

THORAX

Editorials

Alternative and complementary medicine for asthma

It may well be asked what reasons there could be for exposing the pages of *Thorax* to a critique of alternative and complementary medicine. Two spring to mind: scientific curiosity and consumer demand. Alternative medicine makes claims that orthodox medical science cannot comprehend.¹ Yet there is sufficient published evidence to suggest that some forms of alternative medicine have measurable therapeutic effects. There is also widespread enthusiasm among the public for alternatives to conventional treatment²⁻⁴ and sufficient interest from clinicians, especially general practitioners,⁵ to make it important for the subject to be examined critically.

This review will focus on asthma, looking at a wide range of alternative and complementary approaches.

Definitions

"Alternative" and "complementary" need defining. At a linguistic level this is not difficult. "Alternative" should imply "instead of" orthodox medicine and "complementary" should mean "in addition to." In practice most of the techniques we shall describe are used in Western societies alongside conventional remedies and so are complementary. This is probably how orthodox physicians would wish them to be used, as there is considerable danger in abandoning conventional treatment for an alternative, particularly in a condition such as asthma. There are, however, differences that go beyond the merely linguistic. In some instances the philosophy behind the approach is truly alternative. It is difficult to find common ground between the theory behind, for example, radionics, with its claims of healing at a distance (see below), and our understanding of the causation of disease. On the other hand the belief that a device such as an ioniser might help patients with asthma depends on a limited premise and is easily subjected to scientific study. The first example is starkly alternative, the second recognisably complementary. For other alternative techniques the distinction is not so straightforward.

Acupuncture is a good example. Its historical origin is as an integral part of traditional Chinese medicine.⁶ Central to the philosophy of medicine that has evolved in that country over the last 4000 years is the view that health is a harmonious balance of energies within us, a balance that is upset in disease and can be restored by attention to diet and lifestyle and by the judicious use of both acupuncture and herbal remedies. Acupuncture is rarely used in this holistic way for the treatment of asthma in the West or indeed in the urban parts of China that are better endowed with hospitals, where it is used to complement Western pharmaceuticals.⁷ Yet we could envisage acupuncture as part of Western scientific medicine when a scientific explanation emerges for its effects in neurophysiological or biochemical terms. In relation to pain relief the evidence is available.⁸ There seems no doubt that acupuncture relieves pain by stimulating the production of endorphins. That discovery

brings acupuncture for pain in from the cold of heterodoxy into the warmth of orthodoxy. The object of this editorial is to determine how far such a process has been achieved for alternative approaches to the treatment of asthma.

Before we explore specific approaches in alternative medicine some important general points relating to research methods need to be discussed: precisely what should be studied and in what population, the type of controls required, and the most suitable blinding procedures.

Selection of techniques and patients

Western scientific method works best by dissecting out the component parts of a technique to find what is essential and how much is unnecessary. Much alternative medicine takes a holistic approach, regarding a constellation of activities as necessary for success. Thus a study confined to one set of acupuncture points, or a particular yoga exercise, would be considered an inadequate assessment of Chinese or Indian medicine respectively. A further difficulty is encountered when the alternative approach requires changes in medication on a day to day basis as symptoms change. It is difficult to incorporate these requirements into a conventional double blind, placebo controlled trial. Despite these objections from alternative practitioners, however, the way ahead may depend on assessment of the component parts of a system before the whole can be properly appraised.⁹

A second major difficulty is that of defining the study population. Classification by Western diagnosis is often considered irrelevant.¹⁰ A condition such as pneumonia may be treated quite differently in different individuals, according to the non-respiratory symptoms with which it may be associated, whereas in other instances a remedy may be applied across a wide range of patients in a way that would seem likely to obscure any beneficial effect it might have in specified subgroups. The tendency has been to study individuals according to Western diagnosis. That may be unfair to some alternative remedies—but perhaps not so much with asthma, which, we could argue, is more a syndrome than a specific disease.

Controls in trials of alternative medicine

The protagonists of alternative medicine rely heavily on anecdotal experience, sometimes claiming that if just one individual responds to a treatment this must be worthwhile and effective.¹¹ With such a view controlled trials are deemed unnecessary. Nothing could be further from the truth. Finding suitable controls is not always easy. Placebo medications are simple to prepare for controlled trials of homeopathic medicines,¹² but there may be problems in preparing control treatments for herbal medicines, particularly when the subjects have to make their own tinctures. Greater problems are encountered with tech-

niques that use physical devices. Machines like ionisers can be set up to give no charge,¹³ but providing any genuine control for osteopathy is akin to finding controls for surgical procedures. Acupuncture can be controlled for, providing the subject is naive, though the acupuncturist can never be blind.¹⁴ When a complex series of points is being used, as in traditional Chinese medicine, selecting an appropriate collection of negative ("dead") points is difficult.¹⁵ A potential approach when physical forms of treatment are being assessed (aside from sham procedures) is to compare the alternative treatment with a conventional treatment, such as physiotherapy or psychotherapy, that can be applied with conviction and with an equal amount of time and attention spent on the individuals.

Methods of assessment

For trials in asthma there is the question of what assessment should be used. To record change objectively lung function testing is essential, and peak expiratory flow or spirometric indices should be measured as in conventional pharmaceutical trials. Daily diary cards should be part of the assessment in long term studies, which should include use of relief medication and questions on quality of life. If a study shows beneficial change in symptom scores but not in peak expiratory flow or spirometric indices, the temptation is to explain the benefit as a placebo response. But this is not the only possible explanation. In a trial assessing genuine versus sham acupuncture for disabling breathlessness in chronic obstructive lung disease the positive result favouring the active treatment was explained in terms of an effect on perception.¹⁶ Decreased perception of exertional breathlessness allowed these patients to walk further even though lung function was unaltered. A similar explanation was offered for the beneficial effect of diazepam¹⁷ and of dihydrocodeine¹⁸ in similar patients. Perhaps surprisingly, there are no trials of agents that could influence perception directly in a condition such as asthma, though we shall have cause to examine the results of experiments using suggestion in challenge studies in asthmatic patients.

These issues will be taken up later. The evidence relating to specific modalities of alternative and complementary medicine in asthma and some related conditions will now be examined.

Acupuncture and traditional Chinese medicine

Acupuncture has probably attracted more serious and popular interest than any other form of alternative medicine. Needles, placed at points determined by long tradition to lie along meridians that traverse the trunk and limbs (fig 1), are believed to restore the balance of Ying and Yang energies disturbed by disease. The meridians follow at least in part the lines of known structures such as blood or lymph vessels or peripheral nerves but are not exactly contiguous with any of them. The needling of acupuncture points, often several at a time, undoubtedly relieves symptoms of, for example, pain and nausea, and good evidence for a beneficial acute effect in asthma is to be found.^{14 19 20}

Perhaps the most widely quoted paper is that of Yu and Lee from Hong Kong,²¹ who assessed a single acupuncture point, the Ding Chuan, which is 2 cm lateral to the mid point between the C7 and the T1 vertebrae on the back bilaterally. Their subjects were said to be undergoing an acute spontaneous attack of asthma but were stable enough to be deprived of bronchodilators and corticosteroids for at least five hours before the study. They had an initial FEV₁ of just under a litre, which improved by around 80% after isoprenaline. Acupuncture was given to the Ding Chuan

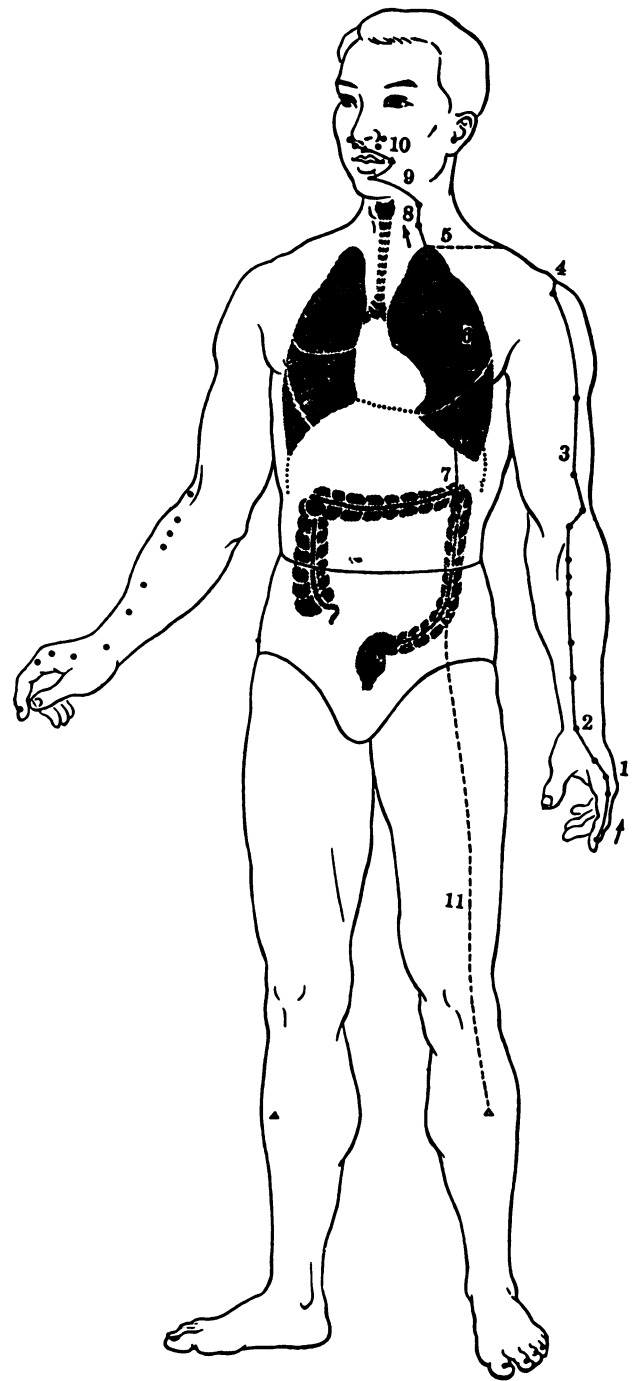


Figure 1 A meridian and associated acupuncture points.

