A background to acupuncture and its use in chronic painful musculoskeletal conditions

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Abstract

This article gives a brief description of the origins of acupuncture and describes some of the underlying philosophy behind this treatment and attempts to place it in context of the traditional Chinese medicine genre within which acupuncture is set. The article then explains the difference between traditional and Western style acupuncture and explains how point selection is made. The use of acupuncture is steadily increasing for a variety of reasons, it is a very safe intervention particularly when compared to conventional treatment and its lack of serious side effects might in part account for some of its popularity. The science behind acupuncture is also explored in terms of its underlying mechanisms and includes pain gate, endogenous opioids, diffuse noxious inhibitory control, serotonin and bioelectricity as possible explanations. The efficacy of acupuncture for a range of chronic musculoskeletal conditions is then explored and it is concluded that acupuncture has a place in the treatment of chronic musculoskeletal pain and in particular osteo-arthritis (OA). Where degenerative conditions are involved, acupuncture clearly cannot provide a 'cure' but can provide symptomatic relief, often over a prolonged period.

ACUPUNCTURE – HISTORY ORIGINS AND CONCEPTS

Acupuncture is an ancient Chinese treatment that involves the insertion of fine needles into various locations in the body at acupuncture points. These points may be local and/or distal to the area requiring treatment. There are conflicting arguments as to how long it has been in use and various sources have proposed anything from 3000 BC to 1000 BC.[1–3] Acupuncture has been traditionally used for a multitude of problems ranging from pain through to systemic disorders, psychological problems, addiction and many others. Indeed, it would seem as though there are relatively few disorders that would not be treated with acupuncture.[4] It has even been stated that acupuncture can be effective on conditions that are considered incurable by Western medicine.[5] It is, however, only one aspect of traditional Chinese medicine (TCM): the other cornerstones of treatment being moxibustion (the application of heat), massage and traditional herbal remedies.

Acupuncture may have evolved either from the process of bloodletting[6] or as a result of applying pressure or massage to what are now known to be acupuncture points. For example, following simple injury a person may have massaged or rubbed an area to gain relief. It became apparent that there were many points over the body that if pressed would elicit feelings of tingling, numbness, heaviness or could cause anaesthesia.[7] For example, pressure exerted at the gluteal fold (onto the sciatic nerve) or at the elbow (onto the ulnar nerve) may cause paresthesia and this principle may have been used to advantage when musculoskeletal pain was apparent. Gradually experience in treatment was gained, until circa 3000 BC in Northeast China a primitive form of acupressure was in use. Primitive stone knives and scrapers had been used in China in the Old Stone Age (up to 8000 BC) for bloodletting and abscess draining, these were called 'Bian' stones[3] and were also used to apply massage and subsequently to pierce acupuncture points. To put this in perspective, this was around 5000 years before the building of the first of the Great Pyramids in Egypt and nearly 6000 years before Stonehenge in Britain. This is illustrated in the time line below.

Development into the more recognizable form of acupuncture therefore came about largely as a result of the astute observations of Chinese physicians who noticed relationships between areas of the body that could be punctured or massaged and the alteration of certain conditions.

