Acupuncture in medical practice

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Acupuncture is a widely used complementary therapy, but what is the evidence for its use?

Acupuncture has been practised as a method of healing for more than 2000 years. Acus is Latin for 'needle' and pungere means 'to prick'. The Yellow Emperor's Book of Internal Medicine, written between the third and second century BC, is the earliest text documenting the use of acupuncture. Nowadays acupuncture is practised by medical practitioners, health practitioners such as physiotherapists and practitioners of Chinese medicine. An explanation of the therapy is given in the box on page 62.

Acupuncture was first recognised and accepted by the World Health Organization (WHO) in 1979, and representatives of the Australian Medical Acupuncture College have contributed to the WHO committee for standardisation of acupuncture nomenclature. There have been Medicare item numbers acupuncture since 1982. For doctors to be accredited to use the specialised acupuncture item numbers they must be enrolled in the RACGP CPD ongoing education program and have passed the equivalent of part one of the Fellowship of the Australian Medical Acupuncture College.

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Types of acupuncture

There are various ways of stimulating the 361 traditional acupuncture points. The most frequently used methods include sterile metal needles, low-level lasers (of sufficiently low energy levels that the temperature of the tissues is not increased) and moxibustion. (Moxibustion is a method of warming acupuncture points with the intention of stimulating circulation through the points. It involves placing a heated compacted herb, traditionally *Artemesius vulgaris*, close to the skin at the site of the acupuncture point.)

In the case of needle acupuncture, gold, silver or stainless steel needles of fine diameter are inserted into acupuncture points and penetrate the patient's skin at various depths, in order to achieve therapeutic effects in different organs and functional systems. A typical treatment course is a weekly session for six to 10 weeks, which may need to be followed up with single repeat treatments at varying intervals.

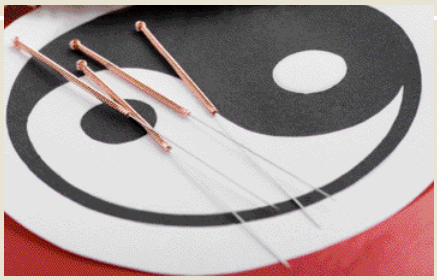
Therapeutic results include analgesic, sedative, anti-inflammatory, antispasmodic and antiemetic effects. Side effects are rare when performed by practitioners mindful of their medical training to avoid organ puncture, haemorrhage and needle infection.

Acupuncture points and meridians

According to the traditional Chinese medicine model, acupuncture points are anatomically described positions on the body. These points were recorded by ancient practitioners after empirical observation of a physiological change induced by stimulation of that point. For example, 'liver 3' on the foot was empirically observed to relieve migraines.

Ancient practitioners then drew lines connecting certain acupuncture points, which we now call meridians. They explained that stimulation of any point on a meridian will have an effect elsewhere on that meridian or in the organ after which the meridian is named. The 12 main meridians are named after the following organs: lung, stomach, large intestine, small intestine, kidney, heart, pericardium, liver, spleen, triple energiser (although this is not an organ as we now know with the benefit of dissection and modern understanding of anatomy), gall bladder and bladder. There are many acupuncture points on the ear and auriculoacupuncture is based on the idea that

Acupuncture explained



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The traditional Chinese explanation of acupuncture is that the flow of Qi, the body's vital life force and the force that exists in everything that shows signs of life, is mobilised by stimulation of acupuncture points. This results in rebalancing of the body's Yin–Yang balance. The Monad, the symbol of Yin and Yang, is recognised worldwide and symbolises holistic harmony through opposite poles.

The balance of Yin and Yang, the opposing forces or dynamics that exist in everything, is essential for the existence of a healthy whole. Where there is an excess or deficiency of either Yin or Yang, there is disease. Examples of Yin and Yang are damp and dry, cold and heat, and female and male. Excess of damp may be oedema, whereas excess of dry may be dehydration – but a healthy organism will have a balance of the two. Our modern understanding is that of homeostasis, with an example being the balance of sympathetic and parasympathetic nervous systems.

the ear is a microsystem with the entire body represented on the auricle.

Now that we have a greater understanding of anatomy and the function of the organs of the body, we know that the points on the meridians have more diverse effects than just affecting the organs after which the meridians are named. For example, while 'large intestine 4' will, true to its name, have an effect on the large intestine such as relieving constipation, 'gall bladder 34' is effective for relieving muscle spasm anywhere in the body and 'pericardium 6' (PC 6) is very effective for relieving nausea and vomiting.

