Introduction to acupuncture in dentistry

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An introduction to the practical application of acupuncture in dentistry is presented in the light of current research. It is concluded that acupuncture could supplement conventional treatment modalities. Its value in the treatment of temporomandibular dysfunction syndrome and facial pain has been well documented and supported by randomised controlled trials. Although it may be useful in the control of post-operative pain, its use as sole analgesia for operative care is questionable. The mode of action of acupuncture can be explained with reference to modern neurophysiology. A short training course can allow the technique to be an effective tool in every dentist's hands.

In brief

- Acupuncture is not a miracle cure and is not going to replace the drill. However, the technique can be a supplement to conventional treatments in TMDs, facial pain, pain management Sjøegrens syndrome, and in phobias and anxiety.
- Acupuncture does have a scientific background and the efficacy has been tested in a number of clinical trials including pain management, facial pain, TMD and increasing of the pain threshold.
- Acupuncture is not without adverse effect and therefore proper training is essential.
- The technique can be achieved by any dentist after a short training programme.

Acupuncture originated in China more than 3,000 years ago and involves insertion of needles into various parts of the body with the intention of curing disease. Two recent papers have reviewed the use of acupuncture in dentistry.[1,2] Both authors have concluded that it is effective in a number of conditions encountered in dental practice such as temporomandibular dysfunction syndrome (TMD) and pain management. In addition Blom *et al.* have demonstrated its value in Sjøgrens disease.[3] Despite its long history there still exists a great deal of scepticism in the professional community as to its efficacy. This is understandable as the scientific study of acupuncture has occurred only relatively recently. A commonly held view of acupuncture is that it is a complicated technique involving a substantial knowledge of ancient Chinese philosophy whose action is largely a placebo effect and in any case of limited application to dentistry. However, Richardson has shown it to be effective in a wide range of musculo-skeletal conditions,[4] Lundeberg has demonstrated that it may improve the immune response,[5] and Tao recommends its use in stress management,[6] a topic that interfaces with dental practice. The aim of this paper is to give a broad introduction to acupuncture to the general dental practitioner and to emphasise the scientific background for acupuncture. Before doing so it is necessary to briefly review some of the scientific evidence in support of acupuncture.

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Research on acupuncture

A recent systematic review[2] of published literature was able to identify 74 publications concerning the use of acupuncture in dentistry of which 17 reported randomised controlled trials (RCT).[8–22] As three of these covered the same study[14–16] they were regarded for the purpose of analysis as one trial resulting in a total of 15 RCTs. These were scored according to predefined and accepted criteria[7] to assess the methodological quality. A score of methodological quality 60%+ (ie trial design incorporating some defects, but these unlikely to seriously influence outcome) was used as an acceptable criterion. Nine of the trials achieved this level: of these, four investigated TMD and four the use of acupuncture in post-operative pain management. All four trials covering TMD[9,12–16] showed some benefit comparable to occlusal splint therapy. Three of the trials on post-operative pain management found acupuncture effective.[10,11,17]

The other recent review analysed 16 trials of the analgesic effect of acupuncture and found that the majority of the studies showed some positive effect,[1] although the experimental nature of some of the studies made the evaluation of practical use difficult. However, in summary it may be stated that where trials are competently constructed and executed there is a body of scientific evidence supporting the efficacy of acupuncture within dental practice.

How does it work?

Acupuncture activates small myelinated nerve fibres in muscle, which send impulses to the spinal cord and then activate the midbrain and pituitary-hypothalamus. It has been shown that enkephalin, beta-endorphin, dynorphin, serotonin and noradrenalin are involved in this process.[23] It is well known that a painful stimulation will activate two types of nerve fibres in the peripheral nervous system: A-δ-fibres and C-fibres which primarily will terminate at the second layer of the back horn. From the second layer of the back horn, the pain sensation is via interneurons transmitted to the cortex and we will experience a pain.[24]