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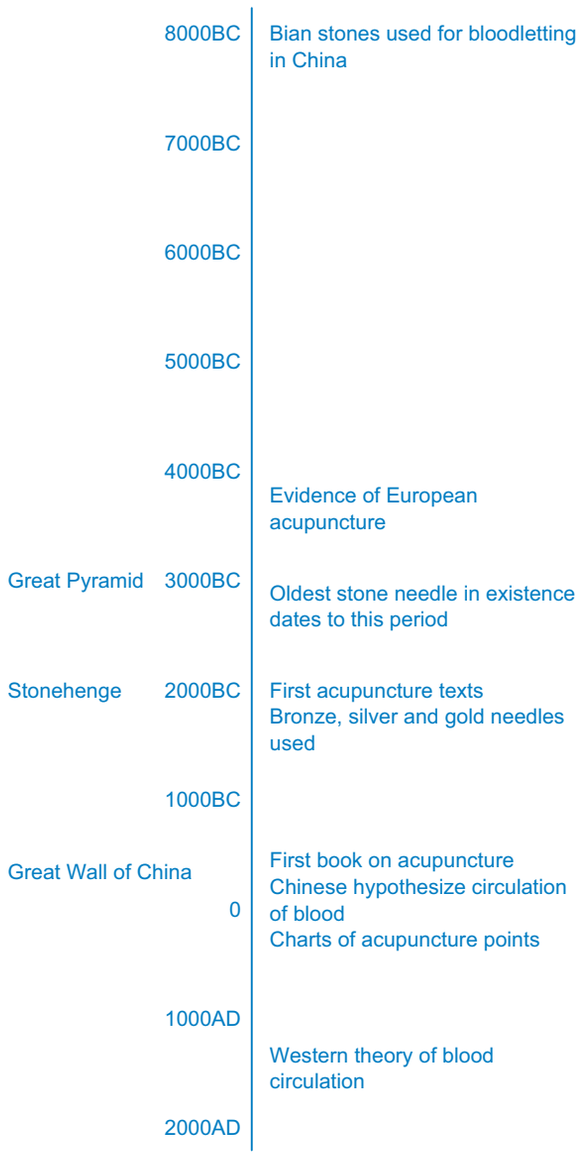
Figure 1

Timeline



While it is generally accepted that acupuncture originated in China,[8] there may be some evidence to suggest that it may have actually been first used in Europe as far back as 3200 BC. This fascinating hypothesis is postulated by Dorfer *et al.*[9] with regard to the much-publicized mummified remains of a traveller discovered in a glacier in the Tyrolean Alps. This is the oldest known European mummy (5200 years old). Dorfer explains that groups of markings are shown on the mummy's back and legs and these coincide with acupuncture points A computerized tomography (CT) scan of the 'iceman' shows that he suffered from arthrosis of the lumbar spine and the points found would be appropriate to treat this condition. This evidence is of course far from conclusive, but it may suggest a different or perhaps simultaneous geographical origin for acupuncture.

ACUPUNCTURE AND TCM

The traditional theories that underpin acupuncture as a treatment modality revolve around the concepts of balance and the flow of energy within the body and that illness is as a result of imbalance. It is thought that by placing needles into specific points and thereby gaining access to body energy, the relative levels can be increased or decreased and correct flow can be restored creating equilibrium.

Chinese medicine in its traditional form is more than simply a method to treat the sick and injured, rather it is a philosophy in itself and is concerned with the balance not only of the forces within a person, but of humankind within nature. It has its own well-developed system of anatomy and physiology. Illnesses and more particularly, symptoms, are simply outward manifestations of an imbalance. Great emphasis is therefore placed upon tracing and treating the cause of the imbalance rather than the symptoms in order to maintain health. Acupuncture treatment seeks to balance these forces within the body by the application of needles to strategic points.

An important aspect within TCM and therefore acupuncture, is that of energy or 'qi' (pronounced 'chee'). By 200 BC, some 1700 years before the West came round to this view, the Chinese had hypothesized the circulation of the blood through two types of vessels, that is, arteries and veins. They also hypothesized, however, the circulation of another vital element, that of 'qi'.[10] It is thought that this is in fact the 'life force' and it is the presence of qi that differentiates between living and inanimate.

'It is the cohesion of our mind, body and spirit and is integrated into the myriad aspects of every being.'[1]

At certain locations along these meridians, access can be gained to the channel where the meridian is superficially situated,[4] that is at acupuncture points. Stimulation of the points by pressure, heat or wounding therefore would have an influence on the meridian and the qi contained within it. This could then in turn affect a diseased, injured or painful part of the body.[11] Furthermore, because a meridian, like a blood vessel, travels through the body, points may be effective locally and/or distal to the affected body part.

There are many factors that may cause an alteration in qi. It is thought that not only do organs and emotions have an influence on this but so too do many external agents. The climate, time of year, time of day, the phases of the moon and the presence and balance of various elements all have a role to play in either maintaining or upsetting equilibrium.[11, 12]

Diagnosis using TCM is holistic and includes a combination of observation of the patient and of their demeanour,[11] the shape, colour, moisture and coating of the

tongue, the patient's manner and tone of voice,[10] an evaluation of various bodily functions and palpation particularly of the radial pulse which is thought to yield a great deal of information about the organs and meridians within the body.

