Summary
A common treatment for post-menopausal hot flushes is to raise oestrogen levels with hormone replacement therapy. However this option is not considered suitable for breast cancer patients with hormone sensitive carcinoma, since an increase in oestrogen is contraindicated. This leaves little available as an effective conventional therapy.

There has been some evidence that acupuncture is a suitable treatment for hot flushes, so a series of 22 consecutive breast cancer patients referred by an oncologist for treatment of hot flushes were given a course of classical body acupuncture with two 20-30min treatment sessions per week for up to 7 weeks. The frequency of recorded hot flushes (both day and night) had improved significantly (p<0.001) by the end of treatment. All patients claimed some benefit and 82% had effective relief.

Key words
Acupuncture, Breast cancer, Hot flushes, Menopause, Tamoxifen.

Introduction
Although acupuncture has aroused interest in Western medicine for its analgesic properties in the treatment of pain (1,2), it is also being used to treat non-painful conditions, including vasomotor symptoms.

An attack of hot flushes is characterised by a rushing sensation of heat that spreads over the body, especially the chest, face and head. Profuse sweating and a feeling of suffocation may accompany the flushes, often followed by a chill; this can severely impair a patient's quality of life.

There are changes in circulation (cutaneous vasodilatation), body temperature, and heart rate (3). The exact mechanisms causing these symptoms are unknown, but a decline in oestrogen concentration has been suggested (4). Since some of the oestrogen is normally present in fatty tissues, obese patients have a greater tendency to develop hot flushes than thin ones. The abrupt loss of ovarian oestrogen due to tamoxifen (5), radiation or chemotherapy in breast cancer may induce particularly severe hot flushes. Tamoxifen is used in the treatment of some types of breast cancer to block the effect of oestrogen on cells.

Recent research on breast cancer patients investigated prevalence, severity and management of hot flushes (5) and concludes that they are more common in women with a high school education and those who were younger at diagnosis, and are more severe in women with a higher body mass index, as well as those receiving tamoxifen. Breast cancer patients have hot flushes twice as often as healthy postmenopausal women (5) and for longer periods of time after the menopause (4): 54% were still having hot flushes more than 10 years after the menopause, compared with 35% of healthy postmenopausal women (5).

Women with a history of breast cancer have few options for managing hot flushes. Hormone replacement therapy (HRT) alleviates the symptoms, but it is considered that hormone treatment is risky for women who have had breast cancer (6).

The aim of this paper is to investigate the use of acupuncture in the treatment of hot flushes for breast cancer patients undergoing chemotherapy and tamoxifen treatment.

Pathophysiology
Breast cancer treatment with cytotoxic drugs and tamoxifen can induce the onset of menopause and precipitate vasomotor symptoms (5,7,8). There are several theories to explain the mechanism of hot flushes in menopausal women: hypothalamic disorder of the thermoregulatory centre (9), prostaglandin stimulation of gonadotrophins through the hypothalamus (10,11), and low levels of oestrogen (12). It has been suspected that lack of oestrogen is the
principle cause of hot flushes, because when the oestrogen level falls it affects the sympathetic nervous system, leading to dilatation of blood vessels with resultant flushing and sweating. Catecholamines and endogenous opioids are also thought to moderate the heat regulatory mechanism in the hypothalamus, and there are other factors that have been found to influence the development and severity of hot flushes (Table 1).

According to Traditional Chinese Medicine, the clinical picture of hot flushes shows a deterioration in the yin of the Liver, weakness in the Blood of the Heart and an exhaustion of the Water of the Kidney. The deficiency of Water is countered by an excess of Fire which endangers the control of the yin of the Liver and unleashes its yang. Hot flushes are associated with other symptoms such as depression, palpitation, insomnia and tiredness which are related to dysfunction of the Heart, Liver, Spleen and Kidney organs. There are two pathological mechanisms:

i. The combined effects of deficiency in the Kidney, hyperactivity in the Liver and flare-up of Heart Fire will lead to palpitation, insomnia, nocturnal emission and dizziness. In addition, there are signs of red tongue proper and a wiry, small, rapid, weak pulse.

ii. The imbalance between the Spleen and Liver is manifested by emotional depression, irritability, loss of temper and an oppressive feeling in the chest.