site in the first 10 patients and FEV₁ had increased by 0.43 litre at 10 minutes; when it was given to a point 2 cm lateral to the genuine site in the second 10 patients FEV₁ increased by only 0.02 litre. There was no crossover design. In another acute study Virsik recorded improvement in a range of lung function tests, the maximum effect occurring half to one hour after needling.²² Using a Japanese acupuncture technique, Takishima *et al*²³ observed a small, poorly sustained fall in respiratory resistance (recorded with the oscillation technique), which was better than with placebo needling but much less than with a bronchodilator. More recent studies in specialist acupuncture journals confirm an acute effect with acupuncture, though this is usually less than that achieved with a bronchodilator.^{24 25} The selection of acupuncture points is critical for good results.²⁶

The ability of acupuncture to protect asthmatic patients against a bronchoconstrictor challenge has been tested in

several studies. Yu and Lee²¹ and Tandon and Soh²⁷ both examined the effect on histamine challenge with negative results. Although Tashkin²⁸ reported protection against methacholine challenge (using a wider range of five points), the acupuncture was, rather curiously, given after the challenge and the benefit was short lived and unimpressive. The effect of exercise challenge, on the other hand, was ameliorated by needling at three points, including the Ding Chuan, the FEV₁ falling by 23.8% compared with 44.4% in untreated patients.²⁹ Needling at control points of unrecognised value gave an intermediate fall in FEV₁ of 32.6%. Strict attention was paid to controlling environmental conditions. This was a crossover study in children aged 9–13 years.

What would be of greater value in the overall management of asthma would be long term benefit in patients with persistent asthma, especially if this allowed reduction in conventional treatment or in side effects. Evidence for such an effect is limited. Few studies have been published in the West, though more, usually not well controlled, have appeared in Chinese journals that are not easily accessible. Dias and colleagues³⁰ in Sri Lanka found twice weekly genuine acupuncture over two to six weeks to be inferior to needling of placebo points in 20 patients with chronic asthma, and a controlled trial in California failed to find any significant long term benefit in a four week study with a crossover design.³¹ On the other hand, 17 Danish patients showed a 22% improvement in morning peak expiratory flow and a halving of bronchodilator use two weeks into the treatment period in a five week controlled study with parallel groups.³² Less bronchodilator was needed by both active and placebo groups for the month after treatment; lung function changes were not sustained. Shao and Ding³³ favoured the Feishu point and recorded an improvement in FEV₁ of 0.25 litre with no significant change in the control subjects. Initial lung function was not stated. Substantial improvement was recorded in 43% of patients, defined as "symptoms disappeared—no relapse in one year." Two other recent reports are less well documented.^{34,35}

Some benefit from acupuncture in asthma appears therefore to be discernible but it is not striking. In acute asthma the effect is usually less than that achieved with a beta agonist²¹ and is not well maintained.²³ Results in chronic asthma are variable. In this number of *Thorax* Kleijnen *et al* review 13 published trials of acupuncture in asthma. They conclude, from an analysis of methodological quality, that claims for the efficacy of acupuncture are not based on the results of well performed clinical trials. Although it is possible to argue with some of the weightings used, and to dispute whether the results of such a heterogeneous group of studies should be analysed together, this conclusion does follow from the data they have reviewed.

A detailed inspection of individual papers, however, suggests that not all the recorded improvements in FEV₁ or protection in challenge studies can be explained away. The failure of effect with placebo acupuncture and the tachycardia and rise in blood pressure that accompanied the beneficial response in the study by Yu and Lee²¹ suggest a genuine effect. How could this be brought about? An effect mediated through the autonomic nervous system is the most favoured explanation. In the Takishima²³ study the needles were aimed towards the stellate ganglion, though no non-pulmonary changes in autonomic function were seen. Other possibilities include a local neurocutaneous reflex or a more distant reflex causing release of adrenaline³⁶ or parasympathetic inhibition.²⁷ There are also reports that cyclic nucleotides, corticosteroids,³⁷ and adrenocorticotropic hormone may be released by acupuncture, all of which could influence asthma. Establishing proof for any of

these mechanisms would be interesting, but in the present state of pharmacological success with asthma it is difficult to see what place acupuncture could have. In China it is often used as additional treatment in acute asthma when response to orthodox medicines has proved disappointing, though such an approach has never been evaluated. Sceptics recall that in 1822 the Emperor of China rejected acupuncture as being a bar to medical progress,³⁹ and case reports of pneumothorax after acupuncture over the chest wall⁴⁰ and of hepatitis B⁴¹ indicate that it is not free of complications.

All these studies fall short of examining a total Chinese traditional medicine approach to asthma. This would use acupuncture as an initial step, supplement it with herbal remedies, and repeat acupuncture as necessary, the number and location of the points being altered to meet changing symptoms, with in addition strict advice on diet and lifestyle. Evaluating such a complex approach has so far daunted the most ardent of investigators, yet this is how traditional Chinese medicine is practised.

Yoga and health systems from the Indian Subcontinent

As in China, there are complete systems of traditional medicine and concepts of health care from India and Pakistan that embrace a combined mental and physical, medicinal and lifestyle approach to health.⁴² Relatively little known in the West and minimally studied until recently, there is now sufficient published material to allow some comment. The approach that has received most attention is Ayur-Vedic medicine,^{43–45} a complex system which includes two components that have been studied—transcendental meditation and yoga.

Transcendental meditation has had apparent success in treating anxiety states,⁴⁶ and claims have been made that it may help in asthma.⁴⁷ Sadly the evidence is poor and uncontrolled.

Yoga has been better studied, although most studies are again uncontrolled and based on qualitative impressions.⁴⁸ A study from Bangalore⁴⁹ followed for several years (up to four and a half in some patients) two groups of matched young people with asthma, one of which had been taught and instructed to practise a full range of yoga exercises. In the treated group the number of attacks and amount of drug treatment fell significantly. This success was attributed to the relief of psychological stress.

A more recent, better controlled, though less ambitious study suggests that the matter may not be so simple.⁵⁰ This considered just one aspect of yoga, that called pranayama. Two aspects of pranayamic breathing—the imposition of a 1:2 ratio between inspiration and expiration and a stepwise reduction in breathing frequency—were deemed to be assessable by means of a double blind controlled trial using a training device and a placebo device of identical appearance. The patients studied had mild asthma (mean FEV₁ 3.2 litres and more than 60% predicted) and were having bronchodilator treatment only. After two weeks of treatment no differences were found between the two groups save in one measurement—histamine reactivity. Those given genuine pranayama exercises showed a decrease in bronchial reactivity of the order of one doubling dose of histamine. Though yoga may cause some endogenous corticosteroid release,⁵¹ this seems unlikely to be responsible for the effect on histamine reactivity. But could yoga have an effect on vagal function? Control over other autonomic functions—heart rate, blood pressure and body temperature—are claimed for yoga.⁵² Although such control might reasonably be attributed to yoga in its totality, it is difficult to believe that such an effect would occur with a technique that did no more than alter respiratory rate and

rhythm. Reducing respiratory rate in patients with airflow obstruction alters lung volumes and decreases respiratory work but these effects are unlikely to influence histamine reactivity, particularly as the change was observed long after the subjects had stopped using the breathing technique.

The cause of the improvement in histamine reactivity in the Singh study⁵⁰ is undetermined but the trial was well conducted and the results seem unlikely to have occurred by chance. The observation should be repeated. Meanwhile yoga should be considered a category of alternative medicine that is worthy of consideration for some asthmatic patients.

Hypnosis and suggestion

Osler regarded asthma as a nervous disease.⁵³ In fiction and biography the emotional aspects of asthma are emphasised and, despite much evidence to the contrary, patients and the public still frequently regard psychological stress as responsible for asthma. The relief of stress has been seen as an aim of treatment, and techniques used have ranged from behaviour therapy⁵⁴ to relaxation⁵⁵ and yoga (see above). One commonly used alternative approach pre-eminently designed to produce relaxation is hypnosis.

Of a cluster of papers published around 1960,⁵⁶⁻⁵⁹ only the study of Maher-Loughnan⁶⁰ included a control group. His six month long follow up study compared a group of asthmatic patients taught autohypnosis with a control group given conventional treatment. The groups were well matched but the trial was not blind. A difference in symptom scores between the groups emerged after three months and prompted the author to use hypnosis regularly.⁶¹ Subsequent controlled trials that have attempted to look at the overall clinical effect of hypnosis in asthma include a British Thoracic Society study from 1968⁶² and a more recent study by Morrison⁶³ (1988). The former, a multicentre study, produced negative results but the second, from a single enthusiastic author, positive results. Morrison recorded a reduction in the annual hospital admission rate from 3.3 to 1.0 but no change in lung function. Finally, Ewer and Stewart⁶⁴ reported improved symptom scores and drug use of 41% and 26% respectively in a subgroup of 12 asthmatic patients who were highly susceptible to hypnosis, though lung function improved by less than 6%.

Despite the lack of significant changes in spirometric values, interesting results are seen with challenge tests. In a careful study of exercise induced asthma Zvi *et al*⁶⁵ showed that the fall in FEV₁ five minutes after the end of exercise was reduced from 30% with placebo to 16% after two five minute sessions of hypnosis. Though the result was significant, it was less than that afforded by sodium cromoglycate in the same patients (7.6%). Response to methacholine challenge improved slightly in the study by Ewer and Stewart⁶⁴ but only in the patients susceptible to hypnosis.