ACUPUNCTURE TREATMENT AND 'WESTERN' ACUPUNCTURE

Treatment of conditions with acupuncture must be viewed as a fluid modality and indeed points chosen may vary from session to session or even within an individual session depending on the response of the patient. Similarly, there may be several options of acupuncture points for the same condition. This gives a staggering amount of variability and flexibility to treatment options, all of which can be individualized. Should a treatment fail to resolve the problem, the combination of points may therefore be changed. Whereas the TCM practitioner would need a comprehensive knowledge of five element theory, pulse and tongue diagnosis, and so forth, in order to arrive at a treatment formula, the Western practitioner is able to integrate a knowledge of anatomy, physiology and pathology and a much more basic understanding of acupuncture to arrive at a more prescriptive choice of points. The actual points used for a particular painful condition may be the same as those used within TCM but the route to choosing them may be entirely different. The distinction between TCM and 'Westernized' acupuncture is important however as 'Western' acupuncture tends to be much more formulaic.[13] Those using a 'Westernized' form of acupuncture may still have many options to treating one condition. These may be points on meridians that pass over or near the painful area as well as associated points further along the meridian. Added to this are the options of using trigger or ahshi points (points which are particularly painful on palpation) which may or may not coincide with a regular acupuncture point. It is also interesting to note that, often, the combination of points may give a much more powerful effect than each point used individually.[14]

In a Westernized treatment for pain, typically anything from three to 10 needles may be used although evidence would suggest that six would be the minimum.[15] Some of these would be placed local to the painful area and others may be on associated meridians distal to the problem. Patient reactions during acupuncture treatment can be wide and varied. The needle is inserted fairly quickly into the chosen point and this may or may not cause mild discomfort as the needle pierces the epidermis. Depth of penetration will vary, first, according to the anatomical area being needled (amount of soft tissue and size of patient) and, second, the specific location of the point itself (not all points are at the same depth).

Point location is most commonly achieved via palpation and a good knowledge of surface anatomy. Once the needle has been inserted the patient should feel some sensation. This is most typically described as a deep ache although feelings of warmth, heaviness, tingling or even numbness are not uncommon. This sensation is called 'deqi' (pronounced der-chee) and its propagation is thought to be important in the treatment of pain.[16, 17] The intensity of this sensation can again vary from person to person with some feeling little more than mild sensation and others describing intense and sometimes quite uncomfortable feelings. The needles are typically in situ for between 10 and 20 minutes although some practitioners may simply insert and immediately withdraw the needle.[18]

Acupuncture is available from several sources both within the NHS setting and privately. Many GPs now use acupuncture as well as staff in pain clinics and physiotherapy departments. It is important however that if referring to an acupuncture practitioner, they are properly accredited and affiliated to one of the professional societies. There are at present three major governing bodies for the practice of acupuncture: British Medical Acupuncture Society (BMAS); the Acupuncture Association of Chartered Physiotherapists (AACP); and the British Acupuncture Council (BAcC).

USE OF ACUPUNCTURE

There has recently been a huge increase in the use of complementary and alternative medicine (CAM) and a rise in its public popularity.[19, 20] In excess of 20 per cent of the UK population use CAM each year[21] and Thomas *et al.*[22] indicate 47 per cent of the population use CAM at some point in their lifetime. Ernst and White[21] further estimated, £1.6 billion is spent on CAM annually within the UK. It may however, be used as a last resort by many patients[23] as a result of dissatisfaction with routine care; in essence the failure of conventional medicine to deliver a satisfactory outcome for many patients with chronic conditions or because of the many side effects associated with conventional drugs.[24, 25]

Acupuncture is one of the most popular and widely used CAM interventions for pain.[21] It is associated with very few side effects and is the most frequently used therapy within the field of CAM for the treatment of osteo-arthritis (OA).[26] Seventy-one per cent of visits to CAM practitioners in the UK are due to musculoskeletal problems.[22] It has been estimated that more than 0.6 million adults used acupuncture in England during 1998 and that in the USA approximately one million people use acupuncture annually for the relief of pain.[27]