Clinical
A hot flush can occur at any time, day or night. It is an acute warm or hot sensation that may be associated with a sudden reddening of the head, neck and chest, followed by profuse sweating, and a chill feeling with shivering. It lasts generally from a few seconds to a few minutes but, rarely, can extend to half an hour or an hour (20). A few patients have some unusual symptoms such as pressure in the head, anxiety, tingling sensations, or nausea. Other causes of flushing need to be excluded (21).

It has been reported that mild hot flushes occur in 40% of healthy women aged 39 or more with a normal menstrual cycle (22). On the other hand, the same study noted that 85% of menopausal women experience hot flushes and 30% describe them as severe. In other studies, hot flushes have been reported in 50-70% of climacteric women associated with palpitation, dizziness, tachycardia or sweating (23,24). The prevalence of hot flushes appears to differ by race: the incidence being higher in Western women (25-27). These studies suggest that in Japan, Hong Kong, Pakistan and Mexico 10% or less of menopausal women experience hot flushes. The low incidence in Japan has been linked to high soya consumption, which stimulates oestrogen production.

Treatment

Hormone replacement
For more than 35 years (HRT) has been used to treat hot flushes following the natural climacteric. Studies have shown that oestrogen is the treatment of choice rather than non-hormonal drugs such as clonidine, sedatives, tranquillisers, beta-blockers, veralipride and vitamin E (28-30), and evening primrose oil showed contradictory results, with lack of scientific evidence to support its use in controlling hot flushes (31). However, little attention has been paid to the problem of hot flushes in breast cancer patients, who cannot take HRT.

Acupuncture
Acupuncture is known to stimulate neuropeptide synthesis, which controls body functions such as cardiovascular physiology and hormonal secretions (32). Wyon and colleagues (33-35) carried out clinical research on 24 healthy women with natural menopause who were suffering from hot flushes. These women were randomly assigned to two groups, one receiving treatment with electro-acupuncture (EA), the other with superficial needle position acupuncture (SNP). The frequency of flushes showed a significant fall of more than 50% in both groups, remaining decreased in the EA.

<table>
<thead>
<tr>
<th>FACTORS CONTRIBUTING TO ONSET OF HOT FLUSHES</th>
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<tbody>
<tr>
<td><strong>Socio-economic</strong> (13)</td>
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<tr>
<td><strong>Exercise</strong>: physical inactivity (14), but also over-exertion (exhaustion, over-work and failure to relax physically or mentally)</td>
</tr>
<tr>
<td><strong>Diet</strong>: hot drinks, spicy foods and alcohol (13,15,16), food containing histamine (cheese and red wine), betaphenylethylamine (chocolate), tyramine (pickled herrings, cheese and marmite) and nitrites (bacon, salami and hot dogs); also caffeine decreases free oestrogen (16)</td>
</tr>
<tr>
<td><strong>Smoking</strong>: smoking changes the breakdown of oestrogen in the liver and thus lowers one form of oestrogen in the blood (17-19)</td>
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<tr>
<td><strong>The weather</strong>: very hot or cold</td>
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</table>

Table 1
group, but increasing slightly again at the three month follow-up in the SNP group. Towlerton and Filshie used patient stimulated, semi-permanent acupuncture studs at the SP.6 point for successful attenuation of flushes in breast cancer patients (36).

Acupuncture points for the treatment of hot flushes (Table 2) can be chosen on the following basis:

i. **Specific points** for the specific problem.

ii. **Homoeostatic points** (37) to restore balance in the body’s internal environment through moderating the endocrine system and sympathetic and parasympathetic activity (38).

iii. **Psychological and sedative points** for calming and tranquillising, and for the treatment of associated problems such as insomnia and anxiety. The acupuncture sedative effect has been shown to decrease delta and theta brain wave activity.