Although these results are not impressive, they are positive when compared with the results with placebo. Attempts to look at the mechanism use the model of simple suggestion rather than hypnosis. Some asthmatic patients will develop bronchoconstriction if given a saline aerosol to breathe after being told that it contains an agent that will make their asthma worse^{66,67} and equally will improve if told that the saline aerosol is a bronchodilator.^{68,69} Plethysmographic measurements suggest central rather than peripheral airway narrowing, pointing to a role for the vagus,⁷⁰ as does the observation that anticholinergic agents may protect against the bronchoconstrictor effects of suggestion.^{69,71} Lewis *et al*⁷² were sceptical of these studies,

however, showing that the conditions for saline inhalation needed to be very carefully controlled. Inhalation of saline at room temperature and humidity without any suggestion caused bronchoconstriction and they were unable to find any additional effect of suggestion.⁷³ These results were, however, contradicted by Neild and Cameron, who found an effect of suggestion independent of airway cooling and blocked it with the anticholinergic agent ipratropium.⁶⁹ Differences in experimental design mean that this controversy cannot be resolved satisfactorily.⁷⁴

At a clinical level it must be asked what place hypnosis and suggestion might have in the everyday management of asthma. Psychological factors may be important in "difficult" asthma and it is for these patients, particularly when they become steroid dependent, that hypnosis is advocated.⁷⁵ Not all individuals are susceptible to hypnosis, however,^{64,76} so the technique is not universally applicable. Reliable clinical tests that could be performed easily by those not versed in the art of hypnosis will be needed if the method is to be used economically. There is an impression (though it is not supported by all studies) that subjects who are easily hypnotised are also easily suggestible.⁶⁴ Is the response to hypnosis therefore simply a good placebo response in selected individuals?

A final word of warning is necessary about hypnosis and other methods of anxiety reduction in asthma.⁷⁷ Suppressing perception of worsening asthma could mean that an individual fails to recognise worsening asthma and may not take appropriate treatment. Those who support the use of hypnosis say that suitable safeguards can, and are, built into the hypnosis instructions so that this does not happen.

Naturopathy

The healing power of nature (*vis medicatrix naturae*) is said to "underpin nearly all the therapeutic techniques in alternative medicine."¹¹ Naturopathy is a system of health care that relies on healthy living to enhance the body's natural ability to resist disease and recover from illness. It has parallels in ancient therapeutic arts from China, India, and elsewhere, and supports its claims by pointing to Claude Bernard's homeostatic principle and Hans Selye's general adaptation syndrome. Although much of medicine relies on the same healing powers, naturopathy appears to differ in its emphasis on enhancing the power of natural healing to the virtual exclusion of recognised surgical or medical procedures.¹¹

No work on specific effects of naturopathy in asthma has been published but attention needs to be drawn to certain diagnostic and therapeutic practices embraced by naturopathy that may be used for patients with asthma. Iridology⁷⁸ and hair diagnosis⁷⁹ are widely used for diagnosis. The distribution of colour and texture in the iris according to a topographical map representing the organs of the body is said to reflect disease in those organs. There is no published evidence to support this claim. Hair diagnosis relies on biochemical analysis, particularly for trace elements. Wide variations in zinc, copper, chromium, cadmium, and other elements are seen with sex, race, age, breast feeding, hair colour, and use of shampoos and rinses, so that defining "normal" is very difficult.⁸⁰ The value of hair analysis in tracing mercury poisoning has been notably vindicated⁸¹ but it is valueless⁸² as a means of diagnosing systemic diseases. When hair from nine subjects with fish allergy and nine control subjects was sent blind to three hair analysis laboratories, widely discordant and inconsistent results were obtained.⁸³

Therapeutic advice in naturopathy covers hydrotherapy, sunlight, diet, fresh air, relaxation, and exercise.⁸⁴ Nothing more than tradition and anecdote support the use of these

approches and no clear guidelines for their use are given. It seems doubtful whether research into naturopathy alone is worth considering.

Homeopathy

First propounded in the late eighteenth century by a German doctor, chemist, and toxicologist, Samuel Hahnemann, homeopathy is a system of medicine that relies on detailed history taking to define syndromes of bodily dysfunction, which are then managed according to two homeopathic principles—the law of similars and the use of infinitesimally small doses.⁸⁵ The law of similars (“*Similia similibus curentur*”) is said to be based on some observations of Hippocrates that substances that in toxic doses cause certain symptoms will in much smaller doses cure the same symptoms caused by disease.⁸⁶ Thus white hellebore causes watery diarrhoea in high dose and is used to treat cholera in low dose. The dilution principle that follows from this is taken to the degree that theoretically no molecules of the original medicine can still be present in the solution.⁸⁷ An effect of the active medicine is said to remain impressed on the molecules of the diluent by the process of succussion—striking the tube containing the solution at each dilution stage.⁸⁸

No treatment in alternative medicine is more suitable for scientific study—yet relatively little has been done.⁸⁹ Asthmatic patients recommended homeopathic remedies are often treated on an extension of the “like cures like” principle called isopathy, in which the agent thought to cause the condition is itself used for the treatment, but in the usual homeopathic high dilution. Pollen extracts are given for pollen asthma,⁹⁰ house dust mite extracts for asthma related to house dust mite.⁹¹ Comparisons have been made with more conventional hyposensitisation procedures, though they are in fact quite different.⁹²

Although very little has been published on homeopathy in asthma, allergic rhinitis has been studied,^{90–93} the latest trial, from Reilly *et al*⁹⁴ in Glasgow, having excited considerable interest. In a randomised parallel group study a control period of seven days was followed by homeopathic or placebo remedies for 14 days and by a further 14 day observation period without treatment. Assessment was by symptom scores, scoring on a visual analogue scale by the attending physician, and use of antihistamines. The results of the trial were judged to favour the homeopathic remedy as all three measures were statistically better at the 2.5% level. An initial deterioration in symptoms was attributed to homeopathic “aggravation” in the treated group but to “natural progression” in the placebo group. After the first week scores improved in the actively treated group but not in the placebo group. This trial showed benefit from homeopathic remedy in hay fever. Subsequent correspondence in the *Lancet* concentrated on how the treatment could have worked, as there appeared to be little to criticise in the trial design or analysis.^{95–98} One difficulty not addressed despite the title “Is homeopathy a placebo response?” is whether the two groups were equally matched for placebo responders. As not all individuals are equally suggestible chance allocation of better responders to the treated group could have influenced the result.

The repercussions of the publication of an article in *Nature* on a related topic, though again not in the context of asthma, were more strident and more public. Benveniste and his colleagues published evidence purporting to show immunological activity from solutions diluted to the order of magnitude used in homeopathic remedies.⁹⁹ The model was the degranulation of sensitised basophils by anti-IgE.¹⁰⁰ Degranulation is orthodoxly expected at dilutions of 1×10^{-3} , but was claimed to be observable at dilutions

down to 1×10^{-60} or more, when theoretically no active agent should be present. The data suggested peaks of activity at various degrees of dilution but the peaks were not reproducible and on some experimental days no degranulation occurred. The results were disputed by a visiting team from *Nature* who attempted to witness a repeat of the experiment, which then failed.¹⁰¹ The vitriolic exchanges that followed this encounter illustrate the strength of feeling that surrounds experimentation on alternative medicine.¹⁰² Even if true, it must be asked what relevance the results have for homeopathic treatment and, of even more startling import, what they mean for physical chemistry as we know it. The experiment assesses only one of the two guiding principles of homeopathy—namely, dilution and succussion. It appears to contradict the principle of “like cures like” since degranulation occurred equally with conventional dilution and at great dilution. The same research team now claims that protection against basophil degranulation in their anti-IgE model can be produced by two homeopathic drugs (lung histamine and *Apis mellifica*¹⁰³).

Sufficient studies of homeopathy are now available in clinical medicine as a whole to tempt us to make an overall analysis. Two recent reviews of published work reached contradictory conclusions. Hill and Doyon¹⁰⁴ excluded from consideration any trial in which randomisation was absent or inadequate. On the basis of an even distribution of trials in favour of active and placebo treatment, they concluded that the case for homeopathy was unproved. Kleijnen *et al*¹⁰⁵ included 107 trials in their analysis, giving them a weighted scoring. Though deeply critical, these authors conceded that some trials (in a wide range of disorders) have convincingly positive results.¹⁰⁶

Surprising, virtually no substantive work has been done on asthma, a condition in which objective measurements are available. Little more than anecdotal case reports have been published.^{107–108} Preliminary results of a trial from Reilly’s team in Glasgow suggest an improvement in overall symptom scores, though lung function indices did not show significant improvement.¹⁰⁹ A trial from Brazil using a commercial homeopathic remedy derived from the lungs of guinea pigs killed by anaphylactic shock appears to show some advantage of this remedy over placebo during a three month controlled trial.¹¹⁰ The attack rate fell from 1.69 a month to 0.38 in treated patients but did not change (1.54 a month) in the controls.