Acupuncture is practised by many healthcare professionals within the NHS (GPs, nurses, midwives and physiotherapists) and 84 per cent of clinics offered acupuncture as a treatment in the control of pain.[28] Such is its popularity, that 95 per cent of GPs say that their patients had discussed CAM with them over the previous year and that 59 per cent of GPs had referred patients to CAM therapy, the most popular being acupuncture.[19] Seventy per cent of GPs believed that some CAM therapies (such as acupuncture) should be available on the NHS.[20]

ACUPUNCTURE AND SCIENCE

There have been many studies of acupuncture, a recent search on the Medline and Cinhal databases showed in the region of 3000 articles relating to acupuncture. There are therefore many theories and explanations as to the nature, effects and mechanism of acupuncture.

Traditionally, many acupuncture points are thought to be linked to each other by channels or 'meridians'. The anatomical existence of meridians or acupuncture channels is unclear. Although points are often linked by nerves, blood vessels or lymphatics, no channel correlates to any one of these structures.[29] Bensoussan[11] also points out that meridians are often contained within one dermatome for a considerable part of its length but never for the whole of its course. They may show

electrical characteristics distinct from surrounding tissue. Bossy[30] argues for a system of interconnecting interneurons within the spinal cord in order to explain the trans-segmental nature of sensation propagated along a meridian but concurs that there is no peripheral anatomical structure to account for the meridian itself. Experiments have involved injecting radiotracers into acupuncture points in order to ascertain whether the existence of the meridian can be demonstrated but these have also been inconclusive.[12, 31]

With regard to the acupuncture point itself, many structures have been cited as being the likely candidates. However, it appears that there is probably no single anatomical structure but rather many, which together form the concept of acupuncture points.[1, 32] Trigger points, that is, areas that are painful on palpation, have been cited as a possible structure. Trigger points are usually areas where muscle is in local spasm but could also be where skin and viscera share the same neural pathway[29] and more often than not, they coincide with acupuncture points.[33]

The theory that acupoints are associated with some form of electrical phenomenon has also been suggested as they show decreased (electrical) skin resistance.[1] The presence of a transdermal electrical potential has been well established[34] and the acupuncture point, being of low resistance, may represent a short circuit in this system.[12] Low voltage DC electrical fields have also been mapped on the body[35] which, it is thought, are primitive neural transmissions and may have an influence over levels of sleep/wakefulness and even healing.[36] These fields tend to coincide with acupuncture meridians and it is possible that the acupoints might be small potential generators dotted along the field.

SUMMARY OF THE MECHANISMS INVOLVED IN ACUPUNCTURE

The definitive answer as to how acupuncture actually works from a Western scientific viewpoint has yet to be discovered. It would seem likely, however, that for pain, there are several possible mechanisms.

Pain gate

Many of the early theories centred on pain gate theory. Melzack[33] postulated that as there was a high correlation between trigger points and acupuncture points and as needling local to the pain was often effective, this might imply a segmental explanation. Needles used within the same dermatome could be effective via the pain-gate mechanism. The need for an intact nervous system may also implicate both pain gate and diffuse noxious inhibitory control (DNIC) as being instrumental in the workings of acupuncture.[37] Briefly, pain gate theory suggests that cells within the dorsal horn of the spinal cord, namely the substantia gelatinosa, act rather like a switch between afferent nerve impulses from different fibres. Slow (chronic) pain is carried by small unmyelinated C fibres, however when there is a preponderance of signals from other myelinated fibres such as A beta and A delta (responsible for touch, vibration and fast pain), the gate closes to C fibre impulses and allows the A fibre signals through. There is also an influence by descending pathways from the brain.[33] This is perhaps well illustrated by the tendency of people to immediately rub an area that has been hit or subjected to minor trauma, it feels better because the pain is decreased by the tactile stimulation. The hypothesis for this mechanism is therefore that the insertion of the acupuncture needle stimulates the A delta fibres and closes the gate to C fibre impulses.