**Exercise**

In Sweden, Hammar and colleagues (39) found that 50% of physically active postmenopausal women have moderate to severe hot flushes; however the study did not look at activity levels of the control group. Physical activity can increase the concentration of β-endorphin, which contributes in the reduction of hot flushes (14) and can decrease the circulating follicular stimulating hormone (FSH) and luteinizing hormone (LH). Exercise on a regular basis affects neurotransmitters, which regulate the central thermoregulation (40). Regular exercise (Table 1) may thus be helpful in addition to acupuncture, but the optimal form and quantity of the exercise remains to be determined.

**Clinical study**

**Method**

This study, conducted over the period from 1995 to 1999, was of a consecutive series of twenty two cancer patients aged from 38-59 years, who had been diagnosed and referred by a consultant clinical oncologist for acupuncture treatment of hot flushes that had been disturbing their sleep and social activities. None of the patients had previously received any form of acupuncture therapy and all had tried various types of conventional treatment without improvement.

Acupuncture was given at points selected according to a standardised formula (Table 2), traditionally used for the treatment of hot flushes. Between 6 and 10 points were needled per session, depending on the severity and frequency of the hot flushes and the associated symptoms. Disposable, stainless steel, 3cm, 30 gauge, solid acupuncture needles were inserted to a depth which varied according to the thickness of skin and subcutaneous fatty tissue at the site of individual acupuncture points. Needles were manipulated to induce a sensation of heaviness or numbness propagating from the site as described in classical acupuncture literature (41) and previous research work (42,43).

The acupuncture course was of 6-14 sessions, with two 20-30 minute treatment sessions per week. A positive response was expected to be evident after 4-6 treatments, so if there were no improvement after 8 sessions treatment would be considered ineffective and the course could be terminated.

Advice on life-style and diet, including avoidance of certain foods and drinks which might tend to increase hot flushing (Table 1) and substitution with a healthy diet rich in minerals and vitamins, together with advice concerning holistic *detoxification* through short-term fasting was given during the first treatment session.

<table>
<thead>
<tr>
<th>Table 2</th>
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<tbody>
<tr>
<td><strong>ACUPUNCTURE POINTS USED IN THE TREATMENT OF HOT FLUSHES</strong></td>
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<tr>
<td><strong>Specific points</strong></td>
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<tr>
<td>BL.62 (Shenmai): 0.5 cun inferior to the tip of the lateral malleolus.</td>
</tr>
<tr>
<td>LR.14 (Qimen): Vertically below the nipple in the 6th intercostal space.</td>
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<tr>
<td>KI.3 (Taixi): Midway between the tip of the medial malleolus and the medial border of the tendo-Achilles.</td>
</tr>
<tr>
<td>HT.7 (Shenmen): At the transverse wrist crease, on the radial side of the tendon of the flexor carpi ulnaris.</td>
</tr>
<tr>
<td>TE.6 (Zhigou): On the back of the forearm between ulna and radius, 3 cun proximal to the wrist crease.</td>
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<tr>
<td><strong>Homoeostatic points</strong></td>
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<tr>
<td>SP.6 (Sanyinjiao): 3 cun above the tip of the medial malleolus on the medial border of the tibia.</td>
</tr>
<tr>
<td>LI.11 (Quchi): At the lateral end of the transverse elbow crease when the elbow is semiflexed.</td>
</tr>
<tr>
<td>ST.36 (Zusanli): One fingerbreadth lateral to the inferior border of the tibial tuberosity, 3 cun below the knee joint.</td>
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<tr>
<td><strong>Sedative points</strong></td>
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<tr>
<td>GV.20 (Baihui): On the vertex of the skull, 5 cun behind the anterior hairline, on the midline.</td>
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<tr>
<td>LI.4 (Hegu): At the highest point of the thenar eminence on the back of the hand when the forefinger and thumb are adducted.</td>
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</table>
Assessment
The number, intensity and length of hot flushes (day and night) were recorded daily by the patient on a diary card and we noted change to the day and night-time flushes between the first and last visit for acupuncture treatment and at the follow-up visit at 3 to 5 weeks. The responses were subjectively assessed at the end of the study period and were classified into the following groups according to the residual level of flushing:

i. *None* (disappearance of hot flushes): no symptoms remain after treatment, and no recurrence by the follow-up visit.

ii. *Mild* (very few hot flushes): symptoms have improved significantly, but a few mild hot flushes, each lasting less than one minute, continue.

iii. *Moderate* (moderate hot flushes): symptoms are largely alleviated, but the patient may still have frequent attacks of hot flushes, each lasting 1-4 minutes.

iv. *No change*: the symptoms remain unchanged and each hot flush may last longer than 4 minutes.

