, on 8981 2886.