Should clinical studies of homeopathy prove convincing, there remains the question of the underlying mechanism. Accepted theories of physical chemistry would need overturning. To explain residual activity after the excessive dilutions used, homeopathic theory suggests that the solvent acts as a template for bonding an impression of the molecules being diluted, polymers of these altered water molecules being built up by the process of succussion.¹¹¹ The farfetched nature of these theories leads to the ridicule of homeopathy.⁹⁷ Although practitioners of homeopathy have not always helped their case,⁸⁹ some animal and plant studies are difficult to explain away.⁸⁹

The case for homeopathy for asthma must be regarded as unproved despite the fact that it is widely used and the only alternative medicine accepted as part of NHS care.^{112–113} It demands more rigorous trials.^{114–115}

Osteopathy and other manipulative techniques

Osteopathy originated in the United States some 120 years ago and is still widely practised and respected there.¹¹⁶ It combines the natural healing principles outlined for naturopathy with the belief that much ill health results from anomalies of the musculoskeletal system. Though

popularly and most readily understood as a treatment for spinal, arthritic, and soft tissue disorders, osteopathy originated from alleged observations that spinal manipulation could influence systemic disorders such as dysentery. Manipulation in the region of the second thoracic vertebra is said to release restricted movement of the ribs and improve asthma.¹¹⁷ The basis for this is believed to be viscerosomatic reflexes¹¹⁸ arising from an affected internal organ (in this case the lung) and reflected in muscle splinting (in this case maximal over T2–7).¹¹⁹ Interestingly, Bouhuys has shown that posture affects histamine reactivity in both asthmatic patients and normal individuals,¹²⁰ reactivity being greater in the supine than in the sitting position. Somewhat similar spinal manipulations are used in chiropractic, but there are no controlled clinical trials to support the claims of osteopathy or chiropractic.¹²¹

Simple physical relaxation techniques have been assessed in asthmatic patients in a controlled way but the results have been disappointing.¹²² Erskine and Schonell¹²³ could find no changes in lung function or symptom scores (physical or psychological) in asthmatic patients given muscular relaxation alone or with mental relaxation. In asthmatic children Alexander¹²⁴ found a small (11%) improvement in peak expiratory flow immediately after relaxation therapy, and Davies *et al*¹²⁵ some benefit in mild but not more severe asthma. Connective tissue massage, a physiotherapeutic technique devised by Dicke in 1929 and claimed to help in asthma, had no effect on lung function in 10 patients with a mean FEV₁ of around 2 litres.¹²⁶

These techniques together with spinal manipulation and traditional physiotherapy might be able to relax muscle tension and so relieve the effects of hyperinflation on the somatic musculature of which the asthmatic patient is so aware. An objective assessment of this potential benefit would seem to be worthwhile.

Diet and asthma

Advice on diet is part of many systems of medicine—Chinese, Indian, and Western. Some is no more than “eating sensibly,” some is based on folklore, and too little is critically considered advice appropriate to the individual and his or her complaint.

All physicians dealing with asthmatic patients need a working knowledge of food allergy and intolerance: it is when dietary advice becomes an obsession that caution is needed. Immediate type I allergic reactions to foods such as nuts, shellfish, fruits, etc. can be dramatic and asthma may occur as part of a generalised anaphylactic reaction.¹²⁷ How often allergic reactions occur to common items of diet such as milk, eggs, and cereals is much debated, but worth considering in those with multiple allergic symptoms, food cravings, and a positive family history.¹²⁸ Intolerance to certain items of the diet is a well recognised but uncommon cause of asthma: tartrazine in those with aspirin sensitive asthma,¹²⁹ sodium metabisulphite used as a preservative,¹³⁰ naturally occurring biogenic amines (for example, histamine in yeast and some cheeses¹³¹), and a few others.

Outside conventional medical practice diets and food “allergy” are sometimes accorded unwarranted importance.¹³² This results in the attribution of a wide range of clinical syndromes and an excessive proportion of asthmatic wheezing to allergy or intolerance to food and drink and it encourages some dubious diagnostic practices. Unfortunately conventional diagnostic tools such as skin-prick testing and radioallergen absorbent tests are less reliable in food than in inhalant allergy and, of course, give negative results in non-allergic food intolerance.¹²⁸ There is, however, no evidence that reliance can be placed on sublingual testing,¹³³ the “cytotoxic test,”¹³⁴ or provocation

neutralisation¹³⁵; exclusion followed by double blind exposure to the potential allergen is the only reliable diagnostic tool.¹³⁶

Herbal medicine

The first known effective treatment for asthma was a herbal remedy—an extract of the root of *Ephedra sinica* discovered over 4000 years ago in China. Herbal cigarettes are recognised to contain anticholinergic alkaloids.¹³⁷ One of the most fascinating of modern asthma treatments—sodium cromoglycate—also has its origins in the folk medicine tradition, being originally extracted as khellin from the root of the Egyptian plant *ammivisnaga*.¹³⁸ Hopes for future asthma treatments are invested in the ginkgo tree¹³⁹ and in a score of other plants from China, India, Africa, and elsewhere. Herbal “remedies” should then come as no surprise. They are a well tried source for drugs for asthma and for that matter many other conditions.

Until a herbal remedy has been through the refining fire of laboratory scrutiny, however, no evidence is required by any regulating body on its efficacy or safety. No trials of herbal remedies for asthma have been reported.

The statement is often made that because herbal remedies are “natural” they can do no harm. Curare and scopolamine are also natural. A herbal remedy from India (misleadingly labelled “homeopathic”) contained a corticosteroid.¹⁴⁰ Not only was it potentially dangerous, but its power to help in asthma was hardly surprising.

Herbal remedies form an integral part of the therapeutic approach of many cultures. In Chinese traditional medicine mixtures of herbs are designed to complement and interact with each other: one to treat the main symptoms, others for subsidiary symptoms, yet others for potential side effects, and even herbs that help to direct the medication to the organ affected.⁶ Yet even such complex mixtures should be amendable to proper scientific study and extraction of active ingredients.

Radionics, radiaesthesia, and psionic medicine

These three are grouped together because they have in common the concept that energies and forces undetectable by conventional physics or biology can be harnessed as diagnostic or therapeutic tools, or both. Radiaesthesia¹⁴¹ is based on the ancient art of dowsing, for example. Radionics¹⁴² arose out of bizarre experiments in which “radiations” from diseased tissues were claimed to be detectable and diagnosable by percussing the abdomen, stroking a rubber membrane, or later “tuning” the dials of a Rae or de la Warr instrument. Psionic medicine¹⁴¹ taps the forces of psychokinetics, telepathy, and clairvoyance to aid healing.

These alternative devices are so alien to orthodox medical thought that it is impossible to give their claims any credence. No specific studies on asthma are available. Vega testing can also be dismissed: the vega instrument claims to make diagnoses of allergy by detecting abnormalities in bioelectrical potentials in the skin.¹⁴³ There is no acceptable validation of these claims.

Ionisers and asthma

The proportion of charged ions in the atmosphere¹⁴⁴ rarely exceeds 1:10¹². More ions will be found in areas close to radioactive sources, both earthbound and interstellar, and abnormal concentrations are formed at the time of electrical storms and in association with sharp changes in humidity and wind speed. For centuries dry, warm winds, such as the Sharav in Israel and the Foehn and Sirocco in Europe, have

been regarded as evil, bringing in their train malaise and ill health.¹⁴⁴ Adverse effects have been attributed to positively charged ions which precede and accompany these winds.

There is evidence that very high concentrations of charged particles influence biological events from the growth of plants¹⁴⁵ to the hatching of silk worm eggs.¹⁴⁶ Of more relevance to lung disease are studies of ciliary activity in the mammalian trachea. Positively charged ions have been observed to decrease ciliary activity and mucus flow in extirpated tracheal strips¹⁴⁷ and in various small mammals,¹⁴⁸ and negative ions the reverse. It has been suggested that the effects of ionic change may be mediated through serotonin,¹⁴⁹ as serotonin antagonists have apparently been of benefit to patients with malaise during the Sharav season in Israel.

Why asthma was thought to be amenable to treatment by ionisation is not clear as it does not feature in the descriptions of the dry wind malaises, and serotonin does not appear to be an important bronchoconstrictor in naturally occurring asthma.

Three clinical settings have been examined for the effects of ionisation on asthma, often in uncontrolled studies and rarely with adequate numbers: acute ionic exposure, long term exposure, and challenge testing.

Of the studies purporting to show benefit from acute exposure to atmospheric ions (15 minutes to 27 hours), none stands up to scrutiny. The larger of the two studies of Kornbluh *et al*¹⁵⁰ included sufficient patients but most had hay fever without asthma, no objective measurements were made, and treatments were not given blind. A similar lack of objectivity and control is seen in the report of Palti *et al*,¹⁵¹ who studied subjects under 1 year of age, described as having either spastic or asthmatic bronchitis. Controls were used by both Blumstein¹⁵² and Osterballe,¹⁵³ though each had only 10 patients. Both positively and negatively charged ions produced a small benefit but this was never greater than 5% and was clinically unimportant.

Some longer term studies have been carried out. In 1983 Nogrady and Furnass¹⁵⁴ reported a double blind crossover study in 20 asthmatic patients, in which they used standard assessments of diary cards and serial peak flow measurements. The negative ion generator, installed in the patient's bedroom, was activated from 10 pm to 8 am. Though measured ion counts increased 100 fold, neither symptom scores nor peak flows changed significantly. This study repeated the eight week protocol with four weeks control and placebo periods devised by Jones *et al*¹³ in 1976 but carried out in only seven patients. Despite some improvement in morning peak flow in three of the seven patients, including one whose serial peak flow chart is clearly displayed in the paper, the overall conclusion from the study was "that it is unlikely that exposure to negative ions will be of significant benefit in the majority of patients with asthma." Preliminary results of an ioniser study in children have shown that despite a measured reduction in house dust mite in the bedroom air, night time cough scores actually increased.¹⁵⁵

Ionisers have also been assessed in bronchoconstrictor challenge studies. Neither Osterballe *et al*¹⁵³ nor Ben-Dov *et al*¹⁵⁶ found any difference in histamine reactivity between normal and negatively ionised air, though the Israeli workers found attenuation of exercise induced asthma in 10 of 11 children tested in a suitable blind manner. The control mean postexercise fall in FEV₁ was 29% (SE 5%), compared with 21% (SE 3%) when the negatively ionised air was breathed during and after exercise, a small but statistically significant difference.