Today it is generally accepted that insertion of a needle in an acupuncture point will create a small inflammatory process with release neurotransmitters such as bradykinin, histamine, etc. and subsequent stimulate A-δ-fibres located in the skin and muscle.[25] The A-δ-fibres terminate in the second layer of the back horn and inhibits the incoming painful sensations by release of enkephaline.[24] This segmental model is the most simple mode of action and accounts probably for the

pain relieving effect of acupuncture in most cases.[25]

From the second layer of the back horn, the A-δ-fibre continues to the fifth layer of the back horn, cross over to the opposite side and ascend via the spinothalamic tract to the mid brain where the raphe magnus nucleus is stimulated.[26] Raphe magnus nucleus is the main producer of serotonin on the brain and is believed to play a key role in acupuncture's mode of action.[27] Thus, it has been demonstrated that serotonin is a pro-drug for endorphin which probably accounts for the central (extrasegmental) effect of acupuncture. Moreover, it has been shown that serotonin is a pro-drug for ACTH, which probably via the pituitary gland accounts for the increase of cortisol which has been shown after acupuncture[23] and thus improves the immune system. Finally, Serotonin has a direct effect on the cortex and it is likely that the beneficial effect of acupuncture on stress and anxiety is because of this direct effect.[27]

It has been suggested that the pituitary gland takes part in the production of endorphin but our knowledge at this level is very scanty.[23]

The implementation of acupuncture in dentistry

Acupuncture came to Western Europe as a part of an alternative system of medicine. Traditional Chinese medicine (TCM), over the past 25 years, through neurophysiological research and well conducted clinical trials, has gained acceptance as a valuable tool in the general management of pain. However, it should be stated that acupuncture should be considered as an extra tool in the toolbox only. Its introduction into general dental practice has potentially three paths:

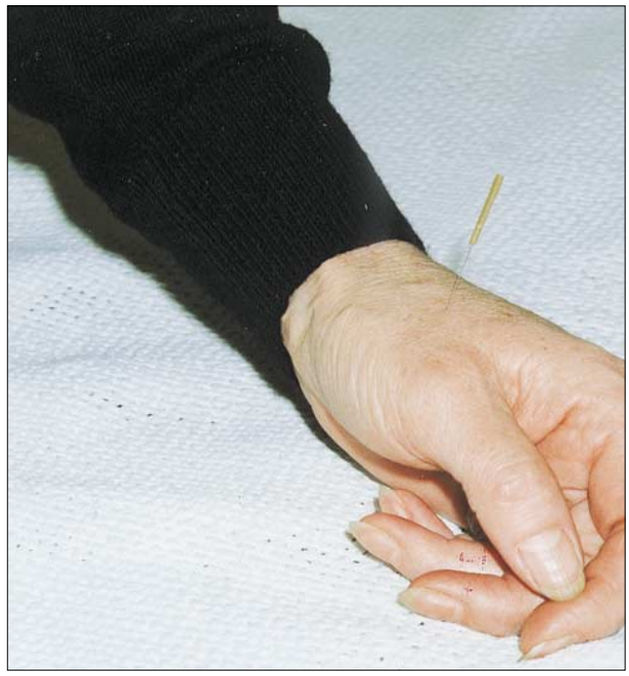
- As a variant of the old medical acronym TEETH (tried everything else, try homeopathy). That is when clinicians have exhausted all available therapeutic avenues, acupuncture is tried as a last resort. This is unfair both to the patient, in whom it may engender false hopes of a 'miracle', and the practitioner for whom repeated failure may lead to abandonment of further study.
- As a supplement to orthodox treatment where treatment modalities may be limited or ineffective. Clear examples are to suppress the gagging reflex during maxillary impression taking, the reduction in postoperative analgesic requirement in patients sensitive to them, reduction of time in the onset of local anaesthesia and control of pre-operative anxiety (Fig. 1). These involve simple acupuncture treatments with the insertion of few needles at recognised acupuncture points, which can be taught to any dentist as a short postgraduate course.
- As an adjunct to, or replacement of normal treatment modalities, for more complex conditions such as TMD or facial pain (Fig. 2). Suitable example are when the use of non steroid anti-inflammatory drugs (NSAID's) is contra-indicated because of concomitant systemic medication or gastric ulceration. These therapies require careful evaluation and a high level of expertise on the part of the practitioner, but postgraduate pathways do exist for this training within the UK.

