British Acupuncture Council

ACUPUNCTURE AND RAYNAUD'S

About Raynaud's phenomenon

Raynaud's phenomenon is caused by episodic vasospasm and ischaemia of the extremities (especially the fingers and toes) in response to a fall in temperature (even taking a cold milk bottle out of the fridge or a cool wind on a hot beach (RSA 2012)) or an emotional stimulus.(Goundry 2012) This response results in a characteristic colour change in the extremities from white, to blue, to red. In about 89% of people, Raynaud's occurs in direct response to a stimulus and there is no known underlying cause. In the other 11%, it results from an underlying condition, most commonly a connective tissue disease such as systemic sclerosis, mixed connective tissue disease.(Goundry 2012)

Around 3-12.5% of men and 6-20% of women have reported symptoms of Raynaud's phenomenon in non-population based studies.(Fraenkel 2002) The prevalence varies widely across countries and populations, but is higher in colder climates. In women, it is often associated with a family history, oestrogen exposure, and emotional stress.(Fraenkel 2002) In men, smoking and hand arm vibration syndrome are more commonly implicated.(RSA 2012; Palmer 2000)

There are few conventional treatments on offer. Lifestyle modifications such as regular exercise and stopping smoking, and reducing exposure to triggers (e.g. cold, emotional stress) can help. Nifedipine is currently the only drug licensed in the UK for use in Raynaud's phenomenon, although other drugs are under investigation. Very rarely, surgery is indicated.

References

Fraenkel L. Raynaud's phenomenon: epidemiology and risk factors. Curr Rheumatol Rep 2002; 4: 123-8.

Goundry B et al. Diagnosis and management of Raynaud's phenomenon, BMJ 2012; 344: e289 doi: 10.1136/bmj.e289

Palmer K et al. Prevalence of Raynaud's phenomenon in Great Britain and its relation to hand transmitted vibration: a national postal survey. Occup Environ Med 2000; 57: 448-52.

Reynaud's and Scleroderma Association. Coping with Raynaud's. [online] Available: http://www.raynauds.org.uk/

How acupuncture can help

This Factsheet focuses on the evidence for acupuncture in the treatment of Raynaud's phenomenon. Overall, very little research has been published on the effects of acupuncture in patients with Raynaud's phenomenon. There are no systematic reviews looking specifically at acupuncture, but one that assessed the evidence of the

effectiveness of non-surgical symptomatic interventions in general concluded that more high-quality, well-designed trials are needed to assess the effects of acupuncture in Raynaud's phenomenon.(Huisstede 2011)

Two randomised trials have been published, with conflicting results. One found that a specific vasospasmolytic effect of acupuncture could not be proven.(Hahn 2004) The other found that traditional Chinese acupuncture may be a reasonable alternative treatment for patients with primary Raynaud's syndrome.(Appiah 1997). The contrasting outcomes may primarily be due to the different types of control groups employed. So-called placebo controls (as in Hahn 2004) are usually modified, and at least partially active, forms of acupuncture, making the results difficult to interpret.

An uncontrolled study found that auricular electroacupuncture appears to reduce symptoms by reducing the frequency and severity of attacks in primary Raynaud's phenomenon, but not to influence skin perfusion and skin temperature.(Schlager 2011)

In general, acupuncture is believed to stimulate the nervous system and cause the release of neurochemical messenger molecules. The resulting biochemical changes influence the body's homeostatic mechanisms, thus promoting physical and emotional well-being.

Research has shown that acupuncture treatment may specifically help to relieve the symptoms of Raynaud's by:

- Increasing local microcirculation (Komori 2009);
- Regulating endothelium-derived vasoconstrictors (endothelin-1) and vasodilators (calcitonin gene-related peptide, nitric oxide and nitric oxide synthase) (Wang 2011a; Wang 2011b; Pan 2010; Kim 2006);
- Reducing inflammation, by promoting release of vascular and immunomodulatory factors (Kavoussi 2007)
- Acting on areas of the brain known to reduce sensitivity to pain and stress, as well as promoting relaxation and deactivating the 'analytical' brain, which is responsible for anxiety and worry (Hui 2010; Hui 2009);
- Increasing the release of adenosine, which has antinociceptive properties (Goldman 2010).

About traditional acupuncture

Acupuncture is a tried and tested system of traditional medicine, which has been used in China and other eastern cultures for thousands of years to restore, promote and maintain good health. Its benefits are now widely acknowledged all over the world, and in the past decade traditional acupuncture has begun to feature more prominently in mainstream healthcare in the UK. In conjunction with needling, the practitioner may use techniques such as moxibustion, cupping, massage or electro-acupuncture. They may also suggest dietary or lifestyle changes.

Traditional acupuncture takes a holistic approach to health and regards illness as a sign that the body is out of balance. The exact pattern and degree of imbalance is unique to each individual. The traditional acupuncturist's skill lies in identifying the

precise nature of the underlying disharmony and selecting the most effective treatment. The choice of acupuncture points will be specific to each patient's needs. Traditional acupuncture can also be used as a preventive measure to strengthen the constitution and promote general wellbeing.