This last study is the only one to give a positive result for negatively charged ions in asthma. How could it work? Ionised particles attract dust and thus remove potential

allergens from the atmosphere. A trial of an electrostatic precipitator designed to enhance this effect conferred no benefit, however, to asthmatic patients sensitive to the house dust mite¹⁵⁷ (though the criticism was made that it generated positive ions). Animal experiments on tracheo-bronchial mucus flow and humidification of the epithelium suggest that positive ions dry the mucosa and negative ions moisten it. The breathing of warm, moist air ameliorates exercise induced asthma. Could negative ions create an effect on exercise induced asthma through this mechanism? If so, it would also help to explain the studies with negative results. If effects on cilia and mucus are the only important effects of ionisation, substantial long term changes in lung function are unlikely to be seen with varying ionic environments.

Discussion

Most physicians working in hospitals would probably hold the view that patients with asthma do not need alternative medicine. An acute attack demands immediate orthodox treatment and for most patients with chronic asthma regular inhaled drugs are simple to take, effective, and safe. To judge from surveys, some patients and their family practitioners think differently.³⁻⁵ It is not so much a turning away from orthodox medicine in search of a true alternative as the desire for something to complement standard treatment. A few turn to unorthodox treatments in the hope of finding a cure, but most do so because they have found conventional treatment unsatisfactory or are distressed by real or imagined side effects.

This review has tried to show what evidence there is that alternative or complementary techniques help asthmatic patients. It must be said that despite a bibliography of 170 references the evidence is not strong. A few techniques—specifically acupuncture, hypnosis, and yoga—do appear to work, in some patients and in some circumstances, and, although more research is desirable, there seems no reason to discourage interested patients from seeking help from such techniques. For practices such as homeopathy, reports are conflicting and the effectiveness of such techniques must be regarded as unproved. For other techniques, such as radionics, no studies have been published and patients should be discouraged from their use. Diets and herbal remedies fall into yet another category: dietary manipulation helps a few patients, and herbal remedies must be tested with far greater rigour than has been the case hitherto. When there is trend towards benefit in published data (as with homeopathy in general, though not specifically its use in asthma), we must guard against publication bias, trials with positive results being more likely to be published than those with negative results.

Several general questions arise from this review. Firstly, are the few recorded benefits clinically important, or could equal or greater benefit be obtained from a conventional treatment with equal or greater ease or safety or both? Secondly, if alternative techniques are effective, how do they work? Is there any common thread to explain positive results? And, thirdly, should we as a profession protest about treatments that have not been tested in any scientific way being offered (at a cost) to patients?

HOW BENEFICIAL?

In the acupuncture studies in acute asthma the degree of benefit was about half that seen with a bronchodilator²¹ and the same was probably true for exercise induced asthma²⁹ (fig 2). Similarly, the effect of hypnosis was to halve the exercise induced fall in FEV₁, though this was less than the protection seen with sodium cromoglycate.⁶⁵ The one

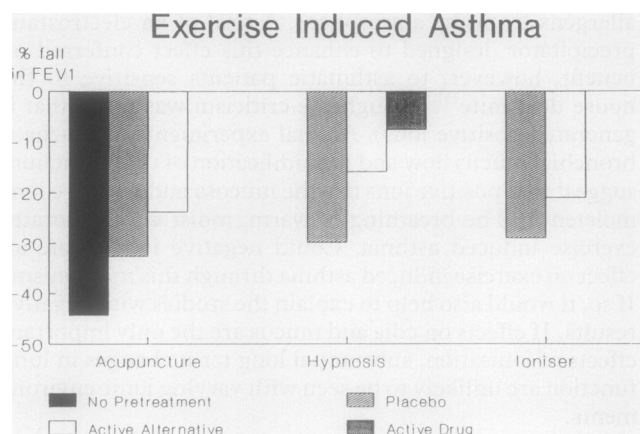


Figure 2 Effect of alternative treatments on exercise induced asthma.

Effect of alternative treatments on histamine and methacholine challenge

	Acupuncture	Hypnosis	Yoga	Ioniser
Exercise	+	+	0	+
Histamine	-	-	+	-
Methacholine	+	+	0	0

+ indicates a positive effect (reduced reactivity),
 - no effect,
 0 not tested.

positive study with ionisers gave about a one third degree of protection in exercise induced asthma.¹⁵⁶ Neither acupuncture, hypnosis, nor an ioniser, however, would seem to be of much practical value in the setting of exercise induced asthma.

With histamine challenge (table) neither acupuncture^{21 27} nor an ioniser^{153 156} was protective, whereas yoga was.⁵⁰ The degree of protection was expressed as "equivalent to one doubling dose." In fact, this represented the difference in the provocative dose of histamine causing a 20% fall in FEV₁ (PD₂₀) between the results at the end of two weeks on a genuine pranayama training device and two weeks using a placebo device. An unscientific comparison of control values with the results after active treatment showed a difference of 1.53 doubling doses. If such a change was genuine, it would be quite impressive—of the order seen with low dose corticosteroids.¹⁵⁸ Pranayama breathing is not demanding and could potentially lead to a reduced need for other treatment, though this has not been tested. The degree of skill in pranayama breathing that can be gained in two weeks must be limited. True practitioners of the art will slow breathing rates to one or two a minute and use it for one to two hours a day.⁵⁹

Yoga has not been assessed against methacholine challenge, but hypnosis has. The study of Ewer and Stewart⁶⁴ showed a PC₂₀ change of rather less than one doubling dose after six weekly half hour sessions of hypnosis. This effect could not be reproduced in subjects who were not susceptible to hypnosis: indeed, in these the PC₂₀ for methacholine fell by about 30%. Simple suggestion does not seem to be powerful enough to alter methacholine reactivity.¹⁶⁰ In patients given two reactivity tests with the suggestion that on the second occasion the methacholine was a bronchodilator PC₂₀ for methacholine did not change.

Histamine and methacholine challenge are relatively stable over long periods (to within one doubling dose, for example, over 10–30 months¹⁶¹), so the trends observed are likely to be valid if they can be sustained. With long term studies, however, where evidence of benefit would be so

useful, trials of alternative treatments are particularly weak. Long term pharmacological treatment with aerosol corticosteroids is beneficial but the doses needed may ultimately lead to toxicity, and if pranayama breathing or hypnosis could be shown to reduce histamine or methacholine reactivity in a sustainable way over many months that would have important implications for patients prepared to learn and persist with these techniques.

MECHANISMS: A COMMON THREAD?

Though there is some dissent, in general, studies of suggestion have indicated that airways function (and possibly reactivity) can be influenced by mental activity. Many patients are convinced that this is so. The power of suggestion to produce bronchoconstriction when an innocuous solution (appropriately controlled for osmolality and temperature) is inhaled may be due to increased vagal activity as it can be blocked by prior inhalation of an anticholinergic drug.^{69 71} Hypnosis seems likely to work through a similar mechanism, and likewise relaxation therapy with biofeedback (on the basis of an effect on large rather than small airways¹⁶²). Interestingly, there is no reported study of cholinergic blockade of a bronchodilator suggestion. Less formalised suggestion presumably lies behind the "placebo response." In bronchodilator studies the degree of response is usually around one third of that produced by the active agent, and is seen in about half of an unselected group of patients. In a study of exercise induced asthma in children Godfrey and Silverman tailored placebo treatment to match the genuine drugs (intravenous, nebulised, dry capsule) and found the most "dramatic" delivery (intravenous) had an effect in 83% of subjects, whereas the dry capsule gave significant protection in only 35%.¹⁶³ Alternatively, the potential exists for some central mechanism affecting perception. Acupuncture could work at this level by release of endorphins (or some other peptide) in parallel with its effects on pain. Could other alternative medicines alter perception? Hypnosis certainly can, but it is not clear how effectively this could be sustained.

If alternative medicine could reduce perception of the distress caused by asthma that could make a contribution to the clinical management of patients, provided that it did not abolish awareness of severe airways obstruction. The ability of asthmatic patients to detect changes in lung function has been studied. It varies between individuals.¹⁶⁴ Some recognise deteriorating lung function to such an accurate degree that there is an inverse linear relation between perception of dyspnoea and measured PEF.¹⁶⁵ Others seem to have a threshold above which perception of change is poor. Acute challenge with methacholine producing a fall in FEV₁ of 50% or more could not be detected by 15% of 82 patients studied by Rubinfeld and Pain.¹⁶⁶ Age, sex, and psychological variables do not appear to distinguish those with poor perception. In histamine reactivity studies distress was less in those who started out with pre-existing airflow obstruction and in those highly responsive to histamine,¹⁶⁷ the implication being that persistent disease somehow decreases perception. Perception also appears to be less in late (as opposed to early) allergic asthmatic reactions.¹⁶⁸

Perception of breathlessness during exercise can be assessed on a visual analogue scale and this technique has been used to evaluate the effects of drugs in normal subjects and patients with various pulmonary diseases.¹⁶⁹ Results in asthma are rather few but sufficient to indicate that relief of airways obstruction measured objectively does not necessarily run parallel with improved dyspnoea scores: of the bronchodilators, beta₂ agonists do allow a given level of ventilation to be tolerated with less dyspnoea, whereas

xanthines often make dyspnoea worse.¹⁷⁰ This approach could be used for investigating possible effects of alternative medicines on breathlessness in asthma.