When dissected, acupuncture points correspond to small nerve bundles. These nerves are either cutaneous (sensory or sensory plus sympathetic), vascular (the blood vessels being surrounded by mixed sympathetic and sensory nerves) or muscular (mixed sensory and motor nerves entering or leaving the muscles).[1]

Acupuncture trigger points

Acupuncture or 'dry needling' of trigger points is a different model to the traditional Chinese medicine meridian system of acupuncture points. According to Travell and Simons, who have extensively researched trigger points and the relation between an active trigger point and its characteristic pain pattern, a myofascial trigger point is a hyperirritable locus within a taut band of skeletal muscle, located in the muscular tissue and/or its associated fascia.[2]

A trigger point may begin with muscular strain or overuse, and result in stiffness or weakness of the muscle as well as pain that is referred in a characteristic distribution. Clinically, the patient feels the greatest tenderness on palpation of the trigger point and the practitioner feels an area that is hard or has the greatest resistance to palpation. The patient may feel referred pain and have an autonomic reaction to stimulation of the trigger point, such as redness, heat, coryza or lacrimation. The myofascial tightness and pain of a trigger point can be relieved by manipulating an acupuncture needle at the point ('dry needling') or injecting a dilute local anaesthetic or saline solution ('wet needling').[3]

Evidence for the use of acupuncture

There are many small trials showing the effectiveness of acupuncture. For example, studies on the use of PC 6 in the treatment of postoperative nausea, morning sickness and chemotherapy-induced nausea have been reviewed and it has been shown that between 60 and 70% of patients benefit from acupuncture.[4] However, gathering evidence for the effectiveness of acupuncture has been more challenging than for drug trials. This is because gold standard, double-blind, randomised controlled trials are difficult to achieve with a technique that involves needles. The problem with sham needling is that inserting a needle anywhere in the body, whether an acupuncture point or not, will potentially create a physiological change.

Studies with placebo needles (the needle is pressed onto the skin but slides back into its case rather than underneath the skin) have been conducted in Germany.[5] The results demonstrated that acupuncture does have specific effects but critics have pointed out that only the patient and not the therapist is blinded with this method.

Many large studies of acupuncture have been conducted in China but they typically do not follow the western format for scientific studies.

Acupuncture appears to work at many levels, with much research being conducted in a quest to have scientific proof of the therapeutic results. Research is also needed to obtain a physiological explanation of what occurs when an acupuncture needle or laser is applied to an acupuncture point. The current status of the research is summarised below.

- Studies have shown that the analgesic effects of acupuncture are reversed by naloxone, providing proof that at least part of the explanation for the pain-relieving effects of acupuncture is that it is opioidergic.[6-8] An increase in beta-endorphin level in the cerebrospinal fluid of patients in whom pain was relieved by acupuncture has also been noted.[9]
- When a nerve is blocked by local anaesthesia, acupuncture is ineffective in the area supplied by that nerve. It has been suggested that this is evidence for nerve conduction being a mechanism of acupuncture.[10]
- Experiments in mice have found adenosine is central to the mechanistic actions of acupuncture.[11] These

experiments showed that acupuncture needles triggered an increase in extracellular purines, including the transmitter adenosine, which is consistent with the observation that tissue damage is associated with an increase in extracellular nucleotides and adenosine. The researchers reported that antinociceptive and anti-inflammatory effects of peripheral, spinal and supraspinal adenosine A1 receptors are well established, and found that suppression of pain mediated by acupuncture required adenosine A1 receptor expression. Acupuncture failed to reduce pain in mice in whom adenosine A1 receptors were deleted.

Magnetic resonance imaging, single photon emission computed tomography and transcranial doppler ultrasonography have shown that acupuncture has a physiological effect. The needling of acupuncture points speeds up the blood flow in certain brain regions, leading to regionally increased oxygen supply to the brain tissue.[12-15] An increase in blood flow can also be demonstrated in the more accessible arteries of the eye during needling of the acupuncture points that are traditionally used to support vision.[16] The blood flow in these arteries did not change when the patients were needled at other points. The acupuncture-induced change in oxygen supply in the central nervous system can continue to be demonstrated after the treatment has been completed.

An analysis of 16 randomised controlled trials has compared efficacy of low-level laser therapy with placebo or with active control in patients with acute or chronic neck pain. The trials revealed that low-level laser therapy reduces pain immediately after treatment in patients with acute neck pain and up to 22 weeks after completion of treatment in patients with chronic neck pain.[17] The trial included a total of 820 patients and treatment included traditional acupuncture, trigger points and tender points.

Conclusion

In consideration of the credibility of acupuncture, we can take into account the long history of acupuncture use, spanning many countries and cultures since at least 300 BC. We can then look at the scientific proof, which started as empirical observation of cause and effect of pain and its disappearance after stimulation of an acupuncture point.

We now have a thirst for more convincing scientific evidence of the efficacy of acupuncture and are embarking on studies that meet the criteria of being large in number, randomised, controlled and double-blind. Such studies are currently under way and we can look forward to an era of exciting acupuncture research. MT

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Further reading

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COMPETING INTERESTS: None.