Endogenous opioids

However, segmental effects do not explain the effects of acupuncture seen throughout the body. Another theory as to how acupuncture may work involves endogenous opioids.[38] Endorphins have been readily measured in the cerebrospinal fluid (CSF) following acupuncture.[39, 40] Andersson[40] particularly cites beta endorphin as being important in pain control which is released from both the hypothalamus and the pituitary, a claim also supported by Strauss.[41] The fact that the effects of acupuncture are only partially reversed by systemic naloxone suggests not only an opioid involvement but other systems as well.[38]

Diffuse Noxious Inhibitory Controls (DNIC)

Another possible mechanism that has gained considerable credence and may help to explain the non-segmental effects of acupuncture, is that of DNIC.[42] Le Bars suggests that dorsal horn neurones are inhibited by nocioceptive afferent signals applied to any other part of the body. Therefore any applied painful or noxious stimulus (such as an acupuncture needle) will attenuate existing pain even in extra-segmental areas. It is suggested that this works by both peripheral and central systems. The peripheral system works via A delta and C fibres and indeed the propagation of needle sensation 'deqi' is a sign of activation of the A delta fibres.[40] If this sensation is blocked by the local injection of procaine, acupuncture is ineffective.[18] The central mechanism operates via descending inhibition from brainstem structures such as the Nucleus Raphe Magnus. In support of the involvement of 'higher' structures in this aspect of pain control is the fact that stimulation of the para-aqueductal grey (PAG) in the midbrain will inhibit responses of the spinal cord neurons to noxious stimuli.[40] It is also suggested that endogenous opioids may participate in the DNIC mechanism.[43]

Serotonin

A positive relationship between serotonin levels and the effectiveness of acupuncture would also tend to implicate this substance in the mechanism.[39, 44] Similarly, serotonin levels tend to increase after acupuncture if the treatment has been effective. Acupuncture tends to be less effective when used on depressed patients and there may therefore be a link between decreased levels of serotonin in these patients and failure of acupuncture to achieve good pain relief.[45]

Bioelectricity

The presence of endogenous electrical fields throughout the body has already been cited. Injury currents have been shown leaving the site of a lesion – a cut in the skin will produce a short circuit in the skin electrical potential[46] and this is thought to have an effect on the healing process insomuch as if the current is prevented from flowing, healing is either delayed or stopped. Insertion of an acupuncture needle may similarly cause a change in the electrical field which in turn may have an effect on the tissues nearby[12] and, it is postulated, may even serve to correct a homeostatic imbalance.[45]

EFFICACY OF ACUPUNCTURE

While there can be little doubt that for many painful conditions, acupuncture is an

effective and safe treatment, as it appears to elicit large effect size, the question of efficacy remains debatable. The reason for this is multi-faceted but might in part be due to the poor quality of trials that have thus far made up the evidence base for acupuncture.

Patel *et al.*[47] conducted a meta-analysis, for several chronic pain conditions, but divided this into subsections for different sites, for example, head and neck. When results were pooled it appeared that the only subgroup that obtained significance were the trials for head and neck pain although Patel *et al.* commented that the blinding was poor in all of these trials. Patel *et al.* noted that patients who received strict formula type acupuncture tended to do less well than those who were treated with a more flexible approach. This could of course be a reflection of the need to maintain flexibility and adequate treatment when using acupuncture. It was also noted that the more rigorous the blinding in a trial, the less significance was attained between real treatment and control, an observation also suggested by Ter Riet[48] and Ernst.[49] Patel *et al.*[47] concluded that on the whole, 'results favourable to acupuncture were obtained significantly more than chance alone would allow'.

Another meta-analysis also examined acupuncture and chronic pain.[48] Studies were marked out of 100 on a range of qualities. One of the most obvious findings that the authors point to is the very low case numbers included in all of the trials and the poor quality of all the trials reviewed. It was felt therefore that no definitive conclusions as to effectiveness could be drawn but that efficacy remained doubtful. Ter Riet *et al.* however, failed to differentiate between different sites of pain because pain from several areas had been included in the analysis. This implied that all pain reacts to acupuncture in the same way; this may not be the case. Also no account was taken of the adequacy of the treatment given in the reviewed trials.[50] Interestingly, Kjellman *et al.*[51] reviewed the literature for all randomized trials on neck pain, covering a wide range of interventions including acupuncture and conventional therapies. They found that again, quality was very low across the board. This of course might suggest that many trials generally are poor and not just those evaluating acupuncture. They also noted that the more recent trials tended to be of better quality than the older ones and perhaps this marks a change for the better in the rigour of trials.