In Table 1 a brief summary of a number of studies and their outcome is presented, which hopefully will give the reader confidence of the techniques efficacy.

The practicalities of acupuncture

Does acupuncture always work?

No, and neither does anything else! It is not a miracle cure and in general if a significant



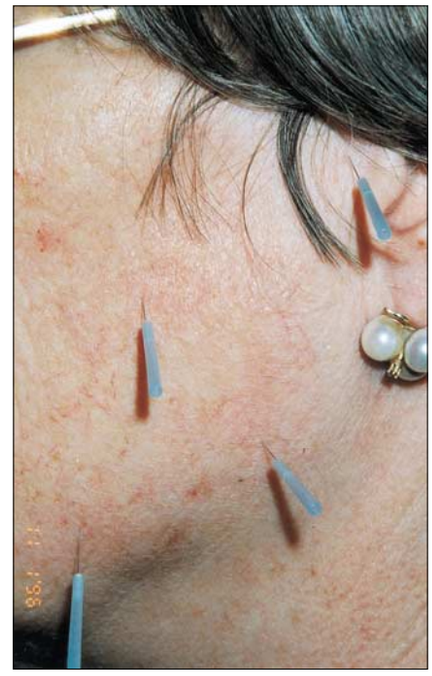


Fig. 1 (left) Controlling of post-operative anxiety
Fig. 2 Controlling of facial pain

Table 1 A brief summary of relevant studies and the outcome

Author and year	Brief summary of the study	Outcome
Temporomandibular dysfunction and facial pain		
Raustia AM *et al.*[14] 1985	Compared the efficacy of acupuncture with standard treatment methods in the management of TMD	Both modalities had a similar marked effect on a number of subjective and objective variables
List T *et al.*[12] 1992	Acupuncture and occlusal splint were compared with a non treatment group	Both acupuncture and occlusal splint reduced symptoms compared with the control group. Acupuncture gave a better subjective result than the occlusal splint
List T *et al.*[13] 1992	A 1 year follow-up of a previous study on the effect of acupuncture and occlusal splint compared with a control group	The study showed that acupuncture gave positive results similar to those of occlusal splint over a 1-year follow-up period
List *et al.*[33] 1987	Patients suffering from facial pain were treated with acupuncture in an uncontrolled study	It is concluded that acupuncture may be a realistic alternative/supplement to conventional treatment
Johansson A *et al.*[9]1991	Compared the effect of acupuncture, occlusal splint with an untreated control group	Both acupuncture and occlusal splint significantly reduced clinical signs from the stomatognathic system. No difference were found between the two groups
Post-operative pain		
Lao *et al.*[11] 1995	After removal of 3rd molar patients were treated with acupuncture or placebo	Subjects treated with acupuncture reported 181 minutes pain free time compared with 71 minutes in the placebo group
Lapeer GL[21] 1987	All patients had 3rd molar removed and received either acupuncture or nitrous oxide	No difference were found between the two groups.
Ekblom *et al.*[8] 1991	Patients undergoing removal of 3rd molar received either acupuncture before or after the surgical procedure. A control group received conventional treatment only	An increase of the intake of pain killers were found in both acupuncture groups compared with the untreated control group
Chapman CR *et al.*[30] 1975	The effect of acupuncture and nitrous oxide was compared with an untreated control group	Both the nitrous oxide and acupuncture groups were found to be significantly different from the control group. No difference were found between the two groups
Sung *et al.*[34] 1977	Patients were allocated to either acupuncture, codeine or placebo treatment	Both acupuncture and codeine were found to reduce the pain compared with the placebo group