Even given an effect on vagal tone or on perception, we might still conclude that alternative medicine offers nothing more than a well orchestrated placebo response. Yet what is the placebo response and how is it generated? Identifying a profile for placebo responders has proved difficult. In a group of patients who showed both bronchoconstrictor and bronchodilator responses to the inhalation of a neutral aerosol, the only psychological variables correlating with an effect were a belief in the influence of chance in the control of health and, unexpectedly, a negative (rather than positive) correlation with the importance of "powerful others." There was no link with anxiety or tension ratings.¹⁶⁸

CONCLUSIONS

This review of published work on alternative medicine, which has included reference to texts of alternative techniques as well as original articles, has led us to the conclusion that there is no place for any alternative approach in the management of the vast majority of cases of acute, severe asthma, but that in persistent asthma some patients could benefit. We wish to make some exceptions and caveats, however. Firstly, in acute, severe asthma a trial of acupuncture as an adjunct to conventional treatment in difficult cases is warranted. Secondly, in persistent asthma the evidence available suggests that techniques such as hypnosis and yoga, which possibly modify vagal tone or influence perception of dyspnoea, deserve further evaluation. Clearly not all asthmatic patients can respond; ways of identifying those that will are of great importance. Thirdly, too little attention is given by orthodox physicians and researchers of the effects of dietary substances on asthma and this has resulted in some patients becoming duped into ridiculous dietary manipulations. Various herbal remedies are on sale for asthma, a few of which may contain useful pharmacological agents. These remedies should be subject to the same regulatory restrictions as conventional pharmaceuticals and be properly tested for efficacy and safety. Finally, some form of regulation should be exercised over non-medicinal alternative medicines to ensure that they are marketed only when they too have statutory standards of efficacy and safety.

DJ LANE
Osler Chest Unit,
Churchill Hospital,
Oxford OX3 7LJ
TV LANE

Formerly student in department of psychology,
University of Southampton

Reprint requests to: Dr D J Lane

- 1 Smith T. Alternative medicine [editorial]. *Br Med J* 1983;287:307-8.
- 2 Association of Community Health Councils for England and Wales. *The state of non-conventional medicine—the consumer view*. Association of Community Health Councils for England and Wales, 1989.
- 3 Donnelly WJ, Spykerboer JE, Thong YH. Are patients who use alternative medicine dissatisfied with orthodox medicine? *Med J Aust* 1985;142:439-41.
- 4 Thomas KJ, Carr J, Westlake L, Williams BT. Use of non-orthodox and conventional health care in Great Britain. *Br Med J* 1991;302:207-10.
- 5 Reilly DT. Young doctors' views on alternative medicine. *Br Med J* 1983;287:337-9.
- 6 Kaptchuk TJ. *Chinese medicine: the web that has no weaver*. London: Rider, 1983.
- 7 Millman BS. Acupuncture: context and critique. *Ann Rev Med* 1977;28:223-34.
- 8 Clement-Jones V, McLoughlin L, Tomlin S, Besser GM, Rees LH, Wen HL. Increased β -endorphin but not met-enkephalin levels in human cerebrospinal fluid after acupuncture for recurrent pain. *Lancet* 1980;ii:946-8.
- 9 Anonymous. Alternative medicine is no alternative [editorial]. *Lancet* 1983;ii:773-4.
- 10 France SE, Dresser A, Wood C, Fleming J, Aldridge D, Pietroni PC. Research on traditional Chinese acupuncture—science or myth: a review. *J R Soc Med* 1988;81:588-90.
- 11 Turner RN. *Naturopathic medicine: treating the whole person*. Wellingborough: Thomsons, 1984.
- 12 Winter R. Homeopathy: medicine or magic? [editorial]. *Br Med J* 1991;302:120.
- 13 Jones DP, O'Connor SA, Collins JV, Watson BW. Effect of long term ionised air treatment on patients with bronchial asthma. *Thorax* 1976;31:428-32.
- 14 Aldridge D, Pietroni PC. Clinical assessment of acupuncture in asthma therapy: discussion paper. *J R Soc Med* 1987;80:222-4.
- 15 Marcus P. Effects of acupuncture in bronchial asthma. *J R Soc Med* 1982;75:670.
- 16 Jobst K, Chen JH, McPherson K, Arrowsmith J, Brown V, Efthimiou J, et al. Controlled trial of acupuncture for disabling breathlessness. *Lancet* 1986;ii:1416-8.
- 17 Mitchell-Heggs P, Murphy K, Minty K, Guz A, Patterson SC, Minty PSB, et al. Diazepam in the treatment of dyspnoea in the "pink puffer" syndrome. *Q J Med* 1980;40:9-20.
- 18 Stark RD, O'Neill PA. Dihydrocodeine for breathlessness in "pink puffers". *Br Med J* 1983;286:1280-1.
- 19 Anonymous. Acupuncture, asthma and breathlessness [editorial]. *Lancet* 1986;ii:1427-8.
- 20 Vincent CA, Richardson PH. Acupuncture for some common disorders: a review of evaluative research. *J R Coll Gen Pract* 1987;37:77-81.
- 21 Yu DYC, Lee SP. Effect of acupuncture on bronchial asthma. *Clin Sci Mol Med* 1976;51:503-9.
- 22 Virsik K, Kristufek D, Bangha O, Urban S. The effect of acupuncture on pulmonary function in bronchial asthma. *Progr Respir Res* 1980;14:271-5.
- 23 Takishima T, Mue S, Tamsra G, Ishihara T, Watanabe K. The bronchodilating effect of acupuncture in patients with acute asthma. *Ann Allergy* 1982;48:44-9.
- 24 He JA, Ma RY, Zhu L, Wang Z. Immediate relief and improved pulmonary functional changes in asthma symptom-complex treated by needle warming moxibustion. *Journal of Traditional Chinese Medicine* 1988;8:164-6.
- 25 Berger D, Nolte D. Acupuncture in bronchial asthma: body plethysmographic measurements of acute bronchospasmolytic effects. *Comparative Medicine of East and West* 1977;5:265-9.
- 26 Guorni J. Lectures on formulating acupuncture prescriptions—selection and matching of acupuncture points. II Acupuncture treatment of bronchial asthma. *British Journal of Acupuncture* 1987;10:8-10.
- 27 Tandon MK, Soh PFT. Comparison of real and placebo acupuncture in histamine-induced asthma: a double blind crossover study. *Chest* 1989;96:102-5.
- 28 Tashkin DP, Bresler DE, Kroening RJ, Kerschner H, Katz RL, Coulson A. Comparison of real and simulated acupuncture and isoproterenol in methacholine-induced asthma. *Ann Allergy* 1977;39:379-87.
- 29 Fung KP, Chow OKW, So SY. Attenuation of exercise-induced asthma by acupuncture. *Lancet* 1986;ii:1419-21.
- 30 Dias RLR, Subramaniam S, Lionel NDW. Effects of acupuncture in bronchial asthma: preliminary communications. *J R Soc Med* 1982;75:245-8.
- 31 Tashkin DP, Kroening RJ, Bresler DE, Simmons M, Coulson AH, Kerschner H. A controlled trial of real and simulated acupuncture in the management of chronic asthma. *J Allergy Clin Immunol* 1985;76:855-64.
- 32 Christensen PA, Laursen LC, Taudorf E, Sorensen SC, Weeke B. Acupuncture and bronchial asthma. *Allergy* 1984;39:379-85.
- 33 Shao JM, Ding YD. Clinical observations on 111 cases of asthma treated by acupuncture and moxibustions. *Journal of Traditional Chinese Medicine* 1985;5:23-5.
- 34 Mitchell P, Wells JE. Acupuncture for chronic asthma: a controlled trial with six months' follow-up. *American Journal of Acupuncture* 1989;17(part 1):5-13.
- 35 Cao Y, Pei WH, Chin YQ. Increase and decrease of IgE of serum and duration of acupuncture treatment in asthmatic bronchitis. *Chinese Journal of Acupuncture and Moxibustion* 1985;5:28-30.
- 36 Han JS, Tang J, Ren MF, Zhou ZF. Central neurotransmitters and acupuncture analgesia. *American Journal of Chinese Medicine* 1980;8:331-48.
- 37 Feng JG, Chen BH. Change in plasma cyclonucleotide and corticosteroid content in asthmatics and its relation to the remission of asthma. *Shanghai Journal of Traditional Chinese Medicine* 1983;7:26-7.
- 38 Liao YY, Seto K, Saito H, Fujita M, Kanakami M. Effect of acupuncture on adrenocortical hormone production in relation to the duration of acupuncture stimulation. *American Journal of Chinese Medicine* 1979;7:362-71.
- 39 Skrabanek P. Acupuncture and the age of unreason. *Lancet* 1984;ii:1169-71.
- 40 Bodner G, Topilsky M, Greif J. Pneumothorax as a complication of acupuncture in the treatment of bronchial asthma. *Ann Allergy* 1983;51:401-3.
- 41 Kent GP, Brondum J, Keenlyside RA, Lazazia LM, Scott HD. A large outbreak of acupuncture-associated hepatitis B. *Am J Epidem* 1988;127:591-8.
- 42 Jayaraman KS. India's scientific basis of traditional remedies. *Nature* 1987;326:323.
- 43 Anonymous. UK: Ayur-Vedic medicine. *Lancet* 1990;336:1060-1.
- 44 Bodeker GC. Ayur-Vedic medicine. *Lancet* 1990;336:1260.
- 45 Chalmers RA. Maharishi Ayur-Veda. *Lancet* 1990;336:1322.
- 46 Orme-Johnson D. Medical care utilisation and the transcendental meditation program. *Psychosom Med* 1987;49:493-507.
- 47 Wilson AF, Honsberger R, Chiu JT, Novey HS. Transcendental meditation and asthma. *Respiration* 1975;32:74-80.