An increasing weight of evidence from Western scientific research (see overleaf) is demonstrating the effectiveness of acupuncture for treating a wide variety of conditions. From a biomedical viewpoint, acupuncture is believed to stimulate the nervous system, influencing the production of the body's communication substances - hormones and neurotransmitters. The resulting biochemical changes activate the body's self-regulating homeostatic systems, stimulating its natural healing abilities and promoting physical and emotional wellbeing.

About the British Acupuncture Council

With over 3000 members, the British Acupuncture Council (BAcC) is the UK's largest professional body for traditional acupuncturists. Membership of the BAcC guarantees excellence in training, safe practice and professional conduct. To find a qualified traditional acupuncturist, contact the BAcC on 020 8735 0400 or visit www.acupuncture.org.uk

ACUPUNCTURE AND RAYNAUD'S

The evidence

Research	Conclusion
Systematic reviews	
Huisstede BM et al. Effectiveness of interventions for secondary Raynaud's phenomenon: a systematic review. Arch Phys Med Rehabil 2011; 92: 1166-80.	A systematic review that evaluated the evidence of the effectiveness of nonsurgical symptomatic interventions to treat secondary Raynaud's phenomenon. In all, five reviews and 19 randomised controlled trials were included. One of the randomised controlled trial studied acupuncture, and the reviewers concluded that no clear favourable effects were found. They concluded that more high-quality, well-designed trials are needed to assess the effects of acupuncture in Raynaud's phenomenon.
Randomised controlled trials	
Hahn M et al. Is there a vasospasmolytic effect of acupuncture in patients with secondary Raynaud phenomenon? J Dtsch Dermatol Ges 2004; 2: 758-62.	A small double-blind randomised controlled trial that compared the effects of 'real' acupuncture with placebo acupuncture in patients with secondary Raynaud's phenomenon. Patients kept diaries of their symptoms and, while an improvement was detected in both groups, there was no significant effect on clinical symptoms recorded (average number of attacks daily before and after treatment: with 'real', 1.9 vs. 1.4 and, with placebo, 2.8 vs. 1.9; duration of attacks: with 'real', 15 vs. 12 and, with placebo, 31 vs. 16; not significant) or on skin microcirculation measured by local cold testing. The researchers concluded that a specific vasospasmolytic effect of acupuncture could not be proven.
Appiah R et al. Treatment of primary Raynaud's syndrome with traditional Chinese acupuncture. J Intern Med 1997; 241: 119-24.	A randomised controlled trial that assessed the effects of acupuncture vs. no acupuncture in 33 patients with primary Raynaud's syndrome. All the patients kept a diary throughout the observation period, noting daily frequency, duration and severity of their vasospastic attacks. A local cooling test combined with nailfold capillaroscopy was performed at baseline and in weeks 12 and 23, which recording flowstop reactions of the nailfold capillaries. The acupuncture-treated patients showed a significant decrease in the frequency of attacks from 1.4 to 0.6 daily ($p<0.01$), while there was a nonsignficant decrease in the control group from 1.6 to 1.2 ($p=0.08$). The overall reduction of attacks was 63% with acupuncture (vs. 27% in the control group, $p=0.03$). The mean duration of the capillary flowstop reaction decreased from 71 to 24 seconds (week 1 vs. week 12, $P = 0.001$) and 38 seconds (week 1 vs. week 23, $P = 0.02$), respectively with acupuncture. In the control group the changes were not significant. The researchers concluded that their findings suggest that traditional Chinese acupuncture is a reasonable alternative treatment for patients with primary Raynaud's syndrome.