Continued

Table 1 Contd A brief summary of relevant studies and the outcome

Author and year	Brief summary of the study	Outcome
Anaesthesia and analgesia		
Andersson *et al.*[27] 1973	Experimental study where the participants received electroacupuncture on the hand and chin	In 14 out of 18 subjects an increase in the pain threshold were observed
Andersson *et al.*[28] 1977	Experimental study where patients received electroacupuncture on the chin only compared with acupuncture on the chin and hand	The author found a correlation between the obtained pain threshold and the clinical analgesia
Bakke M[29] 1976	Compared the effect of acupuncture, electroacupuncture and the use of surface electrodes on the pain threshold	A gradual increase in the pain threshold was observed in all groups after 45 minutes stimulation. The best result were after electroacupuncture
Chapman CR *et al.*[31] 1976	Acupuncture and TENS were compared with placebo acupuncture and an untreated control group	An increase in the pain threshold was observed in the acupuncture and TENS group. No change was observed in the control group
Chapman CR *et al.*[32] 1977	Low frequency electrical stimulation were applied on the chin	The author found an 187% increase in the pain threshold after acupuncture which reached a plateau after 20 minutes
Phobias and anxiety		
Wong T[35] 1989	Electrical stimulation at an acupuncture point on the hand and ear were used in an uncontrolled study	The author stresses a promotion of relaxation and reducing of anxiety after the treatment

improvement has not occurred after three sessions it is not worth continuing. There are two reasons for this: (i) some patients fail to respond to acupuncture *per se*,[28] (ii) the original diagnosis could be wrong. A lack of response should always result in re-examination and refinement of the diagnosis.

How many treatments are needed?

One large-scale study found that the average number of treatments required to control the disorders of a mixed group of 350 patients was five,[29] although clearly it is unrealistic to expect to gain control of chronic conditions with only a couple of treatments; indeed control of orofacial conditions such as trigeminal neuralgia may require several cycles of treatments.[23]

How soon can one expect a result?

It is not uncommon for patients to report some benefit immediately, especially in acute headache and torticollis. This will probably only last for a day or so, the period of relief extending with each successive treatment until control is achieved.

Can there be adverse effects associated with acupuncture?

Contrary to the popular belief that conventional medicine is beset by untoward sequelae and that 'alternative' techniques are totally safe; there have been numerous reports of adverse effects after acupuncture. These are (to mention a few) pneumothorax, endocarditis and hepatitis some resulting in fatalities.[30] However, it must be appreciated that most of these result from ignorance of basic anatomy or because of non applying aseptic procedures by non medical/dental qualified practitioners. When these are factored out of analysis, acupuncture proves to be a very safe technique in the hands of a properly trained practitioner.

How can one get the necessary education in acupuncture?

The education in acupuncture is arranged by the British Medical Acupuncture Society (BMAS) and the British Dental Acupuncture Society (BDAS) leading to a diploma of basic competence. To qualify for this diploma the participants should attend a basic course, a post-basic course and a practical course of a total of 40 hours duration. The basic course teaches the basic principles such as point location, practical needling, the neurophysiological background, plan-

ning treatment etc. The post-basic course puts the acquired skills into dental-related diseases such as TMD, Sjøegrens disease, pain management, facial pains, etc. Finally, the participants take part in a 1-day practical course where the technique and the practical application is demonstrated on patients. Participants will, after the basic course, be able to start using the technique on a selected number of conditions but to use the technique on a wider range of diseases an education equivalent to the diploma of basic competence is required. For those who want to go further, intermediate and advanced courses are available as well as a yearly scientific meeting.

Conclusion

In general acupuncture should be regarded as a supplement to conventional treatment. As a sole analgesic for operative intervention its value is questionable; however, in control of post-operative pain and in the management of TMD and facial pain it may be a valuable addition to the therapeutic armamentarium of the general dental practitioner. These skills may be acquired with a short postgraduate training programme.

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