In a systematic review of acupuncture for the treatment of OA, 13 appropriate studies were found.[26] The overall conclusion of this was that there was no uniform picture as to the efficacy of acupuncture. In view of the high number of methodological flaws displayed in these early trials however, it is not surprising that a systematic review would fail to provide conclusive answers.

Smith *et al.*[52] also carried out a systematic review, drawing on studies that used acupuncture in back and neck pain. They included randomized trials that used acupuncture needling or laser stimulation and an inert control. They did not exclude trials that were not blinded. Both chronic and acute conditions were included. Thirteen trials met their inclusion criteria. Trials were scored on a 0–16-point 'Oxford pain validity scale' (OPVS) and points were awarded for various aspects of blinding, group size, outcome measures, baseline pain and sensitivity to changes and, last, data analysis including handling of dropouts. The authors concluded that acupuncture was no more effective than placebo and that there was an inverse relationship between the quality of the trial and its findings, that is, better quality trials were more likely to produce a negative result for acupuncture. Once again however, homogeneity was not maintained in this systematic review either in terms of the condition being examined or the type of control used. Neither was there any consideration for the type nor adequacy of treatment being used, for example, laser versus needling, formulaic versus flexible treatment, multiple versus single sessions.

Ezzo *et al.*[15] conducted a systematic review to examine the effectiveness of acupuncture for various painful conditions. Studies were included if they were randomized, had a control group, used needles, had a measurement of pain relief and dealt with chronic pain. They also examined the aspects of acupuncture treatment – how many treatment sessions and how many needles needed to be used in order to provide an adequate treatment. To aid homogeneity, Ezzo *et al.* divided the studies depending on the type of control that was used. They found 51 appropriate trials, generally they found that results were inconsistent and that no firm conclusions could be drawn as to the efficacy of acupuncture because so many trials were of such poor quality. They did however conclude that treatments comprising of at least six sessions and using at least six needles each time were consistently associated with a positive result. One suggestion was that this might be due to a cumulative effect of treatment.

A systematic review of knee pain trials (seven trials, 393 patients) concluded that acupuncture was more effective than 'sham' acupuncture in terms of pain relief although all of the included trials were small.[53]

A Cochrane[54] review of the literature for the use of acupuncture in tennis elbow identified only four trials that met their criteria all of which were underpowered and of poor rigour. It was concluded that acupuncture might have a short-term benefit when treating this condition but due to the small number of trials included, firm conclusions could not be made.

Three systematic reviews of acupuncture for low back pain were conducted by Ernst,[55] Furlan *et al.*[56] and Manheimer *et al.*[57] These involved 12, 35 and 33 randomized controlled trials, respectively. Ernst concluded that results suggested that acupuncture was an effective treatment for back pain but because of the large variation in trial methodology, firm conclusions were difficult. Furlan *et al.* concluded that for chronic back pain, acupuncture is more effective for pain relief and functional improvement than either no treatment or 'sham' treatment. Average reductions in pain were in the order of 32 per cent for acupuncture and 23 per cent for sham interventions. They felt therefore that it would be a useful adjunct to other conventional treatments but also pointed out that the quality of trials included in the review was very low and so, as with Ernst, clear recommendations could not be made. The conclusions of Manheimer *et al.* were similar in so much as they felt that acupuncture was effective at reducing chronic back pain but that it was not more effective than other therapies. Manheimer *et al.* also concluded that there was great heterogeneity between trials.

Thus, many early trials were underpowered, non-randomized, unblinded, employed a sub-standard treatment regime and used controls of

unknown physiological effect. Furthermore, these trials were included in systematic reviews thus making conclusions difficult.[58]

In order to provide an unbiased report of the current literature available, the subject to be reviewed must be clearly stated and trials that are included in a systematic review must be appropriate to the subject being examined. This implies the use of great clarity and rigour with respect to the inclusion and exclusion criteria, which must utilise logical and defendable parameters.