Uncontrolled trial	
Schlager O et al. Auricular electroacupuncture reduces frequency and severity of Raynaud attacks. Wien Klin Wochenschr 2011; 123: 112-6.	A non-blinded uncontrolled trial that assessed the effects of auricular electroacupuncture (EA) on the symptoms in primary Raynaud's phenomenon (PRP) in 26 patients with the condition. After 3, 6 and 24 weeks, attack frequency and severity were re-evaluated using standardised questionnaires and a visual analogue scale (VAS). Skin temperature was assessed by infrared thermography and laser Doppler perfusion imaging was used to determine skin perfusion. Compared to baseline, there was a significant reduction in attack frequency at 3 ($p=0.001$) and 6 weeks ($p<0.001$). This improvement sustained after treatment was stopped (at 24 weeks; $p<0.001$). Furthermore, attack-associated pain was reduced at 3 ($p=0.003$), 6 ($p=0.003$) and 24 weeks ($p=0.001$) of treatment, while skin temperature and skin perfusion did not change significantly throughout the study period. The researchers concluded that auricular electroacupuncture appears to reduce symptoms by reducing the frequency and severity of attacks in primary Raynaud's phenomenon, but does not seem to influence on skin perfusion and skin temperature.
Possible mechanisms of acupuncture	
Wang L et al. Effects of reinforcing and reducing methods by twirling and rotating the needle on contents of CGRP and NO in rats with stress-induced hypertension [Article in Chinese]. Zhongguo Zhen Jiu 2011a; 31: 337-41.	A randomised controlled animal study that found acupuncture increased the contents of calcitonin gene-related peptide (CGRP) and nitric oxide (NO) in rats with stress-induced hypertension, thereby causing a fall in blood pressure.
Wang JY et al. Effect of moderate acupuncture-stimulation of "Taichong" (LR 3) on blood pressure and plasma endothelin-1 levels in spontaneous hypertension rats [Article in Chinese]. Zhen Ci Yan Jiu 2011b; 36: 36-9.	A randomised controlled animal study that found moderate-stimulation of Liv 3 can lower blood pressure and plasma endothelin (ET-1) levels in rats with spontaneous hypertension. The reduced level of plasma ET-1 may be one of its mechanisms underlying improving hypertension.
Pan P et al. Effects of electro-acupuncture on endothelium-derived endothelin-1 and endothelial nitric oxide synthase of rats with hypoxia-induced pulmonary hypertension. Exp Biol Med 2010; 235: 642-8.	An animal study that investigated whether electro-acupuncture on bladder-13 and -15 points can protect against chronic hypoxia-induced pulmonary hypertension (PH) by regulating endothelium-derived endothelin (ET)-1 and endothelial nitric oxide synthase (eNOS). The results indicated that treatment with electro-acupuncture could protect against hypoxia-induced PH, possibly by regulating the balance of endothelium-derived vasoconstrictors and vasodilators.
Goldman N et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. Nat Neurosci 2010; May 30.	A study showing that the neuromodulator adenosine, which has anti-nociceptive properties, was released during acupuncture in mice, and that its anti-nociceptive actions required adenosine A1 receptor expression. Direct injection of an adenosine A1 receptor agonist replicated the analgesic effect of acupuncture. Inhibition of enzymes involved in adenosine degradation potentiated the acupuncture-elicited increase in adenosine, as well as its anti-

	nociceptive effect. The researchers concluded that their observations indicate that adenosine mediates the effects of acupuncture and that interfering with adenosine metabolism may prolong the clinical benefit of acupuncture.
Hui KK et al. Acupuncture, the limbic system, and the anticorrelated networks of the brain. Auton Neurosci 2010; 157: 81-90.	Studies have shown that acupuncture stimulation, when associated with sensations comprising deqi, evokes deactivation of a limbic-paralimbic-neocortical network, as well as activation of somatosensory brain regions. These networks closely match the default mode network and the anti-correlated task-positive network. The effect of acupuncture on the brain is integrated at multiple levels, down to the brainstem and cerebellum and appears to go beyond either simple placebo or somatosensory needling effects. Needling needs to be done carefully, as very strong or painful sensations can attenuate or even reverse the desired effects. Their results suggest that acupuncture mobilises the functionally anti-correlated networks of the brain to mediate its actions, and that the effect is dependent on the psychophysical response. They discuss potential clinical application to disease states including chronic pain, major depression, schizophrenia, autism, and Alzheimer's disease.
Hui K.K.-S. The salient characteristics of the central effects of acupuncture needling: limbic-paralimbic-neocortical network modulation. Human Brain Mapping 2009; 30: 1196-206.	This study assessed the results of fMRI on 10 healthy adults during manual acupuncture at 3 acupuncture points and a sham point on the dorsum of the foot. Although certain differences were seen between real and sham points, the hemodynamic and psychophysical responses were generally similar for all 4 points. Acupuncture produced extensive deactivation of the limbic-paralimbic-neocortical system. Clusters of deactivated regions were seen in the medial prefrontal cortex, the temporal lobe and the posterior medial cortex. The sensorimotor cortices, thalamus and occasional paralimbic structures such as the insula and anterior middle cingulate cortex showed activation. The researchers concluded that their results provided additional evidence that acupuncture modulates the limbic-paralimbic-neocortical network. They hypothesised that acupuncture may mediate its analgesic, anti-anxiety, and other therapeutic effects via this intrinsic neural circuit that plays a central role in the affective and cognitive dimensions of pain.
Komori M et al. Microcirculatory responses to acupuncture stimulation and phototherapy. *Anesth Analg* 2009; 108: 635-40.	Experimental study on rabbits in which acupuncture stimulation was directly observed to increase diameter and blood flow velocity of peripheral arterioles, enhancing local microcirculation.
Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. Integr Cancer Ther 2007; 6: 251-7.	Review article that suggests the anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.
Kim DD et al. Acupuncture reduces experimental renovascular hypertension through mechanisms involving nitric oxide synthases. Microcirculation 2006;	An animal study that found electroacupuncture on St 36 in a hamster model reduced blood pressure by activating nitric oxide synthase signalling mechanisms.

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