Results
The mean age of the 22 patients in this study was 50, with a range of 38 to 59 years, 11 had had hot flushes over a period of 2-10 months, 8 for 11-19 months and 3 for 20-26 months. Half of the patients received 2-8 acupuncture sessions and the other 50% had 9-14 sessions (Table 3).

The average number of daily hot flushes recorded on the first visit for the 22 patients was 14.32 daytime flushes and 6.95 nocturnal. By the last visit this had reduced to 1.41 day and 0.86

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**Table 3**

DATA FOR BREAST CANCER PATIENTS WITH HOT FlushES

<table>
<thead>
<tr>
<th>Patient No</th>
<th>Age (years)</th>
<th>Duration (months)</th>
<th>Daily number of hot flushes</th>
<th>Sessions</th>
<th>Result</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Start</td>
<td>End</td>
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<td>4</td>
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<td><strong>22</strong></td>
<td><strong>Totals</strong></td>
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<td><strong>315</strong></td>
<td><strong>31</strong></td>
<td><strong>33</strong></td>
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</table>

Figure 1. Bar chart to show the change in number of hot flushes occurring day and night before and after acupuncture treatment.
night, with benefit being maintained at an average 1.50 and 1.18 respectively at the follow-up visit (Figure 1). There are significant overall differences (p<0.001) in hot flush frequency for both day and night between the first and last visit and between the first and follow-up visit. Statistical analysis was with the paired t test.

The analysis of patients’ daily diaries showed that following treatment the residual level of hot flushes was: None for 7 patients (32%), Mild for 11 (50%), Moderate for 4 (18%), and No change for no patients (0%). No correlation was found between response to acupuncture and original duration of hot flushes, age or occupation. No complications were reported.

Discussion
Hot flushes are a significant problem for breast cancer patients who have chemotherapy and tamoxifen treatment, particularly when they disrupt sleep at night, leading to daily fatigue and irritability. Although most research into the problems of vasomotor symptoms has been directed to the cause (5,6), our knowledge of the aetiology is far from complete. However, it is known that in some postmenopausal women, hot flushes are associated with thermoregulatory, cardiovascular, and endocrine changes (4).

Although there has been no clearly defined treatment for hot flushes in breast cancer patients for whom oestrogen replacement is contraindicated (6), alternatives are available. One that has been investigated to a limited extent (33-36) is acupuncture. This has been shown as effective in the natural climacteric, and clinical experience has suggested that benefit is likely in breast cancer patients.

Analysis of our results showed that of the 22 patients in the series, 82% experienced effective relief from hot flushes and all patients recorded some reduction after completion of a course of acupuncture treatment, with a statistically significant improvement in frequency between both the first and last treatment session and the first and follow-up visit for both day and night flushes. A longer follow-up period would have been helpful in assessing the long term response to acupuncture.

The results obtained may have been influenced by lifestyle modifications suggested at the start of acupuncture treatment, in particular dietary changes. In this context it should be noted that an increase in soya consumption to mimic the situation in Japan (27), where there is a low incidence of hot flushes at the natural menopause, is clinically suspect for breast cancer patients as soya contains phyto-oestrogens.

Conclusion
On the basis of this study acupuncture appears to be an acceptable choice of treatment for the management of hot flushes in breast cancer patients. However, as the study is uncontrolled, being only a clinical series, it provides neither a definite result nor clear statistical evidence, but it has demonstrated a positive trend that should be further investigated with an adequate sized, double-blind, controlled trial.

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