- The literature search must be exhaustive and include all relevant trials, including the grey literature. The included trials must be randomized and controlled with at least single blinding.
- When specifically purporting to be examining acupuncture, the review must only include trials that actually used acupuncture, that is, needle puncture, as a treatment.
- As efficacy may vary from condition to condition,[49, 59] it may well be very prudent to limit reviews to one specific painful site or pathology.
- The type of treatment given is vitally important and must be such that it can be considered as being adequate by general consensus of those who use acupuncture.
- The choice of control used in included trials is important as this enables different questions to be answered as does the trial design – the nature and format of a study to be reviewed must also be taken into account and the wisdom of including it must be examined when attempting to answer a specific question relating to efficacy.
- Often trials are scored utilising a proprietary scoring mechanism in order to ascertain their relative credibility and assess their methodological competence and then weighted accordingly. Failure to consider trial quality may certainly introduce bias into the results of any pooled analysis[60] and if the prime studies are flawed then any conclusions drawn by a meta-analysis will be invalid.[61] However, if this is to have any real meaning, the trials must be homogenous and therefore comparable and the scoring system must be relevant to the pragmatic clinical practice of acupuncture, as well as the carefully defined rigorous science of an RCT. However, if scoring is to play an integral part in the overall process of a systematic review, then the choice of instrument must be made with thoughtful consideration for the subject matter. This in itself can be fraught with difficulties as the choice of scoring mechanism can alter the outcome of the systematic review or meta-analysis.[61] There are a plethora of scoring mechanisms and guidance scales, which can be employed to grade RCTs. A cursory glance at the literature reveals at least 26 different scoring techniques.[48, 62–86] Some of these are very narrow in their scope and concentrate on a few items only; whereas others contain many more criteria, for example, 34 items for a scale developed by Reisch *et al.*[83]

More recently however, the quality of research has changed and researchers are much more cognisant of the issues involved. This has recently led to more rigorous and reliable data although there remains the problem that the absence of a standardized 'placebo' control for acupuncture makes interpretation of trials difficult in terms of efficacy.

A large trial for the treatment of chronic OA of the neck was carried out involving 135 participants and a course of eight treatments (average of six needles per treatment) over four weeks.[87] Patients were randomly allocated to either real treatment or a placebo which involved mock electrical stimulation of acupuncture points. This trial demonstrated in the region of a 60 per cent reduction in pain (the primary outcome) from baseline compared to 42 per cent for placebo. Secondary outcomes (SF36, Neck Disability Index and range of movement) similarly improved. Furthermore, this study also included a long-term follow up that found that patients continued to show a significant improvement at one-year post treatment. The improvement in pain showed a statistically significant difference over the control group. However, the authors felt that this difference was not clinically significant although the difference from baseline clearly was. This trial although rigorous, can be criticized because it did not include a 'non-treatment' arm and therefore the effect of regression to the mean could not be assessed. Also, this was effectively a single practitioner study and therefore it is not known if these results are generalizable to other practitioners.

Two other large and recent studies examined the effectiveness of acupuncture for OA knee.[88, 89] Berman enrolled 570 patients and randomized them to one of three groups: real acupuncture; an 'education' control group whereby patients received advice; and an acupuncture type control. The acupuncture control consisted of a combination of inserting needles at non-classic acupuncture points as well as tapping a plastic needle against the real points. Patients were screened so that they could not view the procedure. This study found a significant improvement in Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and function scores for the acupuncture group over the other interventions. They concluded that due to the lack of any side effects and because the improvement was over and above those achieved with conventional therapy, acupuncture has an important role to play as an adjunctive therapy in osteo-arthritis. This study was also rigorous and therefore produced valid results but could be criticised for the excessively long treatment regime, which spanned 26 weeks, with varying intensity. It could be said that this would render such treatments financially unviable. There was also a very high drop out rate, 25 per cent in the acupuncture groups and 43 per cent in the advice group.

The trial by Witt *et al.*, enrolled 294 participants who were randomly assigned to eight weeks of acupuncture, minimal acupuncture (superficial needling at non-acupuncture points) or a wait-list control.[55] This trial also utilised the WOMAC score as the prime outcome. Immediately post treatment, the baseline adjusted scores showed an improvement for the acupuncture group of 8.8 points over the minimal acupuncture and 22.7 points over the wait-list control. These differences were highly statistically and clinically significant thus drawing the conclusion that efficacy was demonstrated. The authors point out however that at one-year follow-up, this statistical difference had disappeared. These results are summarized in Table 1.