- 48 Goyeche JMR, Abo Y, Ikemi Y. The yoga perspective. Part II. Yoga therapy in the treatment of asthma. *J Asthma* 1982;19:189-201.
- 49 Nagarathna R, Nagendra HR. Yoga for bronchial asthma: a controlled study. *Br Med J* 1985;291:1077-9.
- 50 Singh V, Wisniewski A, Britton J, Tattersfield A. Effect of yoga breathing exercises (pranayama) on airway reactivity in subjects with asthma. *Lancet* 1990;335:1381-3.
- 51 Udupa KN, Singh RH. The scientific basis of yoga. *JAMA* 1972;220:1365.
- 52 Benson H, Lehmann JW, Malhotra MS, Goldman RF, Hopkins J, Epstein MD. Body temperature changes during the practices of gTum-mo yoga. *Nature* 1982;295:234-6.
- 53 Osler W. *The principles and practice of medicine*. 3rd edition. Edinburgh: Young J Pentland, 1898:628-32.
- 54 Moore N. Behaviour therapy in bronchial asthma: a controlled study. *J Psychosom Res* 1965;9:257-76.
- 55 Philip RL, Wilde GJS, Day JH. Suggestion and relaxation in asthmatics. *J Psychosom Res* 1972;16:193-204.
- 56 White HC. Hypnosis in bronchial asthma. *J Psychosom Res* 1961;5:272-9.
- 57 Diamond HH. Hypnosis in children: complete cure of forty cases of asthma. *American Journal of Hypnosis* 1959;1:124-9.
- 58 Morrison Smith JM, Burns CLC. The treatment of asthmatic children by hypnotic suggestion. *Br J Dis Chest* 1960;4:78-81.
- 59 Edwards G. Hypnotic treatment of asthma. Real and illusory results. *Br Med J* 1960;ii:492-7.
- 60 Maher-Loughnan GP, MacDonald N, Mason AA, Fry L. Controlled trial of hypnosis in the symptomatic treatment of asthma. *Br Med J* 1962;ii:371-6.
- 61 Maher-Loughnan GP. Hypnosis and auto-hypnosis for the treatment of asthma. *International Journal of Experimental Hypnosis* 1970;18:1-14.
- 62 Report to the Research Committee of the British Tuberculosis Association. Hypnosis in asthma: a controlled trial. *Br Med J* 1968;4:71-6.
- 63 Morrison JB. Chronic asthma and improvement with relaxation induced by hypnotherapy. *J R Soc Med* 1988;81:701-4.
- 64 Ewer TC, Stewart DE. Improvement in bronchial hyperresponsiveness in patients with moderate asthma after treatment with a hypnotic technique: a randomised controlled trial. *Br Med J* 1986;293:1129-32.
- 65 Ben-Zvi Z, Spohn WA, Young SH, Kattan M. Hypnosis for exercise-induced asthma. *Am Rev Respir Dis* 1982;125:392-5.
- 66 Luparello T, Lyons HA, Bleecker ER, McFadden ER. Influences of suggestion on airway reactivity in asthmatic subjects. *Psychosom Med* 1968;30:819-25.
- 67 Horton DJ, Suda WL, Kinsman RA, Souhrada J, Spector SL. Bronchoconstrictive suggestion in asthma: a role for airways hyperreactivity and emotions. *Am Rev Respir Dis* 1978;117:1029-38.
- 68 Butler C, Steptoe A. Placebo responses: an experimental study of psychophysiological processes in asthmatic volunteers. *Br J Clin Psychol* 1986;25:173-83.
- 69 Neild JE, Cameron IR. Bronchoconstriction in response to suggestion: its prevention by an inhaled anticholinergic agent. *Br Med J* 1985;290:674.
- 70 Spector S, Luparello TJ, Kopetzky MT, Souhrada J, Kinsman RA. Response of asthmatics to methacholine and suggestion. *Am Rev Respir Dis* 1978;117:1029-38.
- 71 McFadden ER, Luparello T, Lyons HA, Bleecker E. The mechanism of action of suggestion in the induction of acute asthma attacks. *Psychosom Med* 1969;31:134-43.
- 72 Lewis RA, Lewis MN, Tattersfield AE. Asthma induced by suggestion: is it due to airway cooling? *Am Rev Respir Dis* 1984;129:691-5.
- 73 Klaustermeyer WB, Hale FC, Prescott EJ. Characteristics of the asthmatic airway response to inhaled diluent. *Ann Allergy* 1979;43:14-8.
- 74 Lewis RA, Lewis MN, Tattersfield AE, Neild JE, Cameron IR. Bronchoconstriction in response to suggestion. *Br Med J* 1985;290:1146.
- 75 Barnes PJ, Chung KF. Difficult asthma. *Br Med J* 1989;299:695-8.
- 76 Collison DR. Which asthmatic patients should be treated by hypnotherapy? *Med J Aust* 1975;ii:776-81.
- 77 Kinsmann RA. Anxiety reduction in asthma: four catches to general application. *Psychosom Med* 1980;42:397-405.
- 78 Priest AW. The iridological assessment of the patient and its relationship to subsequent therapies. In: *Proceedings of the Research Society for Naturotherapy*. 1959.
- 79 Lodge-Rees E, Campbell J. Patterns of trace minerals in the hair and relationship to clinical states. *Journal of Orthomolecular Psychology* 1975;4:53-60.
- 80 Taylor A. Usefulness of measurements of trace elements in hair. *Ann Clin Biochem* 1986;23:364-78.
- 81 Bakir F, Damluji SF, Amin-Zaki L. Methyl mercury poisoning in Iraq. *Science* 1973;181:230-41.
- 82 Dormandy TL. Trace element analysis of hair. *Br Med J* 1986;293:975-6.
- 83 Sethi TJ, Kenery DM, Tobin S, Lessof MH, Lamborn E, Bradley A. How reliable are commercial allergy tests? *Lancet* 1987;ii:92-4.
- 84 Thomson C. *Nature cure from the inside*. Edinburgh: Kingstons Clinic, 1953.
- 85 Coulter HL. *Homeopathic science and modern medicine*. Richmond, California: North Atlantic Books, 1981.
- 86 Vitoulkas G. Homeopathy: a therapy for the future? *World Health Forum* 1983;4:99-101.
- 87 Lovatt H, Buckton G. An introductory assessment of homeopathy. *J R Soc Health* 1986;5:172-3.
- 88 Lecomte J. Homeopathy: science or dogma? *World Health Forum* 1983;4:111-3.
- 89 Scofield AM. Experimental research in homeopathy—a critical review. *British Homeopathy Journal* 1984;73:161-80.
- 90 Reilly DT, Taylor MA. Potent placebo or potency? *British Homeopathy Journal* 1985;74:65-75.
- 91 Gibson RG, Gibson SLM. A new aspect of psora—the recognition and treatment of house dust mite allergy. *British Homeopathy Journal* 1980;69:151-8.
- 92 Morris-Owen RM, Datt-Lai K. Observations on the effect of house dust potencies. *British Homeopathy Journal* 1981;70:70-87.
- 93 Wiesenbauer M, Gaus W. Double-blind trial comparing the effectiveness of the homeopathic preparation Galphimia potentisation D6, Galphimia dilution 10⁻⁶ and placebo on pollinosis. *Arzneim-Forsch/Drug Res* 1985;35:1745-7.
- 94 Reilly DT, McSharry C, Taylor MA, Aitchison T. Is homeopathy a placebo response? Controlled trial of homeopathic potency with pollen in hay fever as a model. *Lancet* 1986;ii:881-5.
- 95 O'Keefe D. Is homeopathy a placebo response? [letter]. *Lancet* 1986;ii:1106.
- 96 Khan MF. Is homeopathy a placebo response? [letter]. *Lancet* 1986;ii:110.
- 97 Skrabanek P. Is homeopathy a placebo response? [letter]. *Lancet* 1986;ii:1107.
- 98 Reilly DT, Taylor MA, McSharry C, Aitchison T. Is homeopathy a placebo response? [letter]. *Lancet* 1986;ii:1272.
- 99 Davenas E, Beauvais F, Amara J, Oberbaum M, Robinzon B, Miadonna A, et al. Human basophil degranulation triggered by very dilute antiserum against IgE. *Nature* 1988;333:816-8.
- 100 Poitevin B. *Le Devenir de L'Homeopathie*. Paris: Doin, 1989.
- 101 Maddox J, Randi J, Stewart WW. "High dilution" experiments a delusion. *Nature* 1988;334:287-90.
- 102 Benveniste J. Dr Jacques Benveniste replies [letter]. *Nature* 1988;334:291.
- 103 Poitevin B, Davenas E, Benveniste J. In vitro immunological degranulation of human basophils is modulated by lung histamine and *Apis mellifica*. *Br J Clin Pharmacol* 1988;25:430-44.
- 104 Hill C, Doyon F. Review of randomized trials of homeopathy. *Rev Epidemiol Santé Publ* 1990;38:138-47.
- 105 Kleijnen J, Knipschild P, Reit Gter. Clinical trials of homeopathy. *Br Med J* 1991;302:316-22.
- 106 Baum M. Trials of homeopathy. *Br Med J* 1991;302:529.
- 107 Wallace KR. The homeopathic treatment of asthma and allergies. *British Homeopathy Journal* 1986;75:218-26.
- 108 Gnaiger J. Allergic asthma. *British Homeopathy Journal* 1990;79:135-7.
- 109 Reilly DT, Taylor MA, Campbell J, et al. Is homeopathy a placebo response? A controlled trial of homeopathic immunotherapy (HIT) in atopic asthma [abstract]. In: *Proceedings of the 45th congress of the Liga Medicorum Homeopathica Internationalis*. 1990.
- 110 Boucinhas JC, Boucinhas ID de M. Prophylaxie des crises d'asthme bronchique chez l'enfant par l'usage de Pouman histamine 5CH. *Homopathie francaise* 1990;78:35-9.
- 111 Scofield AM. Experimental research in homeopathy—a critical review (conclusion). *British Homeopathy Journal* 1984;73:211-26.
- 112 Anonymous. The trial of homeopathy [editorial]. *Lancet* 1983;ii:108.
- 113 Turner P. Clinical trial of homeopathic remedies. *Br J Clin Pharmacol* 1980;9:443-4.
- 114 Rubik B. Report on the status of research on homeopathy with recommendation for future research. *British Homeopathy Journal* 1989;78:86-96.
- 115 Korock M. Is there a future for homeopathy? *Can Med Ass J* 1985;132:840-9.
- 116 Chaitow L. *Osteopathy: a complete health care system*. Wellingborough: Thomsons, 1982.
- 117 O'Donovan D. The possible significance of scoliosis of the spine in the causation of asthma and allied allergic condition. *Ann Allergy* 1951;9:184-219.
- 118 Beal MC. Viscerosomatic reflexes: a review. *Journal of the American Osteopathy Association* 1985;85:786-811.
- 119 Beal MC, Morlock JW. Somatic dysfunction associated with pulmonary disease. *Journal of American Osteopathy Association* 1984;84:179-83.
- 120 Bouhuys A. Effects of posture in experimental asthma in man. *Am J Med* 1963;34:470-6.
- 121 Renaud CI, Pichette D. Chiropractic management of bronchial asthma: a literature review. *American Chiropractic Association Journal* 1990;27:25-6.
- 122 Chai H, Falliers CJ, Dietiker F, Franz B. Long term investigation into the effects of physical therapy in chronically asthmatic children. *J Allergy* 1968;39:109.
- 123 Erskine J, Schonell M. Relaxation therapy in bronchial asthma. *J Psychosom Res* 1979;23:131-9.
- 124 Alexander AB, Miklich DR, Hershkoff H. The immediate effects of systematic relaxation training on peak expiratory flow rates in asthmatic children. *Psychosom Med* 1972;34:388-94.
- 125 Davis MH, Saunders DR, Creer TL, Chai H. Relaxation training facilitated by biofeedback apparatus as a supplemental treatment in bronchial asthma. *J Psychosom Res* 1973;17:121-8.
- 126 Robertson A, Gilmore K, Frith PA, Antic R. Effects of connective tissue massage in sub-acute asthma. *Med J Aust* 1984;140:52-3.
- 127 Lessof MH, Wraith DG, Merret TG. Food allergy and intolerance in 100 patients: local and systemic affects. *Q J Med* 1980;195:259-71.
- 128 Wraith DG, Merret J, Roth A, Yman L, Merret TG. Recognition of food allergic patients and their allergens by the RAST technique and clinical investigation. *Clin Allergy* 1979;9:25-36.
- 129 Lockett SD. Hypersensitivity to tartrazine and other dyes and additives present in foods and pharmaceutical products. *Ann Allergy* 1977;38:206-10.
- 130 Baker GJ, Collett P, Allern DH. Bronchospasm induced by meta-bisulphite-containing foods and drugs. *Med J Aust* 1981;ii:614-6.
- 131 Moneret-Vautrin DA. Food intolerance masquerading as food allergy: false food allergy. In: Brostoff J, Chalkacombe SJ, eds. *Food Allergy and Intolerance*. London: Ballière Tindall 1987:836-49.
- 132 Mackarness R. *Not all in the mind*. London: Pan, 1976.
- 133 Morris DL. Use of sublingual antigen in diagnosis and treatment of food allergy. *Ann Allergy* 1969;27:289-94.
- 134 Lowell FC, Heiner DC. Food allergy: cytotoxic diagnosis technique not proven. *JAMA* 1972;220:1624.
- 135 Miller JB. Technique of intradermal testing and subcutaneous injection therapy. *Trans Am Soc Ophthalmol Otolaryngol Allergy* 1976;16:154-68.
- 136 Goldman AS, Kantak AG, Hampong AJ, Goldblum RM. Food hypersensitivities: historical perspectives, diagnosis and clinical presentations. In: Brostoff Chackracombe, *Food allergy and intolerance*. London: Ballière Tindall, 1987:797-805.