SIDE EFFECTS

Acupuncture cannot be said to be completely free of risk but the risks are very low. It has been estimated that major

Table 1

Summary of trial results

Study	Type	Site/condition	Intervention	Result	Conclusion
Patel[47]	SR	Pain various	–	–	In favour of AP
Ter Riet[48]	SR	Pain various	–	–	Doubtful efficacy for AP
Ernst[26]	SR	Neck Pain	–	–	Inconclusive
Smith[52]	SR	Back Pain	–	–	AP no better than placebo
Ezzo[15]	SR	Pain various	–	–	Inconclusive
Ezzo[53]	SR	Knee	–	–	AP better than sham
Green[54]	SR	Tennis elbow	–	–	Some short term benefit/ inconclusive
Ernst[55]	SR	Back pain	–	–	Efficacy shown
Furlan[56]	SR	Back pain	–	–	Efficacy shown
Manheimer[57]	SR	Back pain	–	–	Efficacy shown
White[59]	RCT	Neck pain	AP vs mock electrical stimulation	58% improvement for AP, 42% improvement for placebo	Large effect, but not clinically better than placebo
Berman[60]	RCT	Knee pain	AP vs advice vs sham intervention	Pain improved by –0.87 and function by –2.5 (WOMAC) over sham	AP demonstrates greater improvement in pain than sham
Witt[61]	RCT	Knee pain	AP vs superficial needling vs wait list	8.8 points improvement over control acupuncture (WOMAC)	AP demonstrates greater improvement than control AP

Note: SR = systematic review; RCT = randomized controlled trial; AP = acupuncture.

complications of this form of treatment has an incidence of between 1:10,000 and 1:100,000.[90] MacPherson[91] surveyed 574 practitioners (34,407 treatments) and found no serious adverse events. Minor events, the most common being nausea or fainting, were noted in 1.3 per 1000 treatments. Another survey[92] found 14 'significant' (e.g. fainting, nausea, drowsiness, anxiety, lost needle, and so on) events per 10,000 treatments although they also reported 671 'minor' adverse events (including bleeding and discomfort) per 10,000. Norheim and Fonnebo,[93] in Norway, suggested 0.21 incidents, of any nature, serious or otherwise, per year of acupuncture practice. The low risk is particularly illustrated when considered within the context of conventional medicine. Side effects from NSAIDs are generally dose related and increase with increasing age. It has been suggested that on average, one in 1200 patients will die from complications as a result of taking NSAIDs for at least two months, that is, approximately 2000 deaths each year in the UK.[94] MacPherson[95] points out that (in New York State) 3–7 per cent of all hospital admissions were due to adverse drug reactions and that 1 per cent of all patients admitted to hospital were seriously harmed by conventional treatment and that in comparison acupuncture seems very safe.[96] Ernst and White[97] observe that if one takes into account the vast number of acupuncturists practising worldwide and the many millions of treatment sessions performed each year, then the incidence of serious complication is very low. It should be pointed out however that acupuncture should be used with caution where pregnancy is suspected, as it is thought that certain points may induce labour, or when patients are using anticoagulants.

CONCLUSION

While the rigour of early trials has often been poor, there is evidence to suggest that acupuncture has a place in the treatment of chronic musculoskeletal pain and in particular OA. The recent and much higher quality trials support this view and appear to produce quite large and clinically important effects. The question of efficacy of acupuncture over and above a convincing placebo, that is, the effect due to specific or non-specific factors, will remain unanswered until such time as such a validated placebo exists. The basic mechanism of acupuncture remains unclear, but there are many promising theories as well as a slowly growing body of evidence from neuroimaging trials that treatment has an effect on the neurology associated with pain and pain relief.[98–100]

Where degenerative conditions are involved, acupuncture clearly cannot provide a 'cure' but can provide symptomatic relief. This relief can work over a prolonged period (up to a year in some cases) but often 'top up' treatments will be required as symptoms begin to manifest once more.

We know that acupuncture is safe and can be used in conjunction with almost all medications (but with caution with anticoagulants). It is therefore an appropriate treatment for chronic pain in many populations and should be considered as a part of any pain management programme.

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