- 137 Elliott HL, Reid JL. The clinical pharmacology of a herbal asthma cigarette. *Br J Clin Pharmacol* 1980;10:487.
- 138 Howell JBL, Altounyan REC. A double blind trial of disodium cromoglycate in the treatment of allergic bronchial asthma. *Lancet* 1967;ii:539-42.
- 139 Chung KF, Dent G, McCusker M, Guinot PH, Page CP, Barnes PJ. Effect of a ginkgolide mixture (BN 52063) in antagonising skin and platelet responses to platelet activating factor in man. *Lancet* 1987;ii:248-51.
- 140 Morice A. Adulterated "homeopathic" cure for asthma. *Lancet* 1986;ii:862-3.
- 141 Stanway A. *Alternative medicine: a guide to natural therapies*. London: McDonald and James, 1979.
- 142 Tansley DV. *Radionics and the subtle anatomy of man*. Wellingbourne: Health Science Press, 1972.
- 143 Katelaris CH, Yan KY, Welner JM, Heddle RJ, Stuckey MS. Unorthodox methods of diagnosis and treatment of allergic diseases. *Med J Aust* 1990;152:107.
- 144 Kornblueh L, Griffin J. Artificial air ionization in physical medicine. *Am J Phys Med* 1955;34:618.
- 145 Kotyaka S, Krueger AP. Studies on the air-ion-induced growth increases in higher plants. *Advances in the Frontiers of Plant Science* 1967;20:115-208.
- 146 Krueger AP, Kotaka S, Nishizawa K, Kogure Y, Takenobu M, Andriese PC. Air ion effects on the growth of the silkworm (*Bombyx mori* L.). *International Journal of Biometeorology* 1966;10:29-38.
- 147 Kensler CJ, Batrtista SP. Chemical and physical factors affecting mammalian ciliary action. *Am Rev Respir Dis* 1966;93:93-102.
- 148 Krueger AP, Smith RF. The effects of air ions on the living mammalian trachea. *J Gen Physiol* 1958;42:69-82.
- 149 Krueger AP, Andriese PC, Kotaka S. Small air ions: their effect on blood levels of serotonin in terms of modern physical theory. *International Journal of Biometeorology* 1968;12:225-39.
- 150 Kornblueh IH, Piersol GM, Speicher FP. Relief from pollinosis in negatively ionised rooms. *Am J Phys Med* 1958;37:18-27.
- 151 Palti Y, De Nour E, Abrahamov A. The effect on atmospheric ions on the respiratory system of infants. *Pediatrics* 1966;38:405-11.
- 152 Blumstein GI, Spiegelman J, Kimbel P. Atmospheric ionization in allergic respiratory diseases. *Arch Environ Health* 1964;8:818-9.
- 153 Osterballe O, Weeke B, Albrechtsen O. Influence on small atmospheric ions on the airways in patients with bronchial asthma. *Allergy* 1979;34:187-94.
- 154 Nogrady SG, Furnass SB. Ionisers in the management of bronchial asthma. *Thorax* 1983;38:917-22.
- 155 Price JA, Marchant JC, Little SA, Assadullahi T, Warner JO. The effect of electrostatic charge as aeroallergen production in homes. *Clin Exp Allergy* 1990;20(suppl 1):12.
- 156 Ben-Dov L, Amirav I, Schochina M, Amita L, Bar-Yishay E, Godfrey S. Effect of negative ionisation of inspired air on the response of asthmatic children to exercise and inhaled histamine. *Thorax* 1983;38:584-8.
- 157 Mitchell EA, Elliott RB. Controlled trial of an electrostatic precipitator in childhood asthma. *Lancet* 1980;ii:559-61.
- 158 Juniper EF, Kline PA, Vanzielegem MA, Ramsdale EH, O'Byrne PM, Hargreave FE. Long-term effects of budesonide on airway responsiveness and clinical asthma severity in inhaled steroid-dependent asthmatics. *Eur Respir J* 1990;3:1122-7.
- 159 Stanescu DC, Nemery B, Veriter C, Marechal C. Pattern of breathing and ventilatory response to CO₂ in subjects practising hatha-yoga. *J Appl Physiol (Respir Environ Exercise Physiol)* 1981;51:1625-9.
- 160 Pastorello EA, Codecasa LR, Gerosa A, Buonocore E, Sillano V, Zanussi C. The role of suggestion in asthma. II Effects of a bronchoconstrictor drug on bronchial reactivity under bronchoconstrictor or bronchodilator suggestion. *Ann Allergy* 1987;59:339-40.
- 161 Juniper EF, Frith PA, Hargreave FE. Long term stability of bronchial responsiveness to histamine. *Thorax* 1982;37:288-91.
- 162 Lehrer PM, Hochron SM, McCann B, Swartzman L, Reba P. Relaxation decreases large airway but not small airway asthma. *J Psychosom Res* 1986;30:13-25.
- 163 Godfrey S, Silverman M. Demonstration by placebo response in asthma by means of exercise testing. *J Psychosom Res* 1973;17:291-7.
- 164 Higgs CMB. The role of psycho-social stresses in bronchial asthma. In: Pichot P, Bernes P, Wolf R, Than K. (*Psychiatry: state of art vol 2.*) *Biological psychiatry—higher nervous activity*. New York: Plenum, 1985:802-6.
- 165 Higgs CMB. The influence of knowledge of peak flow on self-assessment of asthma studies with a coded peak flow meter. *Thorax* 1986;41:671-5.
- 166 Rubinfeld AR, Pain MCF. Perception of asthma. *Lancet* 1976;ii:882-4.
- 167 Burdon JGW, Juniper EF, Killian J, Hargreave FE, Campbell EJM. The perception of breathlessness in asthma. *Am Rev Respir Dis* 1982;126:825-8.
- 168 Turcotte H, Corbeil F, Boulet LP. Perception of breathlessness during bronchoconstriction induced by antigen, exercise and histamine challenges. *Thorax* 1990;45:914-8.
- 169 Stark RD, Gambles SA, Chatterjee SS. An exercise test to assess clinical dyspnoea: estimation of reproducibility and sensitivity. *Br J Dis Chest* 1982;76:259-78.
- 170 Stark RD. Dyspnoea: assessment and pharmacological manipulation. *Eur Respir J* 1988;1:280-7.